

**SUBJECT CATEGORIES  
AND SCOPE DESCRIPTIONS  
(INIS/ETDE)**

INTERNATIONAL ATOMIC ENERGY AGENCY  
VIENNA, JUNE 2000

## PREFACE

This document is one in a series of publications known as the **INIS Reference Series**. It defines the subject categories and provides the scope descriptions to be used for categorization of the nuclear literature for the preparation of INIS input by national and regional centres. Together with the other volumes of the INIS Reference Series it defines the rules, standards and practices and provides the authorities to be used in the International Nuclear Information System. A complete list of the volumes published in the INIS Reference Series may be found on the inside front cover of this publication.

At the 27<sup>th</sup> Consultative Meeting of INIS Liaison Officers (Vienna, Austria, 25-27 May 1999), it was recommended to adopt a simplified subject category scheme, common to the INIS and ETDE databases, which was prepared by a joint INIS/ETDE working group. The corresponding scope descriptions prepared by the same working group were endorsed by the 5<sup>th</sup> INIS/ETDE Joint Technical Committee meeting, Knoxville, TN, USA, 28-29 October 1999.

This simplified categorization scheme contains 45 one-level broad subject categories from which 42 only are within INIS subject scope. These categories have three-character alphanumeric codes.

The scope descriptions are given for both INIS and ETDE on opposite pages.

Special note should be made of the fact that the overall subject scope of INIS has not been affected by the adoption of the simplified categorization scheme.

The secretariat wishes to acknowledge the assistance, comments and suggestions received from national INIS centres in the preparation of the new revision of the present document and continues to invite comments and criticism, which should be sent to:

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## INTRODUCTION

This INIS Reference Series document is intended to serve two purposes:

- to define the subject scope of the International Nuclear Information System (INIS)
- to define the subject classification scheme of INIS.

It is thus the guide to the INIS inputting centres in determining which items of literature should be reported to INIS, and in determining where the full bibliographic entry and abstract of each item should be included in INIS database.

Each category is identified by a category code consisting of three alphanumeric characters.

A scope description is given for each subject category. The scope of INIS is the sum of the scopes of all the categories. It should be noted that **three** categories from the common scheme, namely **S32** (ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION), **S33** (ADVANCED PROPULSION SYSTEMS), and **S47** (OTHER INSTRUMENTATION) **are not within INIS subject scope**.

With most categories cross references are provided to other categories where appropriate. Cross references should be of assistance in finding the appropriate category; in fact, by indicating topics that are excluded from the category in question, the cross references help to clarify and define the scope of the category to which they are appended.

A Subject Index is included as an aid to subject classifiers, but it is only an **aid and not a means** for subject classification. It facilitates the use of this document, but is no substitute for the description of the scope of the subject categories. Index-based subject categorization is likely to be wrong and must be avoided.

Subject classifiers, who are expected to be subject specialists at INIS inputting centres, are requested to identify the significant topics of each item of literature and to report the item only if it contains significant information that falls within the subject scope of INIS. The main topic (from the "nuclear science" point of view for INIS) is the basis for determining the primary subject category. The *INIS: Guide to Bibliographic Description (IAEA-INIS-1)* requires the assignment of a primary subject category to each INIS record (in Tag 008). The primary category should be the one for which the scope description encompasses the main INIS topic discussed in the piece of literature. If there are significant secondary topics discussed in the piece of literature that fall within the scope description of a category or categories other than the one relevant to the main topics of the paper, INIS rules permit the assignment of one or more **secondary categories** for the piece of literature. Furthermore, in order to create subsets of the database containing references to literature that might be useful in a particular area, it has been found advantageous in certain cases to additionally assign a secondary category to indicate the field of application or area of usefulness of the information contained in the piece of literature. This is also permitted under INIS rules. Although their number is not limited, **more than one or two secondary categories rarely should be needed**.





## INIS Scope Descriptions

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### **S01 COAL, LIGNITE, AND PEAT**

*Environmental aspects* of developing, transporting and using coal, coal products, lignite and peat for energy production, including studies on animal life, plant life, cultural resources of the affected area, land, air, surface water and groundwater pollution, site revegetation and overall effects

*Economic aspects*, such as supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand, economics of power plants fueled by coal, lignite, peat and gas from coal gasification, economic aspects of accidents

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### **S02 PETROLEUM**

*Environmental aspects* of the various steps in drilling, production, refining, transporting and using petroleum and petroleum products for energy production, including oil spills and studies on animal life, plant life, cultural resources of the affected area, land, air, surface water and groundwater pollution, site revegetation and overall effects

*Economic aspects*, such as supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand, economics of power plants fueled by petroleum, economic aspects of accidents

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### **S03 NATURAL GAS**

*Environmental aspects* of the various steps in drilling, production, processing, transporting and using natural gas, including liquefied natural gas (LNG), for energy production, production, transport, storage of LNG and LNG spills, including studies on animal life, plant life, cultural resources of the affected area, land, air, surface water and groundwater pollution, site revegetation and overall effects

*Economic aspects*, such as supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand, economics of power plants fueled by natural gas, economic aspects of accidents

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### **S04 OIL SHALES AND TAR SANDS**

*Environmental aspects* of developing, transporting and using oil shales and tar sands for energy production, including studies on animal life, plant life, cultural resources of the affected area, land, air, surface water and groundwater pollution, site revegetation and overall effects of disposal of spent shales, tar sand tailings, etc.

*Economic aspects*, such as supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand, economics of power plants using these energy sources, economic aspects of accidents

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## ETDE Scope Descriptions

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### **S01 COAL, LIGNITE, AND PEAT**

Includes all topics in the field of coal and coal products, including lignite and peat, such as reserves, geology and exploration; mining; preparation; processing; products and by-products; properties and composition; combustion; transport, handling and storage; waste management; environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

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### **S02 PETROLEUM**

Includes all topics in the field of petroleum, such as reserves, geology, and exploration; drilling and production; processing; products and by-products; properties and composition; combustion; transport, handling, and storage; waste management; environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

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### **S03 NATURAL GAS**

Includes all topics in the field of natural gas including liquified natural gas, such as reserves, geology, and exploration; drilling, production, and processing; products and by-products (e.g.. LPG); properties and composition; combustion; transport, handling, and storage; waste management; environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

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### **S04 OIL SHALES AND TAR SANDS**

Includes all topics in the field of oil shales and tar sands, such as reserves, geology, and exploration; drilling, fracturing, and mining; oil production, recovery, and refining; products and by-products; properties and composition; combustion; transport, handling, and storage; waste management, environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

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## INIS Scope Descriptions

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### S07 ISOTOPES AND RADIATION SOURCES

**Isotope production, separation and enrichment:** industrial methods of production, enrichment and separation of stable and radioactive isotopes (other than the isotopes of uranium), including the design, construction, operation, maintenance and safety aspects of facilities and equipment, industrial production of tritium, commercial radioisotope generators

**Isotopic radiation sources:** design, construction, operation and safety aspects of isotopic radiation sources such as neutron sources, gamma sources, etc., including *isotopic power supplies*, isotopic X-ray sources and associated facilities, regardless of their application, radiation source metrology, including activity measurement of radiation sources, calculation and measurement of dose distribution from radiation sources, radiation source standardization and calibration, standard sources, and units for radiation and activity measurements

**Production of heavy water:** industrial processes for the separation of deuterium from hydrogen including the design, construction, operation, maintenance and safety aspects of facilities and equipment

**Industrial applications** of radiation, accelerated particles, radioisotopes and fission products for measurement and control, radiation processing, including calculation and measurement of absorbed doses, radiation treatment of agricultural and biological wastes

**Advances in tracer technique** (with radioactive or stable isotopes) when no specific application is indicated

**Environmental aspects** of the use of isotopes and radiation sources and their associated facilities and equipment, including selection criteria and suitability studies for siting, environmental implications resulting from generation, on-site treatment and release of radioactive, chemical and thermal effluents, environmental consequences predicted from the analysis of design basis or hypothetical accidents, and of performance of safety systems, including those involving handling and transport of radioactive materials

**Economic aspects** of production and utilization of radioactive and stable isotopes and other radiation sources in power production, radiometric industrial applications, radiation processing and tracer techniques, economics of heavy water production (e.g. supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits)

**Legal and regulatory aspects**, including licensing procedures and inspection, for production, handling, operation, trade, transfer and supply of radioisotopes and radiation sources, legislation for national or international transport of radioactive materials or radiation sources by any means, and of accident prevention

For:	- basic physical chemistry of stable isotope exchange and separation - chemical separation of radioisotopes, or preparation of radioactive materials in non-industrial quantities	use S37  use
S38	- chemistry of fission fuels in connection with their processing or reprocessing, or separation of plutonium and uranium-233 in connection with fuel reprocessing, or industrial separation of uranium isotopes, or separation of stable elements in connection with fuel reprocessing - non-isotopic radiation sources	use S11 see S71 or category for application use S22
S43	- isotope production reactors or chemonuclear irradiation reactors - accelerators and accelerator experimental facilities as radiation sources	use use
	- fission reactors as radiation sources - neutron generators - personnel dosimetry and monitoring - power production in fusion reactors - power production in fission reactors - direct energy conversion - nuclear techniques for testing materials - radiometric gauges - analytical applications of activation analysis - radiation processing in vaccine production, or radiation processing of food, or radiation sterilization in medicine - legal aspects concerning radioactive materials	see S21, S22 use S43 use S61 use S70 use S21 use S30 use S42 use S46 use S37  use S60 see also S11, S12, S98

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## ETDE Scope Descriptions

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### **S07 ISOTOPES AND RADIATION SOURCES**

Includes all topics in the field of isotope and radiation source technology, such as physical isotope separation (e.g. for heavy water production); radiation sources (design, fabrication, operation; industrial applications, advances in tracers and tracer techniques, metrology), isotopic power supplies; economic, industrial, and business aspects; health and safety; environmental aspects; regulation and licensing. All industrial methods of production, enrichment and separation of stable and radioactive isotopes are included (except industrial methods in connection with fuel reprocessing)

## INIS Scope Descriptions

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### **S08 HYDROGEN**

*Environmental aspects* of developing, transporting and using hydrogen as a fuel.

*Economic aspects*, such as supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand; economics of power plants using hydrogen, economic aspects of accidents

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### **S09 BIOMASS FUELS**

*Environmental aspects* of developing, transporting and using energy crops and wastes directly as fuels (e.g., wood, straw, municipal wastes), fuels derived from energy crops and wastes (e.g., methane, ethanol), biogas from sanitary landfills, including pollution arising from any part of the biofuels cycle and land impoverishment caused by intensive monoculture for energy crops

*Economic aspects*, such as supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors taxes and tax credits, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand, economics of power plants using biomass fuels, economic aspects of accidents

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### **S10 SYNTHETIC FUELS**

*Environmental aspects* of developing, transporting and using fuels produced by chemical synthesis, such as inorganic hydrogen compound fuels, town gas, etc.

*Economic aspects*, such as supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand, economics of power plants using these energy sources, economic aspects of accidents

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## ETDE Scope Descriptions

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### **S08 HYDROGEN**

Includes all topics in the field of hydrogen, such as production; properties and composition; combustion; storage, transport, and handling; products and by-products; waste management; environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

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### **S09 BIOMASS FUELS**

Includes all topics in the field of biomass fuels (e.g. crops and wastes used directly as fuels, as e.g., wood, straw, municipal wastes or indirectly used as fuels, such as biogas from sanitary landfills). Aspects include resources; production; processing; products and by-products; properties and composition; combustion; storage, transport and handling; waste management; environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

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### **S10 SYNTHETIC FUELS**

Includes all fuels produced by chemical synthesis, e.g., inorganic hydrogen compound fuels, town gas, etc. Aspects include production; properties and composition; combustion; products and by-products; storage, transport and handling; waste management; environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

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## INIS Scope Descriptions

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### S11 NUCLEAR FUEL CYCLE AND FUEL MATERIALS

**Fission fuels processing:** chemical and physico-chemical processing of ores, seawater or groundwater for recovery of uranium or thorium, including all extraction, conversion, reduction steps, analytical control, and plant and process design, performance, operation and safety aspects

**Spent fuels reprocessing:** reactor fuel reprocessing, including analytical control, chemical separation of stable or radioactive elements, solvent studies, and plant and process design, performance, operation and safety aspects

**Production of enriched uranium:** design, construction, operation, maintenance, and safety aspects of facilities and equipment, processes for industrial separation of uranium isotopes, such as gaseous diffusion, ultracentrifugation, laser separation, etc.

**Uranium and thorium ores:** petrogenesis, mineralogy, reserves and resources, prospecting, mining and mechanical processing, including methods, equipment and technical aspects of safety; reserves, resources, and prospecting for uranium and thorium recovery from seawater and groundwater

**Environmental aspects** of various steps in nuclear fuels cycle, including selection criteria and suitability studies for siting of fission fuel cycle facilities, environmental impact theoretical studies under normal operating conditions for fission fuel cycle installations, environmental implications resulting from generation, on-site treatment and release of radioactive, chemical and thermal effluents from fission fuel cycle facilities under both normal operation and accident conditions, environmental consequences predicted from the analysis of design basis or hypothetical accidents, and of performance of safety systems, including those involving handling and transport of radioactive materials, other environmental impacts of fission fuel cycle facilities (e.g. infrastructure, noise, aesthetics, landscaping)

**Nuclear fuel cycle economics:** supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, cost categories of uranium resources, economics of prospecting, mining and conversion of uranium and thorium ores, economics of uranium enrichment, economics of plutonium recycling, economics of transport and reprocessing of irradiated fuel, economics of multifuel systems involving breeders and converters, forecasts of fission fuel requirements, fabrication costs of fission fuel elements, economics of uranium and thorium recovery from waters, economic aspects of nuclear accidents

**Legal and regulatory aspects,** including licensing procedures and inspection, for production, handling, operation, trade, transfer and supply of nuclear fuels and installations and equipment for nuclear fuel cycle facilities, siting, construction, operation and decommissioning of nuclear fuel cycle installations, legal aspects of national or international transport of radioactive materials by any means, and of accident prevention

For:	- structure analysis of fuels	use S36
	- seismological, geological, hydrological, meteorological and climatic studies of sites for fission fuel processing or reprocessing plants	use
S58	- industrial separation of uranium isotopes	use S07
	- radioactive waste treatment and disposal	use S12
	- transport and interim storage of radioactive materials	use S42
	- safeguards and inspection, including legal aspects	use S98
	- nuclear instrumentation	use S46
	- treatment and disposal of tailings from mining and mechanical, or chemical processing of ores	use S12
	- engineering aspects of fuel (pellets, elements, assemblies) fabrication or reprocessing, and fuel fabrication or reprocessing plants, including decommissioning and dismantling	use S22
	- separation chemistry (analytical) of uranium	use S37
	- chemical separation of uranium isotopes (other than analytical applications and industrial methods), or chemical properties of uranium	use S38
S36	- structure, phase studies or physical properties of uranium	use

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## ETDE Scope Descriptions

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### **S11 NUCLEAR FUEL CYCLE AND FUEL MATERIALS**

Includes all information on the nuclear fuel cycle, except for fuel element design and assembly (see S22) and except waste management (see S12). It includes reserves, exploration, and mining (e.g. uranium and thorium ores); feed processing; uranium enrichment; fuels production and properties; spent fuels reprocessing; transport, handling, and storage; environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

## INIS Scope Descriptions

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### S12 MANAGEMENT OF RADIOACTIVE WASTES, AND NON-RADIOACTIVE WASTES FROM NUCLEAR FACILITIES

**Waste treatment:** processing of radioactive wastes, including transmutation technology, processing of non-radioactive wastes generated by nuclear facilities, radioactive waste treatment plants, structures and equipment, tritium processing, containment and recovery, technical aspects of safety

**Waste disposal:** ultimate storage and disposal of radioactive wastes, disposal of non-radioactive wastes generated by nuclear facilities, structures and equipment used in connection with waste disposal, technical aspects of safety

**Legal aspects** of waste treatment, of temporary or ultimate storage and disposal of radioactive wastes, including licensing and inspection, of national or international transport of radioactive waste materials by any means, and of accident prevention

For:	- environmental aspects of radioactive, chemical or thermal effluents	see S07, S11, S21
	- studies of materials used for immobilization of radioactive wastes	use S36
	- seismological, geological, hydrological, meteorological and climatic studies of waste treatment plant sites and of waste disposal sites	use
S58	- environmental consequences of design basis or hypothetical accidents, or environmental aspects of siting, or economic evaluations, or spent fuel reprocessing	use S11 use S29
	- nuclear controversy	see also S07, S11, S98
	- legal aspects concerning radioactive materials	use S43 use S73
	- accelerators used for waste processing	use S43
	- nuclear reactions used for transmutation	use S73
	- interim storage of radioactive materials, including reactor fuels	use
S42	- radioactive contamination of soils, waters or atmosphere	use
S54	- radioactive contamination of man, animals, plants and microorganisms	use
S63	- radioactive contamination of food	use S60

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## ETDE Scope Descriptions

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### **S12 MANAGEMENT OF RADIOACTIVE WASTES, AND NON-RADIOACTIVE WASTES FROM NUCLEAR FACILITIES**

Includes the treatment, disposal, transport, storage, safety and legal aspects of radioactive wastes and spent fuels (for reprocessing of spent fuels see S11). Includes processing, disposal, interim or ultimate storage of radioactive wastes, including transmutation technology; processing and disposal of non-radioactive wastes generated by nuclear facilities; radioactive waste treatment plants, structures and equipment; tritium processing, containment and recovery.

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## INIS Scope Descriptions

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### S13 HYDRO ENERGY

*Environmental aspects* of developing and using hydroelectric power plants utilizing both dammed streams and undammed, free-flowing streams and ocean currents, including fish-passage facilities, land use, studies on animal and plant life, and cultural resources of the affected area

*Economic aspects*, such as supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand, economics of power plants using hydro energy, economic aspects of accidents

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### S14 SOLAR ENERGY

*Environmental aspects* of developing and using solar energy, including land use, pollution and resource problems associated with the large-scale production of equipment for the utilization of solar energy, studies on animal and plant life, and cultural resources of the affected area

*Economic aspects*, such as supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand, economics of power plants using solar energy, economic aspects of accidents

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### S15 GEOTHERMAL ENERGY

*Environmental aspects* of developing and using geothermal energy, including ground subsidence, noise, earthquakes, uncontrolled blowouts, gaseous emissions and surface water and groundwater effects, studies on animal and plant life, and cultural resources of the affected area

*Economic aspects*, such as supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand, economics of power plants using geothermal energy, economic aspects of accidents

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### S16 TIDAL AND WAVE POWER

*Environmental aspects* of developing and using tidal and wave power, including site environmental studies and environmental impact studies in the construction and operation of tidal power plants

*Economic aspects*, such as supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand, economics of power plants using tidal and wave power, economic aspects of accidents

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### S17 WIND ENERGY

*Environmental aspects* of developing and using wind energy, including effects of wind turbines on the environment (e.g. noise and the effects of site construction)

*Economic aspects*, such as supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand, economics of power plants using wind energy, economic aspects of accidents

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## ETDE Scope Descriptions

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### **S13 HYDRO ENERGY**

Includes all aspects of hydroelectric power plants, such as retrofitting existing dams for power, hydroelectric-dam safety and environmental studies, and generating equipment. Also includes the extraction of energy from the Florida Current, Gulf Stream, or undammed, free-flowing streams. Aspects include resources and availability; site geology and meteorology; plant design and operation; power-conversion systems; environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects

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### **S14 SOLAR ENERGY**

Includes conversion of solar radiation to useful amounts of electric energy, use of solar energy for heating and cooling, or any other use of solar energy that might contribute to the total energy budget. All technical aspects of the design, research and development, manufacture, testing, and operation of solar cells and solar collectors are included along with photovoltaic power systems, solar thermal power systems, ocean energy systems and solar thermal utilization (space heating and cooling; water heating; agricultural and industrial process heat for e.g. crop drying, food dehydration). Also includes materials with indicated utility in solar cells or solar converters. Aspects include resources and availability; environmental aspects; solar energy conversion (photovoltaic, thermionic, thermoelectric, photochemical, photobiological and thermochemical conversion); heat storage; health and safety; legislation and regulations economic, industrial, and business aspects.

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### **S15 GEOTHERMAL ENERGY**

Includes all aspects of geothermal resources, such as availability; geology and hydrology of geothermal systems; geothermal exploration and exploration technology; products and by-products; geothermal power plants and components; geothermal engineering (drilling technology, well hardware, fluid transmission; corrosion, scaling, and materials development; geothermal reservoir and well performance; control systems; reservoir stimulation and extraction technology); direct energy utilization; geothermal data and theory (properties of aqueous solutions, minerals and rocks; rock-water-gas interactions; isotope and trace element studies); waste management; environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects;

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### **S16 TIDAL AND WAVE POWER**

Includes all aspects of tidal and wave power, such as resources and availability (site characteristics); tidal power plants and power conversion systems; wave energy converters; environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

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### **S17 WIND ENERGY**

Includes all aspects of wind energy, such as resources and availability (climatology and site characteristics); wind energy engineering including applications, turbine design and operation, power-conversion systems; environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

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## INIS Scope Descriptions

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### **S20 FOSSIL-FUELED POWER PLANTS**

*Environmental aspects* of using fossil fuels for power and heat generation, if the type of fossil fuel is not specified

*Economic aspects*, such as information on companies and organizations, labour factors, market trends, prices, forecasts, statistical information, R & D expenditures, economic aspects of accidents, if the type of fossil fuel is not specified

For: - environmental or economic aspects of power plants using  
specific fossil fuels

see S01-S04

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## ETDE Scope Descriptions

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### **S20 FOSSIL-FUELED POWER PLANTS**

Routine aspects of power plant hardware use are not included, but new designs, developments, and technologies are appropriate. Includes design, operation and performance of fossil-fueled power plants and power generation (e.g. cooling and heat transfer equipment; power cycles; waste-fueled systems; components, heat utilization such as combined heat and power plants (cogeneration), off-peak energy storage); waste management (on-site equipment and processes for the control of emissions and effluents; processing, disposal and management of waste fuel products such as fly ashes; environmental protection measures); environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

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## INIS Scope Descriptions

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### S21 SPECIFIC NUCLEAR REACTORS AND ASSOCIATED PLANTS

*Note: This category must be assigned to the relevant literature if the reactor type is specified.*

Design, construction, performance, operation, accidents, decommissioning and dismantling of specific reactors (e.g. **BWR-**, **PWR-**, **PHWR-**, **WWER-**, **GCR-**, **AGR-**, **HTGR-**, **LMFBR-types**) and reactor plants as energy sources for electricity and heat generation; **research reactors**, including **experimental reactors**, **zero-power reactors** and **subcritical assemblies**, **test**, **training**, **production** (of fissionable materials, tritium, other isotopes), **irradiation** (such as **chemonuclear reactors**), **materials testing**, and **materials processing reactors**; other applications, including **mobile**, **propulsion**, **package**, and **transportable reactors**.

**Environmental aspects** of fission power reactors, including selection criteria, suitability studies and environmental impact theoretical studies under normal operating conditions for siting fission reactors, environmental implications for ecosystems resulting from generation, on-site treatment and release of radioactive substances, chemical, and thermal effluents from fission reactors, under both normal operation and accident conditions, other environmental impacts (e.g., infrastructure, noise, aesthetics, landscaping) of fission reactors, environmental consequences predicted from the analysis of design basis or hypothetical accidents and performance of safety systems for fission reactors, including those involving handling and transport of radioactive materials

**Economic aspects** of fission power reactors, including supply and demand, consumption, trade and restraints to trade, prices, market trends, forecasts, R & D expenditures, labour factors, taxes and tax credits, economic comparison of fission reactors with alternative power sources or of different reactor types, fission nuclear power growth, comparative studies of energy consumption, energy sources and their future trends; financing of fission nuclear power; methodology of comparative analysis of fission nuclear energy and other energy costs, general economic planning of fission nuclear power and its integration into regional power supply systems, impacts of policy and energy costs on households, regions, countries, impact of weather on supply and demand, economic aspects of nuclear accidents

**Legal aspects**, including licensing and inspection, of siting, construction, operation and decommissioning of nuclear reactors, trade, transfer and supply of nuclear reactors and equipment, navigation and accident prevention for nuclear ships and other nuclear means of conveyance

(for **accidents** or **incidents** at nuclear facilities see the **International Nuclear Event Scale** in **Appendix 2**)

For:	- seismological, geological, hydrological, meteorological and climatic studies of nuclear reactor sites	use S58
	- environmental aspects of radioactive, chemical or thermal effluents from other nuclear facilities	see S07, S11
	- nuclear controversy	use S29
	- chemical and physico-chemical fuel processing or spent fuel reprocessing	use S11
	- reactor fuels where no reactor type is specified	use S22
	- control systems where no reactor type is specified	use S22
	- overall fission fuel cycle economics	use S11
	- legal aspects	see
also S11, S22, S29,		
	- economic aspects	S61 see also S11, S29

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## ETDE Scope Descriptions

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### **S21 SPECIFIC NUCLEAR REACTORS AND ASSOCIATED PLANTS**

*Note: This category must be assigned to the relevant literature if the reactor type is specified.*

Includes the design, construction, performance, operation, accidents, decommissioning and dismantling of specific reactors (e.g. BWR-, PWR-, PHWR-, WWER-, GCR-, AGR-, HTGR-, LMFBR-types) and reactor plants as energy sources for electricity and heat generation; research reactors (including experimental reactors, zero-power reactors, and subcritical assemblies), test, training, production (of fissionable materials, tritium, other isotopes), irradiation (such as chemonuclear reactors), materials testing, and materials processing reactors; and other applications (includes mobile, propulsion, package, and transportable reactors).

All environmental, economic, legal and reactor safety aspects are included.

(In the case of reactor accidents, please see Appendix 2 for the International Nuclear Event Scale).

## INIS Scope Descriptions

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### S22 GENERAL STUDIES OF NUCLEAR REACTORS

*Note: This category must be assigned to the relevant literature if **no** reactor type is specified.*

**Reactor theory and calculation**, including in-pile experiments verifying reactor theory and calculations, and computation of in-reactor processes

**Reactor components and accessories**, including the design, construction, fabrication, performance (e.g., mechanical integrity, structural analysis, reliability, fracture mechanics), and safety aspects of reactor components and accessories (e.g., cooling systems, coolants, shielding, pressure vessels, loading machines), methods and equipment for in-service (recurring) inspection of reactors or reactor components and accessories

**Reactor fuels**, including the design, fabrication and performance of fuel pellets, fuel elements and fuel assemblies, fuel-loading procedures, fuel fabrication plants (regardless of type of fuel elements produced), including technical aspects of safety, decommissioning and dismantling

**Reactor control systems**, including systems for alarm and automatic shutdown and the automatic initiation of protective systems or actions, elements of reactor and reactor plants control system such as drive units, control rods and incorporated instruments, reactor and reactor plants control by on-line computers, man-machine communication problems in reactor control

**Liability for nuclear damage**: legal aspects of nuclear damage and risk, operator's liability, state responsibility, absolute liability, limited liability, financial security for nuclear risks, insurance for third party liability, insurance for damage to a nuclear installation, insurance for damage by a means of transport, workers' compensation schemes

For:	- physics and calculation of specific types of reactors	use S21
	- fundamental studies of neutrons in macroscopic systems	use
S73	- fuel elements and assemblies	see also S21
	- fission reactors of specific type	use S21
	- preparation and fabrication of materials	use S36
	- radiation effects on chemical behaviour of materials	use S38
	- radiation effects on the physical behaviour of materials	use S36
	- spent fuel processing	use S11
	- uranium and thorium ores, and chemical or physico-chemical processing of uranium and thorium ores, seawater and groundwater for recovery of uranium or thorium	use S11
	- fuel-handling equipment	use S42
	- fuel-loading machines	see also S21
	- detailed fuel burnup calculations in specific environments	use S21
	- fission fuel cycle economics	use S11
	- chemical analysis of spent reactor fuels for burnup determinations	use S37
	- interim storage of spent fuel elements	use S42
	- legal aspects	see also S21
	- reactor accidents	see also S21
	- radiation protection procedures	use S61

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## ETDE Scope Descriptions

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### **S22 GENERAL STUDIES OF NUCLEAR REACTORS**

*Note: This category must be assigned to the relevant literature if no reactor type is specified.*

Covers general studies of nuclear reactors, such as reactor theory, reactor physics calculations, reactor components and accessories, reactor fuels, reactor safety aspects, reactor control systems and liability for nuclear damage.

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## INIS Scope Descriptions

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### S24 POWER TRANSMISSION AND DISTRIBUTION

*Environmental aspects:* effects of high-voltage electric fields, polychlorinated biphenyles (PCB) leakage from transformers, ecological disruptions during transmission line construction, etc.

*Economic aspects,* such as information on companies and organizations, labour factors, market trends, statistical information on consumption, supply and demand, imports, exports, price trends, forecasts, R & D expenditures

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### S25 ENERGY STORAGE

*Environmental aspects:* environmental implications of the methods, such as mechanical, chemical, electromagnetic, thermal, etc., and devices, such as capacitor banks, flywheels, batteries, pumped water, etc., used for storage of energy

*Economic aspects,* such as information on companies and organizations, labour factors, market trends, prices, forecasts, statistical information, R & D expenditures of different methods, such as mechanical, chemical, electromagnetic, thermal or pumped storage and devices, such as capacitor banks, flywheels, batteries, etc., used for storage of energy

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### S29 ENERGY PLANNING, POLICY AND ECONOMY

General economic, political, environmental, legal, and sociological aspects of energy planning and policy, energy analysis and modeling (only non-technical documents), including nuclear controversy, public relations aspects of nuclear energy, and social impact of nuclear accidents

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### S30 DIRECT ENERGY CONVERSION

*Methods and devices for direct conversion* (without intermediate conversion into mechanical work) *of actual or simulated nuclear energy* (thermal energy and the energy of particles and radiation) into electrical energy, such as magnetohydrodynamic energy conversion and MHD generators, electrohydrodynamic energy conversion and EHD generators, thermoelectric generators, thermionic converters, fuel cells, other convertors (e.g. piezoelectric, ferroelectric, magnetothermoelectric, photoelectromagnetic or magnetorestrictive)

*Note: solar cells are excluded*

For:	- power conversion systems in fusion plant technology	use S70
	- applications of radioisotopes and fission products in power production	use
S07	- MHD phenomena in plasmas	use S70

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## ETDE Scope Descriptions

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### **S24 POWER TRANSMISSION AND DISTRIBUTION**

Includes the design, development, and new technologies of power systems and power transmission from any source. Hardware includes transformers, switchgear, converters, and cables. Aspects include power systems; power systems networks, transmission, and distribution; power transmission lines and cables; environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

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### **S25 ENERGY STORAGE**

Covers methods for storing energy in a readily recoverable form for later use. Such methods may be mechanical, chemical, electromagnetic, or thermal. Aspects include energy storage by compressed and liquefied gas; capacitor banks; flywheels or magnetic, thermal and chemical storage or batteries (design, development, materials, components and auxiliaries). Includes all environmental aspects; health and safety; legislation and regulations; economic, industrial, and business aspects.

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### **S29 ENERGY PLANNING, POLICY AND ECONOMY**

Contains general aspects of energy planning, policy, and policy analysis (only non-technical documents). Includes planning and policy aspects of electric power and its generation; energy storage and transport (e.g. by pipelines); energy consumption, utilization, and conservation; district heating and cooling; and specific energy sources such as fossil fuels, synthetic fuels, nuclear energy, and unconventional energy sources (wind, tides, geothermal energy, etc.). Also includes sociology and economics of energy production and use, such as supply and demand, cost comparisons, and environmental, health, and safety aspects. Also includes broad, generally applicable articles on total energy systems, energy management, energy analysis and modeling, legislation and regulations, and the research, development, demonstration, and commercialization policies of governments and private institutions.

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### **S30 DIRECT ENERGY CONVERSION**

Includes methods and devices for converting heat or other forms of energy into electrical energy without intermediate conversion into mechanical work. Aspects include MHD generators; EHD generators; thermoelectric generators; thermionic converters; fuel cells; other converters (e.g. piezoelectric, ferroelectric, magnetothermoelectric, photoelectromagnetic or magnetorestrictive conversion). For direct energy converters used in fusion technology see S70.

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**INIS Scope Descriptions**

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S32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION

**NOT WITHIN INIS SCOPE**

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S33 ADVANCED PROPULSION SYSTEMS

**NOT WITHIN INIS SCOPE**

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## ETDE Scope Descriptions

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### **S32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION**

Includes information on equipment and methods to reduce energy consumption, increase energy efficiency, or to enable the substitution of more plentiful or environmentally favorable energy sources. The area includes energy conservation within buildings, in transportation, in industry and agriculture, and within municipalities and communities. It includes e.g. optimization of materials, equipments and processes for reducing energy consumption, waste heat recovery und utilization, waste management for energy recovery or recycling.

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### **S33 ADVANCED PROPULSION SYSTEMS**

Includes design and development of advanced propulsion systems for automobiles, buses, trucks, ships, aircraft, and trains - e.g. components and devices that promise better fuel economy, less maintenance, and increased service life; more efficient power cycles; better emission-control devices; feasibility studies on the use of alternative fuels, such as hydrogen or alcohol fuels. Aspects include internal combustion engines, external combustion engines, electric-powered systems, hybrid systems, flywheel propulsion, and vehicle design factors.

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## INIS Scope Descriptions

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### S36 MATERIALS SCIENCE

*Note: metals, alloys, intermetallic compounds, metallic matrix composites, metallic glasses, ceramics and cermets (e.g., borides, carbides, hydrides, nitrides, oxides, silicides), and other materials (e.g., boron, carbon, graphite, concretes, glass, semiconductor materials, composite materials, plastics, soil, rock, cloth, fluids) if they are associated with an actual or simulated nuclear application.*

*(See Appendix 1 as a guide for the principal elements of nuclear interest)*

**Preparation, fabrication, and manufacture** (e.g., annealing, bonding brazing, casting, cold working, doping, drawing, electroplating, extrusion, fastening, forging, forming, gelation, hot working, moulding, pelletization, powder metallurgy, pressing, refining, rolling, sintering, soldering, surface finishing, swaging, thin film deposition, welding), **structure and phase studies** (e.g., allotropy, crystal structure and microstructure, crystal-phase transformations, melting points, phase diagrams, solidification, transformation temperatures), **mechanical properties** (e.g., brittleness, buckling, cracking, creep, deformation, ductility, elastic properties, elongation, embrittlement, fatigue, fracture, friction, hardness, plasticity, Poisson's ratio, rupture, shear properties, strain, strength, stress, tensile properties, toughness, wear, Young's modulus), **physical properties** (e.g., damping, density, electrical properties including superconductivity and superconducting transition temperatures, magnetic properties, optical properties, specific heat, thermal conductivity, thermal diffusivity, vapor pressure, thermal expansion, other thermodynamic properties), **corrosion and erosion** of materials of nuclear interest, and **physical radiation effects** on the mechanical integrity or physical properties of **all** materials

For:	- material studies related to fusion research	use
S70	- fabrication of components and accessories of specific nuclear facilities, plants and devices	see category for facility
	- production of enriched uranium	use S11
	- fabrication of fission fuel elements	see
S21, S22	- nuclear instrumentation	use S46
	- nuclear phenomena and techniques in solid state studies of materials	use S75
	- chemical and physico-chemical properties of materials	see S37,S38
	- basic studies in superconductivity	use S75
	- superconducting devices	see S75 or the
category		
	for the device - effects of corrosion or erosion on performance and operation of nuclear facilities	see category for facility
	- radiation effects in solid state and fluid physics	use S75
	- chemical radiation effects	use S38
	- radiation effects on instruments, electrical and electronic devices and their components	use S46
	- radiation effects on the performance and operation of components and accessories of nuclear facilities	see category for facility
	- fabrication of thermonuclear fuel pellets	use S75
	- production of heavy water	use S07
	- testing the particle and radiation detection capability of sensor materials	use S46
	- materials testing reactors	use S22

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## ETDE Scope Descriptions

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### **S36 MATERIALS SCIENCE**

Includes preparation, fabrication, structure and phase studies, mechanical properties, physical properties, corrosion, erosion of and radiation effects on metals, alloys, ceramics, cermets, refractories, and other materials, such as composite materials, polymers, plastics, boron, carbon, graphite, concrete, glass, semiconductor materials, soil, rock, cloth, textiles.

## INIS Scope Descriptions

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### S37 INORGANIC, ORGANIC, PHYSICAL AND ANALYTICAL CHEMISTRY

Note: **only if the field is of relevance for nuclear technology or of nuclear interest**

(see **Appendix 1** as a guide for the principal elements of nuclear interest)

**Analytical and separation chemistry** (activation, nuclear reaction, radiometric, and radiochemical procedures), inorganic, organic, and physical chemistry, electrochemistry, photochemistry, combustion, pyrolysis and high-temperature chemistry;

**Isotope effects** on nonnuclear chemical and physical properties of elements and compounds. (isotope effect are not included when used only as a tool in the analysis of reaction mechanisms or in chemical structure studies).

**Isotope exchange** if the exchange is of primary concern or the exchange mechanism is used in isotope separation, chemical and physicochemical methods of **isotope separation**.

For:	- analysis of radiolytical products	use S38
	- analytical control in nuclear fuel processing or in spent fuel reprocessing	use S11
	- detailed fuel burnup calculations in specific reactor types	use S21
	- industrial applications of activation analysis	use S07
	- nuclear instrumentation	use S46
	- structure and phase analysis of compounds and materials of nuclear interest	use S36
	- industrial methods of isotope separation	use S07
	- chemical separation of radioisotopes (other than analytical applications and industrial methods)	use S38
	- target preparation using ion, atomic or molecular beams	use
S71	- target preparation by other physical methods	use S36
	- fusion fuel target preparation	use S70
	- chemical studies of corrosion	use S36
	- chemistry of fission fuels in connection with their processing or reprocessing	use
S11	- physical properties of materials for nuclear technology	use S36
	- chemical and physico-chemical studies of radioactive elements and compounds	use S38
	- isotope effects in atomic and molecular physics	use S74
	- isotope effects in solid state and fluid physics	use S75

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## ETDE Scope Descriptions

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### **S37 INORGANIC, ORGANIC, PHYSICAL AND ANALYTICAL CHEMISTRY**

Includes **analytical and separation chemistry** (activation, nuclear reaction, radiometric, and radiochemical procedures; inorganic, organic, and physical chemistry; electrochemistry; photochemistry; combustion, pyrolysis and high-temperature chemistry).

Isotope effects on nonnuclear chemical and physical properties of elements and compounds. (isotope effect are not included when used only as a tool in the analysis of reaction mechanisms or in chemical structure studies).

Isotope exchange if the exchange is of primary concern or the exchange mechanism is used in isotope separation.

Chemical and physicochemical methods of **isotope separation** are included. (For industrial methods of isotope separation see S07).

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## INIS Scope Descriptions

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### S38 RADIATION CHEMISTRY, RADIOCHEMISTRY AND NUCLEAR CHEMISTRY

**Hot-atom chemistry:** chemical reactions of atoms or ions of high kinetic energy (more than 1 eV) resulting from nuclear transformations, including recoil production

**Properties of radioactive materials:** chemical and physico-chemical properties of radioactive elements, compounds or materials

**Preparation of radioactively-labelled compounds:** chemical separation and preparation of radioisotopes (other than analytical applications and industrial methods of production, separation and enrichment), preparation of radioactively labelled compounds and studies of their stability

**Radiation chemistry:** radiation-induced chemical reactions, including formation of free radicals and G value determination, analysis of radiolytical products; chemical radiation effects on gases, liquids, and solids (excluding industrial applications), post-factum detection of food irradiation (nuclear radiation only, e.g., beta, gamma radiation)

*Note: effects of ultraviolet, visible and infrared radiation as well as laser beams are excluded*

For:	- chemistry of fission fuels in connection with their processing or reprocessing	use
S11		
	- physical properties of radioactive materials	use S36
	- chemical decontamination of food and animal feed	use S60
	- chemical decontamination of man, animals and plants	use S63
	- chemical decontamination of materials, structures and equipment	use S61
	- chemical decontamination of soils, water or air	use S54
	- separation for analytical applications	use S37
	- preparation of compounds labelled with stable isotopes	use S37
	- isotope-labelled compounds in biological systems	see S62, S63
	- novel tracer techniques	see S07 or
	category for application	
	- enrichment of isotopes (industrial)	use
S07		
	- handling and storage equipment and procedures	use S42
	- radiation effects on organic molecules occurring in living systems	use S63
	- industrial radiation processing	use S07
	- chemonuclear irradiation reactors	use S22
	- chemical dosimeters	use S46
	- physical radiation effects on materials	use S36

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## ETDE Scope Descriptions

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### **S38 RADIATION CHEMISTRY, RADIOCHEMISTRY AND NUCLEAR CHEMISTRY**

**Hot-atom chemistry.** Chemical reactions of atoms or ions of high kinetic energy (more than 1 eV) resulting from nuclear transformations, including recoil production).

**Properties of radioactive materials.** *Chemical and physico-chemical properties of radioactive elements, compounds or materials.*

**Preparation of radioactively-labelled compounds.** Chemical separation and preparation of radioisotopes (other than analytical applications and industrial methods of production, separation and enrichment), preparation of radioactively labelled compounds and studies of their stability.

**Radiation Chemistry.** Radiation-induced chemical reactions, including formation of free radicals and G value determination, analysis of radiolytical products; chemical radiation effects on gases, liquids, and solids (excluding industrial applications); post-factum detection of food irradiation (nuclear radiation only, e.g., beta, gamma radiation). *Note: effects of ultraviolet, visible and infrared radiation as well as laser beams are excluded.*

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## INIS Scope Descriptions

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### S42 ENGINEERING

Design, construction, operation, safety aspects, decommissioning, dismantling, and applied mechanics studies of **structures and nuclear equipment** (such as floor supports, ventilation fans, air filters, off-gas systems, valves), laboratories, pilot plants and factories not covered by a more specific category

*Note: for any structure or piece of equipment whose application is identified, always use the category for the application*

**Heat transfer and fluid flow studies** (e.g., nucleate boiling, boiling burnout, critical heat flux, two-phase flow, flow in rod bundles, flow of liquid metals) of **nuclear systems or in relation to nuclear systems**, including nuclear techniques (tracers only if the application is new)

Peaceful use of **nuclear explosions** and their simulation

Aspects (including safety and administrative aspects) of the **transport and interim storage** of radioactive materials, including fresh and spent reactor fuels

Design, development, construction, evaluation, safety analyses and testing of **shipping and storage containers** for radioactive materials

Design, construction, operation and safety aspects of **equipment and facilities for handling** radioactive materials such as remote-handling equipment, glove boxes, hot cells, etc. (non-reactor criticality studies are included, but reactor loading is excluded)

**Materials testing** (methods and equipment (destructive and non-destructive) for determining the integrity or the mechanical properties of materials of actual or potential nuclear use such as fuels, cladding, moderators, structural materials, etc.)

For:	- thermodynamic properties of materials	use S36
	- industrial application of nuclear techniques in thermodynamics and fluid flow	use S07
	- thermodynamics studies of fission reactors in general	use S22
	- thermodynamics studies of specific fission reactor types	use
S21	- thermodynamics studies in plasma physics or fusion reactors	use S70
	- magnetohydrodynamics	use S30
	- superfluidity	use
S75	- cryogenics	use S71
	- hydrological studies	use
S58	- thermodynamics of direct energy conversion	use S30
	- studies of waste heat released into waters at existing nuclear installations	see category for installation
	- decommissioning and dismantling of reactors	see S21, S22
	- decommissioning and dismantling of accelerators	use S46
	- nuclear instruments	use S46
	- environmental aspects, including possible accidents	see category for installation
	- legal aspects of nuclear explosions	use
S98	- contamination and decontamination of soils, waters and atmosphere	use S54
	- reactor loading and fuel-loading machines	see S21, S22
	- waste processing or disposal	use S12
	- economic or legal aspects	see category for equipment
	- containers for waste disposal	use S11
	- radiation protection procedures	use S61

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## ETDE Scope Descriptions

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### S42 ENGINEERING

Encompasses general engineering information directly related to energy, including facilities, equipment and techniques. Includes **protective structures and equipment**, such as blast and fallout shelters, air-filtration systems, fire protection systems, special clothing. **Handling equipment and procedures**, e.g. for handling of radioactive materials not necessarily related to nuclear fuel cycle (see S11), handling equipment, such as remote-handling equipment, glove boxes, hot cells. **Shipping containers** for radioactive materials. **Transport and storage facilities**, such as tanks, pipelines, tanker vessels. **Heat transfer and fluid flow** studies (nucleate boiling, boiling burnout, critical heat flux, two-phase flow). **Materials testing**. **Combustion systems** (e.g. boilers, furnaces). **Mining and underground engineering**. **Marine engineering** (equipment for offshore operations). **Power cycles** (Brayton, Rankine, Stirling and others). **Components, electron devices and circuits** (including lasers and masers). Peaceful uses of **Nuclear explosions** for e.g. civil/engineering purposes.

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## INIS Scope Descriptions

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### S43 PARTICLE ACCELERATORS

Design, development, operation, decommissioning, dismantling, and safety aspects of *particle accelerators* and *storage rings*, including *beam dynamics*, *field calculations*, *ion optics*, *components and auxiliaries* (e.g. ion and electron sources, injection and extraction systems, magnet coils, vacuum systems, shielding, experimental facilities and equipment, such as target facilities, facilities used as a radiation source (e.g. X-ray sources, neutron sources), devices for measuring beam parameters, etc.)

- For:
- accelerators or storage rings used in thermonuclear devices use S70
  - seismological, geological, hydrological, meteorological and climatic studies of accelerator or storage rings sites use S58
  - environmental aspects of accelerator or storage rings use S54
  - production of electron, ion, atomic and molecular beams other than in accelerators use S71
  - ion and electron beam sources in fusion power plants use S70
  - non-isotopic ion and electron sources other than for accelerator applications see S71 or category for application
  - isotopic ion sources other than for accelerator applications use S07
  - beam injection in fusion devices use S70
  - particle and radiation detection and measuring instruments use S46
  - fuel targets used in fusion devices use S70
  - target preparation by chemical methods use S37
  - target preparation by physical methods use S36
  - target preparation using ion, atomic or molecular beams use

S71

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### S46 INSTRUMENTATION RELATED TO NUCLEAR SCIENCE AND TECHNOLOGY

*Note: for detectors and instrumentation incorporated in a larger device or system the appropriate category for that device or system should be used*

Design, development, manufacture, testing, evaluation and standardization of *radiation dosimeters*, *nuclear spectroscopic instrumentation*, (e.g. instruments for measurement of energy spectra of nuclear particles or radiation), *high-energy physics instrumentation* (e.g. bubble chambers, Cherenkov counters, gas track detectors, missing-mass spectrometers, spark chambers), *other particle and radiation detection and measuring instruments* (e.g. instrumentation for medical diagnosis and therapy), electronic circuits and equipment, including automated systems for measurement, control and data processing, specifically designed for incorporation with such instruments, *other instrumentation and methods* required in nuclear science and its applications (e.g., flow meters, pressure gauges, well logging, etc.); *radiation effects on instruments, components or electronic devices* (adverse or beneficial effects of radiation on the sensitivity, accuracy or performance)

- For:
- channeling and sputtering in sensor materials use S75
  - radiation effects on the sensor materials see S36, S38

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### S47 OTHER INSTRUMENTATION

NOT WITHIN INIS SCOPE

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## ETDE Scope Descriptions

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### **S43 PARTICLE ACCELERATORS**

Design, development, operation, decommissioning, dismantling of particle accelerators and storage rings used in energy research. Topics include beam dynamics, field calculations, and ion optics; auxiliaries and components (e.g. ion and electron sources; injection and extraction systems), experimental facilities and equipment.

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### **S46 INSTRUMENTATION RELATED TO NUCLEAR SCIENCE AND TECHNOLOGY**

Includes radiation detectors or monitors, radiometric instruments, radiation dosimeters, nuclear spectroscopic instrumentation, high-energy physics instrumentation, particle detectors, and other nuclear-related instrumentation such as flowmeters, pressure gages and heat sensors.

Radiation effects on instruments or electronic systems.

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### **S47 OTHER INSTRUMENTATION**

Includes well logging, thermal, optical, geophysical, meteorological and other instrumentation associated with energy research.

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## INIS Scope Descriptions

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### S54 ENVIRONMENTAL SCIENCES

*This category is used for pollutants/contaminants in the environment that cannot be directly connected with a particular energy source. If the source is clear, the subject category for the energy source is used.*

**Monitoring and transport of radioactive materials and radioisotopes, monitoring of ionizing radiations** (whether natural or not) in environment (soils, groundwater, surface waters, geosphere, and the earth's atmosphere), including contamination and decontamination, **monitoring and transport of chemical and thermal effluents from nuclear facilities** in the environment

**Environmental aspects of nuclear installations other than fission reactors or fuel cycle installations**

Measures for **restoration** of the land and surface waters following radioactive contamination or chemical or thermal pollution **from nuclear facilities**, land and water use and reclamation,

measures for **cleaning** the atmosphere following radioactive contamination or chemical pollution **from nuclear facilities**

**Regional and global environmental aspects of nuclear and nonnuclear energy production** (e.g., acid rain, global warming), irrespective of the energy source, including studies on nuclear winter

- For:
- environmental aspects of radioactive, chemical or thermal discharges from particular nuclear facilities see S07, S11, S21, S22
  - radiation measuring instruments use S46
  - age determination of objects use S37
  - economics of nuclear methods use S07
  - well-logging equipment use S46
  - environmental aspects of siting of particular nuclear installations see S07, S11, S21,
- S22
- use of nuclear explosions in geological and seismological studies use S42
  - environmental aspects of chemical or thermal discharges from particular nonnuclear energy facilities see category for facility use S12
  - radioactive waste disposal in waters of the earth
  - uranium and thorium ores, or chemical and physico-chemical processing of ores, seawater or groundwater for recovery of uranium and thorium, or economics of uranium and thorium recovery from waters use S11
  - fuel fabrication plants use S22
  - food contamination due to fallout use S60
  - stack disposal of radioactive effluents use S12

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### S58 GEOSCIENCES

Basic seismological, geological and soil, hydrological, meteorological, climatic, and atmospheric studies of existing or potential sites used for any phase of nuclear energy development, use of **nuclear methods** (e.g. radiometric methods using radioisotopes or ionizing radiations) in basic terrestrial, aquatic, and atmospheric studies

Use of nuclear and isotopic techniques in studies for water resources development

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## ETDE Scope Descriptions

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### **S54 ENVIRONMENTAL SCIENCES**

*This category is used for pollutants/contaminants in the environment that cannot be directly connected with a particular energy source. If the source is clear, the subject category for the energy source is used.*

Includes information on the effects of any energy-related activity on the environment (land, water or atmosphere), on methods for mitigating or eliminating adverse effects, and on technical aspects (e.g. radiometric methods using radioisotopes or ionizing radiations) of ensuring that energy-related activities are environmentally safe and socially acceptable. Includes site resource and use studies, such as seismological, geological, soil, hydrological, meteorological, climatic and atmospheric studies of existing or potential sites for any phase of energy development and use. This area covers all aspects of global climate change. Covers monitoring and transport of chemicals, radioactive materials and thermal effluents within the atmospheric, terrestrial and aquatic environment.

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### **S58 GEOSCIENCES**

This area is limited to providing information to support research in geosciences where the context of the work is energy technology. Aspects of geology, geography, seismology and geochemistry are covered when energy-related. This category should be used if an item cannot be categorized elsewhere.

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## INIS Scope Descriptions

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### S60 APPLIED LIFE SCIENCES

**Plant cultivation and breeding:** crop and plant improvement by development of radiation-induced mutants, including use of radiomimetic substances in comparative studies, nuclear techniques (tracers only if the application is new) in plant growth and cultivation, including plant nutrition, metabolism, fertilizer utilization, and irrigation studies, assessment of seed quality by nuclear or radiographic techniques, low-dose stimulation of plant growth

**Pest and disease control:** nuclear techniques (tracers only if the application is new) relating to specific human, animal and plant parasitic diseases, to pathogens, including viruses, and to disease transmission, radiation procedures in vaccine production and animal reactions to irradiated pathogens, new applications of tracers in pest ecology, including host-parasite relationships, and in studying pesticides (including weed control) and insect pathogens, radiation sterilization for control of insects and other arthropods of agricultural significance (e.g. sterile insect release)

**Food protection, preservation and human nutrition evaluation:** irradiation procedures for, and radiation effects on, agricultural food products, fish and fish products, processed foods and food ingredients, processed animal feed, extension of storage life and sprout inhibition, radiation disinfestation of stored and packaged food products and chemical changes resulting from irradiation, radiation processing of food on an industrial scale, evaluation of wholesomeness and quality of irradiated food, contamination and monitoring of, and decontamination procedures for food, new applications of isotopic techniques in human nutrition evaluation)

**Animal husbandry** (new applications of tracers in nutrition, metabolism and breeding of domestic animals, nuclear techniques in veterinary science)

**Other applications of radiations and radioisotopes in life sciences:** irradiation sterilization in medicine, nuclear techniques and applications of radiation and stable or radioactive isotopes (tracers only if the tracer or application is new) in the life sciences

For:	- contamination and decontamination of soils	use S54
	- basic studies of radiation effects on plants, or contamination and decontamination of plants	use S63
	- radiation treatment of agricultural and biological wastes	use
S07	- activation analysis of pesticide residues	see S07, S37
	- basic studies of radiation effects on parasites or pests	use S63
	- immunological effects of irradiation	use S63
	- radiation processing of pesticides	use S07
	- use of nuclear techniques in medicine	use S62
	- post-factum detection of food irradiation	use S38
	- economics of radiation processing of food	use S07
	- legal aspects of food irradiation, including labelling and packaging rules	use S61
	- effects of external or internal irradiation on animals	use S63
	- tissue distribution, metabolism, toxicity and removal of radioisotopes	use S63
	- contamination of pasture	use S54
	- applications of radiopharmaceuticals, radioisotopes, radiation, and nuclear techniques in medical diagnosis or therapy	use S62
	- preparation of radiopharmaceuticals	use S38
	- radioassay, including radioimmunoassay, in medical diagnosis	use S62

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## ETDE Scope Descriptions

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### **S60 APPLIED LIFE SCIENCES**

#### ***Comprehensive coverage is not obligatory for ETDE***

*Plant cultivation and breeding (crop and plant improvement by development of radiation-induced mutants, including use of radiomimetic substances in comparative studies, nuclear techniques (tracers only if the application is new) in plant growth and cultivation, including plant nutrition, metabolism, fertilizer utilization, and irrigation studies, assessment of seed quality by nuclear or radiographic techniques, low-dose stimulation of plant growth)*

*Pest and disease control (nuclear techniques (tracers only if the application is new) relating to specific human, animal and plant parasitic diseases, to pathogens, including viruses, and to disease transmission, radiation procedures in vaccine production and animal reactions to irradiated pathogens, new applications of tracers in pest ecology, including host-parasite relationships, and in studying pesticides (including weed control) and insect pathogens, radiation sterilization for control of insects and other arthropods of agricultural significance (e.g. sterile insect release)*

*Food protection, preservation and human nutrition evaluation (irradiation procedures for, and radiation effects on, agricultural food products, fish and fish products, processed foods and food ingredients, processed animal feed, extension of storage life and sprout inhibition, radiation disinfestation of stored and packaged food products and chemical changes resulting from irradiation, radiation processing of food on an industrial scale, evaluation of wholesomeness and quality of irradiated food, contamination and monitoring of, and decontamination procedures for food, new applications of isotopic techniques in human nutrition evaluation)*

*Animal husbandry (new applications of tracers in nutrition, metabolism and breeding of domestic animals, nuclear techniques in veterinary science)*

*Other applications of radiations and radioisotopes in life sciences (irradiation sterilization in medicine, nuclear techniques and applications of radiation and stable or radioactive isotopes (tracers only if the tracer or application is new) in the life sciences)*

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## INIS Scope Descriptions

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### S61 RADIATION PROTECTION AND DOSIMETRY

**Radiation protection standards:** technical standards, including definitions and units, dealing with the presence of radioactive materials, natural or artificial (e.g. radon in houses or mines), or with the operation of reactors or other nuclear equipment or facility when such standards are set to provide radiation protection for man, documents about such standards

**Radiation protection procedures:** procedures designed wholly or primarily to provide radiation protection for man (except for shielding of reactors and accelerators), prevention of contamination or procedures for decontamination, including chemical decontamination of materials, structures and equipment

**Dosimetry and monitoring:** personnel dosimetry and radiation monitoring (e.g., in nuclear facilities, industry, radiotherapy, X-ray diagnostics, nuclear medicine) for both patients and medical personnel, medical surveillance of personnel exposed to ionizing radiations in conformance with national or international radiation protection regulations or recommendations, population dose estimates, collective dose and dose commitment from natural background radiation (e.g. radon in houses or mines), or as a result of nuclear accidents, from medical or industrial use of radioisotopes and ionizing radiations or from contaminated food, calculation and measurement of absorbed doses in man, animals, plants and other biological systems at all levels, as well as in tissue-equivalent materials and phantoms

**Legal aspects** of protecting personnel, members of the public, and the environment against contamination from the operation of nuclear facilities, legal aspects of direct or indirect applications of radioisotopes and radiation to man (e.g., medical and industrial applications, food irradiation, radiation from consumer products)

For:	- decontamination of man	use S63
	- wholesomeness and quality of irradiated food	use S60
	- calculation, estimation and measurement of dose distributions	see
S07	- radiation measuring instruments	use S46
	- radiation shielding calculations	use S73
	- shield fabrication	use S36
	- thermonuclear reactor shielding	use S70
	- accelerator shielding	use S43
	- fission reactor shielding	see S21, S22
	- procedures and equipment for handling radioactive materials	use S42
	- measures for decontamination of the atmosphere, or	
	measures for restoration of the land or waters from effects of	
	radioactive contamination	use S54
	- emergency planning, non-legal aspects	see category
		for
		installation
	- emergency planning, legal aspects	use S99
	- external irradiation effects in life sciences	use
S63	- surface, depth and internal dose distributions in radiation therapy	use S62
	- radiation source metrology	use S07
	- monitoring of food	use S60
	- calculation and measurement of absorbed doses in radiation processing	use
S07		

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## ETDE Scope Descriptions

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### **S61 RADIATION PROTECTION AND DOSIMETRY**

**Radiation Protection Standards.** Technical standards, including definitions and units, dealing with the presence of radioactive materials, natural or artificial (e.g. radon in houses or mines), or with the operation of reactors or other nuclear equipment or facility when such standards are set to provide radiation protection for man; documents about such standards.

**Radiation Protection Procedures.** Procedures designed wholly or primarily to provide radiation protection for man (except for shielding of reactors and accelerators); prevention of contamination or procedures for decontamination, including chemical decontamination of materials, structures and equipment.

**Dosimetry and Monitoring.** Personnel dosimetry and radiation monitoring (e.g., in nuclear facilities, industry, radiotherapy, X-ray diagnostics, nuclear medicine) for both patients and medical personnel; medical surveillance of personnel exposed to ionizing radiations in conformance with national or international radiation protection regulations or recommendations; population dose estimates, collective dose and dose commitment from natural background radiation (e.g. radon in houses or mines), or as a result of nuclear accidents, from medical or industrial use of radioisotopes and ionizing radiations or from contaminated food; calculation and measurement of absorbed doses in man, animals, plants and other biological systems at all levels, as well as in tissue-equivalent materials and phantoms).

**Legal aspects.** Legal aspects of protecting personnel and members of the public; legal aspects of protecting the environment against contamination from the operation of nuclear facilities; legal aspects of direct or indirect applications of radioisotopes and radiation to man (e.g., medical and industrial applications, food irradiation, radiation from consumer products).

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## INIS Scope Descriptions

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### S62 RADIOLOGY AND NUCLEAR MEDICINE

**External radiation in diagnosis:** advances in the use of ionizing radiations (e.g., X-rays, bremsstrahlung, gamma radiation, neutrons, charged particles) for diagnostic purposes, advances in imaging procedures, including NMR spectroscopy and tomography

*Note: sonography and routine X-ray diagnostics are excluded*

**Radioisotopes in diagnosis:** advances in the use of radioisotopes and stable isotopes for diagnostic purposes, imaging and non-imaging procedures, radioassay, including radioimmunoassay, incorporation and elimination of radioisotopes and labelled compounds, advances in Single Photon ECT, Positron Computed Tomography

**External radiation in therapy:** advances in the use of ionizing radiations for therapeutic purposes (implants are included), surface and depth dose distributions, afterloading, irradiation and dose planning, use of response modifying factors in radiation therapy

**Radioisotopes in therapy:** advances in the use of radioisotopes for therapeutic purposes, internal dose distributions, response modifying factors, radioactivation (e.g. neutron capture therapy), incorporation and elimination of radioisotopes and labelled compounds

For:	- radiation protection standards, or radiation protection procedures	use S61
	- personnel and patient dosimetry and monitoring	use S61
	- design, construction, operation, metrology and performance of isotopic radiation sources, including technical aspects of safety	use S07
	- radiation measuring instruments	use S46
	- interim storage of radioactive materials	use S42
	- legal aspects	use S61
	- preparation of radioisotopes and labelled compounds for medical use	use S38
	- preparation of radioisotopes on industrial scale for medical use	use
S07	- side and late effects of radioisotopes and radiation	use S63
	- uptake, distribution, metabolism, kinetics, elimination and effects of incorporation of radioisotopes other than in diagnosis or therapy	use S63
	- contamination and decontamination of man	use S63
	- disposal of radioactive materials	use S12
	- modification of radiation effects due to radioprotective or effect-enhancing substances or irradiation conditions	use
S63	- accelerators used in, safety aspects	use S43
	- calculation and measurement of absorbed doses and dose distributions in tissue-equivalent materials and phantoms	use
S61	- calculation and measurement of absorbed doses in man for radiation protection	use S61

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## ETDE Scope Descriptions

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### **S62 RADIOLOGY AND NUCLEAR MEDICINE**

#### ***Comprehensive coverage is not obligatory for ETDE***

*External radiation in diagnosis (advances in the use of ionizing radiations (e.g., X-rays, bremsstrahlung, gamma radiation, neutrons, charged particles) for diagnostic purposes, advances in imaging procedures, including NMR spectroscopy and tomography)*

*Note: sonography and routine X-ray diagnostics are excluded*

*Radioisotopes in diagnosis (advances in the use of radioisotopes and stable isotopes for diagnostic purposes, imaging and non-imaging procedures, radioassay, including radioimmunoassay, incorporation and elimination of radioisotopes and labelled compounds, advances in Single Photon ECT, Positron Computed Tomography)*

*External radiation in therapy (advances in the use of ionizing radiations for therapeutic purposes (implants are included), surface and depth dose distributions, afterloading, irradiation and dose planning, use of response modifying factors in radiation therapy)*

*Radioisotopes in therapy (advances in the use of radioisotopes for therapeutic purposes, internal dose distributions, response modifying factors, radioactivation (e.g. neutron capture therapy), incorporation and elimination of radioisotopes and labelled compounds)*

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## INIS Scope Descriptions

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### **S63 RADIATION, THERMAL, AND OTHER ENVIRONMENTAL POLLUTANT EFFECTS ON LIVING ORGANISMS AND BIOLOGICAL MATERIALS**

**Effects of external irradiation on biochemicals, on cell and tissue cultures, and on microorganisms:** effects of radiations, including ultraviolet radiation and laser radiation, on living systems at the biochemical, cellular and tissue culture level, on isolated cell constituents, and on microorganisms, both animals and plants (e.g., bacteria, bacteriophages, rickettsiae, yeasts, viruses), including the relative effects of irradiation procedures, doses, dose rates, Relative Biological Effectiveness (RBE), Linear Energy Transfer (LET) and various response modifying factors

**Effects of external irradiation on plants:** effects of ionizing radiations on plants or parts of plants (seeds, roots, leaves, etc.), plant growth, physiology and metabolism, including the relative effects of irradiation procedures, doses, dose rates, Relative Biological Effectiveness (RBE) and Linear Energy Transfer (LET), modification of effects of such radiation due to various response modifying factors, such as radioprotective and effect-enhancing substances or irradiation conditions

**Effects of external irradiation on animals:** effects of ionizing radiations, including immunological consequences, on any animal, the relative effects of irradiation procedures, doses, dose rates, Relative Biological Effectiveness (RBE) and Linear Energy Transfer (LET), modification of effects of such radiations due to various response modifying factors, such as radioprotective or effect-enhancing substances or irradiation conditions, side effects (e.g. toxicity) of such substances, effects of radiomimetic substances and radiation in comparative studies

**Effects of external irradiation on man:** effects of ionizing radiations, including immunological consequences, and acute and late effects, on man, the relative effects of irradiation procedures, doses, dose rates, Relative Biological Effectiveness (RBE), Linear Energy Transfer (LET) and quality factors, modification of effects of such radiations due to various response modifying factors, such as radioprotective or effect-enhancing substances or irradiation conditions, side effects (e.g. toxicity) of such substances, side and late effects of such radiations in medical diagnosis and therapy, epidemiological studies of possible radiation-caused illness

**Effects of internal irradiation and various aspects of radioisotope kinetics and toxicity in man, animals, plants and microorganisms:** acute and late effects of absorbed or incorporated radioactive materials (not implanted sources or afterloading), internal source evaluation, side and late effects, including toxicity, of the use of radioisotopes in bound or unbound form in diagnosis and therapy, radioisotope kinetics, localization, uptake and elimination of radioisotopes at all levels (subcellular, cellular, tissue, organ and whole organism), contamination and decontamination (both internal and external), use of chelating agents or complex forming agents, modifying factors and radioprotective substances such as EDTA (ethylenediaminetetraacetic acid), DTPA (diethylenetriaminepentaacetic acid), stable iodine, epidemiological studies of possible radioisotope-caused illness

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|------|--|---------|
| For: | - radiation effects on organic molecules not occurring in living systems   | use S38 |
|      | - radiation treatment of agricultural and biological wastes  | use     |
| S07  | - applications in pest and disease control, or<br>applications in plant cultivation and breeding, or<br>applications in food protection and preservation, or<br>radiation sterilization in medicine, or<br>animal reaction to irradiated pathogens | use S60 |
|      | - advances in the use of ionizing radiations in diagnosis or therapy   | use S62 |
|      | - radiation protection in radiodiagnosis and radiotherapy  | use S61 |
|      | - contamination and decontamination of food  | use S60 |
|      | - use of unsealed radioisotopes in medical diagnosis/therapy   | use S62 |
|      | - methods of incorporation and extraction of radioisotopes<br>in medical diagnosis or therapy  | use S62 |
|      | - transmission of radioisotopes through the food chain or in an ecosystem  | use S54 |
|      | - techniques using radioisotopes in basic and applied life sciences  | use     |
| S60  |  |         |
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**S63 RADIATION, THERMAL, AND OTHER ENVIRONMENTAL POLLUTANT EFFECTS ON LIVING ORGANISMS AND BIOLOGICAL MATERIALS**

***Effects of External Irradiation on Biochemicals, on Cell and Tissue Cultures, and on Microorganisms.*** Effects of radiations, including ultraviolet radiation and laser radiation, on living systems at the biochemical, cellular and tissue culture level, on isolated cell constituents, and on microorganisms, both animals and plants (e.g., bacteria, bacteriophages, rickettsiae, yeasts, viruses); includes the relative effects of irradiation procedures, doses, dose rates, Relative Biological Effectiveness (RBE), Linear Energy Transfer (LET) and various response modifying factors.

***Effects of External Irradiation on Plants.*** Effects of ionizing radiations on plants or parts of plants (seeds, roots, leaves, etc.), plant growth, physiology and metabolism; includes the relative effects of irradiation procedures, doses, dose rates, Relative Biological Effectiveness (RBE) and Linear Energy Transfer (LET); modification of effects of such radiation due to various response modifying factors, such as radioprotective and effect-enhancing substances or irradiation conditions.

***Effects of External Irradiation on Animals.*** Effects of ionizing radiations, including immunological consequences, on any animal; includes the relative effects of irradiation procedures, doses, dose rates, Relative Biological Effectiveness (RBE) and Linear Energy Transfer (LET); modification of effects of such radiations due to various response modifying factors, such as radioprotective or effect-enhancing substances or irradiation conditions; side effects (e.g. toxicity) of such substances; effects of radiomimetic substances and radiation in comparative studies.

***Effects of External Irradiation on Man.*** Effects of ionizing radiations (including immunological consequences, acute and late effects) on man; includes the relative effects of irradiation procedures, doses, dose rates, Relative Biological Effectiveness (RBE), Linear Energy Transfer (LET) and quality factors; modification of effects of such radiations due to various response modifying factors, such as radioprotective or effect-enhancing substances or irradiation conditions; side effects (e.g. toxicity) of such substances; side and late effects of such radiations in medical diagnosis and therapy; epidemiological studies of possible radiation-caused illness.

***Effects of Internal Irradiation and Various Aspects of Radioisotope Kinetics and Toxicity in Man, Animals, Plants and Microorganisms.*** Acute and late effects of absorbed or incorporated radioactive materials (not implanted sources or afterloading); internal source evaluation; side and late effects, including toxicity, of the use of radioisotopes in bound or unbound form in diagnosis and therapy; radioisotope kinetics, localization, uptake and elimination of radioisotopes at all levels (subcellular, cellular, tissue, organ and whole organism); also includes contamination and decontamination (both internal and external), use of chelating agents or complex forming agents, modifying factors and radioprotective substances, e.g., EDTA (ethylenediaminetetraacetic acid), DTPA (diethylenetriaminepentaacetic acid), stable iodine; epidemiological studies of possible radioisotope-caused illness].

***Effects of thermal effluents on living organisms from energy production, utilization or conservation activities.*** Includes effects of temperature change resulting from the energy cycle, such as decreased temperature effects from hydroelectric dams or increased temperature effects from fossil fuel burning.

***Chemicals Metabolism and Toxicology.*** Includes effects of any element or compound (e.g. PCBs, freons) associated with an energy cycle, including resource extraction, conversion utilization, and waste processing and disposal.

***Effects of other environmental pollutants,*** such as noise produced in energy production, conversion, or utilization; hazards from power transmission lines, Laser and microwave hazard, effects from global climate changes, and any other health hazards from energy related activities that are not covered in other categories.

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## INIS Scope Descriptions

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### S70 PLASMA PHYSICS AND FUSION TECHNOLOGY

#### *Plasma Physics*

*Note: includes only plasmas related to nuclear fusion*

**Plasma confinement**, both magnetic and inertial confinement (studies on plasma lifetime, particle and heat loss, energy balance in plasma and fusion devices, enhanced confinement concepts, alpha particle confinement, disruptions), **plasma production, heating, and interactions** (ohmic, radiofrequency, microwave, ICR, ECR and lower hybrid heating, plasma heating by laser or particle beams, shock waves, compression, plasma production by guns or other means, electromagnetic wave propagation and absorption, interactions with antennas, walls, probes and sheaths, current drive), plasma kinetic equations, thermodynamic properties, neoclassical theory, plasma transport, plasma impurities, plasma simulation, plasma waves (electrostatic, electrodynamic, MHD, sound, drift or other waves, linear or nonlinear), plasma oscillations, **plasma instabilities** (macro- and micro-instabilities), turbulence, solitons, BGK modes, shock waves, plasma fluid and MHD properties (MHD equilibria and resistive MHD effects), **nuclear fusion reactions** (exoenergetic fusion reactions between nuclei of light elements in plasma, beam-induced fusion, cold fusion, muon-catalyzed fusion, etc.), elementary and classical processes in plasmas (particle orbits, electron, atom, ion, molecule and heavy-particle collisions in plasmas), **plasma diagnostic** techniques and instrumentation (diagnostic techniques and instrumentation for rf, optical, X-ray, gamma-ray and particle measurements), other **physics studies of fusion plasmas**.

#### *Fusion Technology*

*Note: includes hybrid reactors*

**Fusion devices and experiments** (design and specifications of magnetic or inertial confinement devices, implosion physics, studies related to laser fusion, electron beam fusion and ion beam fusion, safety analyses of fusion devices), **plasma-facing components** (physics and engineering related to first wall, liners, limiters, divertors, impurity control, etc.), **magnet coils and fields** (experiments, design analyses and design codes related to magnets and magnetic field configurations), **power supplies and energy storage** (design and performance analyses for any power supply or energy storage system associated with a fusion device), **blankets and cooling systems** (physics and engineering studies of blankets, and studies of heat transfer or system components), other **components** of fusion devices (such as vacuum and exhaust systems, control systems, shielding), **materials studies** related to fusion research, **heating and fueling systems** (studies on any plasma gun, neutral beam source to be used for beam injection, or microwave or laser radiation source used for plasma heating), **fusion fuels** (studies on deuterium, tritium, boron -11, etc., for use as fuel, including processing, inventories and availability), **power conversion systems** (studies on MHD topping cycles, direct energy converters, gas turbines, etc.)

#### *Economics of Fusion Nuclear Power and Fusion Fuel Cycle*

*Note: includes economic aspects of hybrid reactors*

(economic aspects of fusion nuclear energy, forecasts, R & D expenditures, economic comparison of fusion reactors with alternative power sources or of different reactor types, financing of fusion nuclear power, methodology of comparative analysis of fusion nuclear energy and other energy costs, economic aspects of fusion fuel production or recovery, forecasts of fusion fuel requirements, R & D expenditures, economic aspects of waste management, economic aspects of nuclear accidents)

For:	- heavy-ion fusion reactions	use S73
	- MHD generators and basic studies in MHD	use S30
	- atomic collision phenomena not taking place in plasmas	use
S74	- fusion devices used as neutron sources	see S71 or category for application
	- basic materials studies	use S36
	- environmental aspects of fusion installations	use S54

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### **S70 PLASMA PHYSICS AND FUSION TECHNOLOGY**

**Plasma Physics** (Note: includes only plasmas related to nuclear fusion). *Plasma confinement*, including both magnetic and inertial confinement (studies on plasma lifetime, particle and heat loss, energy balance in plasma and fusion devices, enhanced confinement concepts, alpha particle confinement, disruptions), *plasma production, heating, and interactions* (includes ohmic, radiofrequency, microwave, ICR, ECR and lower hybrid heating, plasma heating by laser or particle beams, shock waves, compression, plasma production by guns or other means, electromagnetic wave propagation and absorption, interactions with antennas, walls, probes and sheaths, current drive), plasma kinetic equations, thermodynamic properties, neoclassical theory, plasma transport, plasma impurities, plasma simulation, plasma waves (electrostatic, electrodynamic, MHD, sound, drift or other waves, linear or nonlinear), plasma oscillations, *plasma instabilities* (macro- and micro-instabilities), turbulence, solitons, BGK modes, shock waves, plasma fluid and MHD properties (includes MHD equilibria and resistive MHD effects), *nuclear fusion reactions* (exoenergetic fusion reactions between nuclei of light elements in plasma, beam-induced fusion, cold fusion, muon-catalyzed fusion, etc.), elementary and classical processes in plasmas (particle orbits, electron, atom, ion, molecule and heavy-particle collisions in plasmas), *plasma diagnostic techniques and instrumentation* (diagnostic techniques and instrumentation for rf, optical, X-ray, gamma-ray and particle measurements), other physics studies of fusion plasmas.

**Fusion Technology** (Note: includes hybrid reactors). *Fusion devices and experiments* (design and specifications of magnetic or inertial confinement devices, implosion physics, studies related to laser fusion, electron beam fusion and ion beam fusion, safety analyses of fusion devices), *plasma-facing components* (physics and engineering related to first wall, liners, limiters, divertors, impurity control, etc.), *magnet coils and fields* (experiments, design analyses and design codes related to magnets and magnetic field configurations), *power supplies and energy storage* (design and performance analyses for any power supply or energy storage system associated with a fusion device), *blankets and cooling systems* (physics and engineering studies of blankets, and studies of heat transfer or system components), other *components* of fusion devices (such as vacuum and exhaust systems, control systems, shielding), *materials studies* related to fusion research, *heating and fueling systems* (studies on any plasma gun, neutral beam source to be used for beam injection, or microwave or laser radiation source used for plasma heating), *fusion fuels* (studies on deuterium, tritium, boron -11, etc., for use as fuel, including processing, inventories and availability), *power conversion systems* (studies on MHD topping cycles, direct energy converters, gas turbines, etc.).

**Economics of Fusion Nuclear Power and Fusion Fuel Cycle** (Note: includes economic aspects of hybrid reactors). Economic aspects of fusion nuclear energy; forecasts, R & D expenditures; economic comparison of fusion reactors with alternative power sources or of different reactor types; financing of fusion nuclear power; methodology of comparative analysis of fusion nuclear energy and other energy costs; economic aspects of fusion fuel production or recovery; forecasts of fusion fuel requirements, R & D expenditures; economic aspects of waste management; economic aspects of nuclear accidents.

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## INIS Scope Descriptions

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### S71 CLASSICAL AND QUANTUM MECHANICS, GENERAL PHYSICS

Aspects of *classical mechanics of interest for nuclear science and technology*, general aspects of *quantum mechanics* (formalism, theory of measurement, mathematical models, non-relativistic scattering theory, semiclassical theories) not applied to a specific field, general theory of scattering;

**Cryogenics:** (methods and equipment for low temperature application in systems **of interest for nuclear science** for which no more appropriate category is identifiable, basic cryogenic studies relevant to nuclear technology or in which nuclear phenomena are involved (e.g. nuclear alignment at low temperature), vacuum production and techniques at cryogenic temperatures and of interest for nuclear science and technology

**Particle beam production and handling, targets:** beam production and transport of electron, neutron, ion, atomic and molecular beams (not for specific applications), nonisotopic electron, neutron and ion sources not developed for specific applications), nuclear target preparation using ion, atomic or molecular beams

**Other aspects of physical science of nuclear relevance**

*Note: restricted to physical processes or studies of systems or materials of stated nuclear relevance*

(other physical sciences such as statistical physics, dynamical systems, thermodynamics, electricity and magnetism, electrodynamics, optics, acoustics, continuum mechanics, etc., that have a relevance for nuclear science and technology)

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|--|---|
| For: - quantum field theory, or<br>quantum chromodynamics, or<br>quantum electrodynamics, or<br>relativistic scattering theory, or<br>S-matrix theory, or<br>scattering of elementary particles  | use S72   |
| For applications of quantum mechanics in:<br>- atomic and molecular physics<br>- solid state and fluid physics<br>- plasma physics<br>- elementary particle physics<br>- nuclear physics   | use S74<br>use S75<br>use S70<br>use S72<br>use S73 |
| For: - nuclear instrumentation<br>- superconductivity, or<br>superfluidity   | use S46<br>use S75                                  |
| For applications of cryogenics in:<br>- fusion technology<br>- accelerators<br>- fission reactors<br>- neutron instrumentation   | use S70<br>use S43<br>see S21, S22<br>use S46       |
| For: - fusion fuel target fabrication<br>- isotopic radiation sources<br>- ion and electron beam sources for accelerator applications, or<br>beam dynamics and ion optics for accelerator applications, or<br>injection and extraction systems for accelerator applications<br>- low-energy beam techniques in nuclear instrumentation | use S70<br>use S07<br>use S43<br>use                |
| S46<br>- neutral beam sources in fusion technology, or<br>electron and ion beam sources in fusion technology<br>- nuclear target preparation by other physico-chemical methods   | use S70<br>use S36                                  |
| For: - historical, philosophical, educational aspects relevant to nuclear science<br>and technology  | use S99   |
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## ETDE Scope Descriptions

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### **S71 CLASSICAL AND QUANTUM MECHANICS, GENERAL PHYSICS**

#### ***Comprehensive coverage is not obligatory for ETDE***

*Aspects of classical mechanics of interest for nuclear science and technology, general aspects of quantum mechanics (formalism, theory of measurement, mathematical models, non-relativistic scattering theory, semiclassical theories) not applied to a specific field, general theory of scattering;*

*Cryogenics (methods and equipment for low temperature application in systems of interest for nuclear science for which no more appropriate category is identifiable, basic cryogenic studies relevant to nuclear technology or in which nuclear phenomena are involved (e.g. nuclear alignment at low temperature), vacuum production and techniques at cryogenic temperatures and of interest for nuclear science and technology);*

*Particle beam production and handling, targets (beam production and transport of electron, neutron, ion, atomic and molecular beams (not for specific applications), nonisotopic electron, neutron and ion sources not developed for specific applications), nuclear target preparation using ion, atomic or molecular beams);*

*Other aspects of physical science of nuclear relevance*

*Note: restricted to physical processes or studies of systems or materials of stated nuclear relevance (other physical sciences such as statistical physics, dynamical systems, thermodynamics, electricity and magnetism, electrodynamics, optics, acoustics, continuum mechanics, etc., that have a relevance for nuclear science and technology)*

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## INIS Scope Descriptions

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### S72 PHYSICS OF ELEMENTARY PARTICLES AND FIELDS

*Theory of fields and strings* (axiomatic, Lagrangian and Hamiltonian approaches, renormalization, field theories in higher dimensions, such as Kaluza-Klein theories, Schwinger source theory, Bethe-Salpeter equations, relativistic wave equations, lattice gauge theory, techniques employed in field theory studies, such as strong-coupling expansions, theories of strings and other extended objects in the context of elementary particles, superstring theory, theory of quantized fields, etc.), *symmetry, conservation laws, currents and their properties* (Lorentz and Poincaré invariance, C, P, T and other discrete symmetries, flavor symmetries, internal symmetries, supersymmetry, spontaneous symmetry breaking, chiral symmetries, current algebras, studies concerning scalar, pseudoscalar, vector, axial vector and tensor currents, etc.), *S-matrix theory* (scattering matrices, dispersion relations, sum rules, bootstraps, crossing symmetries, Mandelstam representation, Regge formalism, etc.), *relativistic scattering theory, unified theories and models* (models of electroweak interactions, extensions of gauge or Higgs sector, quark and lepton masses and mixing, applications of electroweak models to specific processes, neutral currents in electroweak interactions, unified theories and models of strong and electroweak interactions, including those that involve gravitation, etc.), *Quantum Electrodynamics (QED)* (specific calculations and limits of QED, experimental tests of QED), *Quantum Chromodynamics (QCD)* (general properties, lattice QCD calculations, quark-gluon plasma, experimental tests), *models for strong interactions* (bag models, statistical models, Regge poles and cuts, peripheral, multiperipheral and multi-Regge models, duality and dual models, bootstrap model, absorptive, optical and eikonal models, potential models, vector-meson dominance, other composite models of quarks, leptons, gauge bosons, symmetry breaking, hadron mass formulas, etc.), *interactions, decays and processes* (interactions of leptons, i.d. neutrinos, electrons, muons, taus, and their corresponding antiparticles, among one another and with non-leptons, interactions of photons, interactions of hadrons with other hadrons (e.g., nucleon-nucleon, hyperon-nucleon, pion-baryon, kaon-baryon, meson-meson interactions), decays of mesons, baryons, leptons, intermediate bosons ( $W^+$ ,  $W^-$ ,  $Z$ ), electromagnetic processes and properties (electromagnetic mass differences, form factors and decays, electromagnetic moments, electromagnetic corrections to strong- and weak- interaction processes, etc.), *properties of particles and resonances* (properties of baryons and baryon resonances, meson and meson resonances, leptons, other particles, e.g., photons, quarks, intermediate bosons, including hypothetical particles, such as gluons, Higgs bosons, magnetic monopoles, supersymmetric particles, tachyons, etc.)

For:	- general quantum mechanics	use S71
	- general theory of scattering	use
S71	- high-energy physics instrumentation	use S46
	- nucleon-nucleon interactions in nuclei	use S73

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**S72 PHYSICS OF ELEMENTARY PARTICLES AND FIELDS**

*Comprehensive coverage is not obligatory for ETDE*

*Theory of fields and strings (axiomatic, Lagrangian and Hamiltonian approaches, renormalization, field theories in higher dimensions, such as Kaluza-Klein theories, Schwinger source theory, Bethe-Salpeter equations, relativistic wave equations, lattice gauge theory, techniques employed in field theory studies, such as strong-coupling expansions, theories of strings and other extended objects in the context of elementary particles, superstring theory, theory of quantized fields, etc.), symmetry, conservation laws, currents and their properties (Lorentz and Poincaré invariance, C, P, T and other discrete symmetries, flavor symmetries, internal symmetries, supersymmetry, spontaneous symmetry breaking, chiral symmetries, current algebras, studies concerning scalar, pseudoscalar, vector, axial vector and tensor currents, etc.), S-matrix theory (scattering matrices, dispersion relations, sum rules, bootstraps, crossing symmetries, Mandelstam representation, Regge formalism, etc.), relativistic scattering theory, unified theories and models (models of electroweak interactions, extensions of gauge or Higgs sector, quark and lepton masses and mixing, applications of electroweak models to specific processes, neutral currents in electroweak interactions, unified theories and models of strong and electroweak interactions, including those that involve gravitation, etc.), Quantum Electrodynamics (QED) (specific calculations and limits of QED, experimental tests of QED), Quantum Chromodynamics (QCD) (general properties, lattice QCD calculations, quark-gluon plasma, experimental tests), models for strong interactions (bag models, statistical models, Regge poles and cuts, peripheral, multiperipheral and multi-Regge models, duality and dual models, bootstrap model, absorptive, optical and eikonal models, potential models, vector-meson dominance, other composite models of quarks, leptons, gauge bosons, symmetry breaking, hadron mass formulas, etc.), interactions, decays and processes (interactions of leptons, i.d. neutrinos, electrons, muons, tauons, and their corresponding antiparticles, among one another and with non-leptons, interactions of photons, interactions of hadrons with other hadrons (e.g., nucleon-nucleon, hyperon-nucleon, pion-baryon, kaon-baryon, meson-meson interactions), decays of mesons, baryons, leptons, intermediate bosons ( $W^+$ ,  $W^-$ ,  $Z$ ), electromagnetic processes and properties (electromagnetic mass differences, form factors and decays, electromagnetic moments, electromagnetic corrections to strong- and weak- interaction processes, etc.), properties of particles and resonances (properties of baryons and baryon resonances, meson and meson resonances, leptons, other particles, e.g., photons, quarks, intermediate bosons, including hypothetical particles, such as gluons, Higgs bosons, magnetic monopoles, supersymmetric particles, tachyons, etc.)*

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**S73 NUCLEAR PHYSICS AND RADIATION PHYSICS**

***Nuclear Structure***

**General and average properties of nuclei and nuclear energy levels:** masses, binding energies, mass and charge distributions, spin, parity, isospin, spectroscopic factors, static electromagnetic moments, level densities, strength functions, collective levels and giant resonances, Coulomb energies, nuclear forces, few-nucleon systems, nuclear matter, hypernuclei, etc. **Nuclear structure models and methods:** shell models, collective models, models based on group theory, cluster models, Hartree-Fock and random-phase approximations, etc.

**Radioactivity and electromagnetic transitions:** alpha decay, proton-emission decay, decay by emission of heavier composite particles, beta decay, electron and muon capture, including weak-interaction and lepton aspects of beta decay and electron and muon capture by nuclei, and the relation with nuclear matrix elements and nuclear structure, transition probabilities and lifetimes, multipole matrix elements, multipole mixing ratios, internal conversion and extranuclear effects, nuclear resonance fluorescence, angular distribution and correlation measurements of electromagnetic transitions, gamma transitions and level energies, Moessbauer effect, etc.

**Nuclear reactions and scattering:** nuclear reactions and scattering models and methods, resonance reactions and scattering, direct reactions, statistical reactions and fluctuations, polarization in reactions and scattering, specific nuclear reactions and scattering (photonuclear reactions and photon scattering, lepton-, nucleon-, deuteron-, triton-, helion-, and alpha particle-induced reactions and scattering, heavy-ion-induced reactions and scattering, meson and hyperon-induced reactions and scattering, fission, both spontaneous and induced)

***Radiation Physics***

*Note: X radiation, gamma radiation, bremsstrahlung, neutrons, electrons, protons, deuterons, alpha particles, heavy ions, other particles*

(interactions of radiations with bulk matter and radiation transport: scattering, absorption, diffusion of radiations as they pass through macroscopic systems, including thermalization, multiplication, and moderation of neutrons, solution of the neutron transport equation and theoretical neutron transport in matter in general geometric configurations such as spheres, cylinders, plates, etc., range-energy relations, energy loss mechanisms and absorption mechanisms, shielding calculations and experiments for which no more appropriate category is identifiable)

- For:
- theory and applications of nuclear phenomena and techniques to solid state and fluid physics use S75
  - nuclear phenomena and techniques in atomic and molecular physics use S74
  - muon-catalyzed fusion, or fusion reactions in plasma physics use S70
  - calculation and measurement of absorbed doses in tissue-equivalent materials and phantoms, or calculation and measurement of absorbed doses in man, animals and plants use S61
  - calculation and measurement of absorbed doses in radiation processing use
- S07
- reactor physics use S22
  - accelerator shielding use
- S43
- fission reactor shielding see S21, S22
  - thermonuclear reactor shielding use S70
  - neutron beams used in solid state and fluid physics study use
- S75
- radiation protection standards, or radiation protection procedures use S61
  - physical radiation effects on materials use S36
  - radiation effects on instruments, components or electronic devices use S46
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**S73 NUCLEAR PHYSICS AND RADIATION PHYSICS**

*Comprehensive coverage is not obligatory for ETDE*

*Nuclear Structure*

*General and average properties of nuclei and nuclear energy levels (masses, binding energies, mass and charge distributions, spin, parity, isospin, spectroscopic factors, static electromagnetic moments, level densities, strength functions, collective levels and giant resonances, Coulomb energies, nuclear forces, few-nucleon systems, nuclear matter, hypernuclei, etc.), nuclear structure models and methods (shell models, collective models, models based on group theory, cluster models, Hartree-Fock and random-phase approximations, etc.)*

*Radioactivity and electromagnetic transitions (alpha decay, proton-emission decay, decay by emission of heavier composite particles, beta decay, electron and muon capture, including weak-interaction and lepton aspects of beta decay and electron and muon capture by nuclei, and the relation with nuclear matrix elements and nuclear structure), transition probabilities and lifetimes, multipole matrix elements, multipole mixing ratios, internal conversion and extranuclear effects, nuclear resonance fluorescence, angular distribution and correlation measurements of electromagnetic transitions, gamma transitions and level energies, Moessbauer effect, etc.)*

*Nuclear reactions and scattering (nuclear reactions and scattering models and methods, resonance reactions and scattering, direct reactions, statistical reactions and fluctuations, polarization in reactions and scattering, specific nuclear reactions and scattering (photonuclear reactions and photon scattering, lepton-, nucleon-, deuteron-, triton-, helion-, and alpha particle-induced reactions and scattering, heavy-ion-induced reactions and scattering, meson and hyperon-induced reactions and scattering, fission, both spontaneous and induced)*

*Radiation Physics*

*Note: X radiation, gamma radiation, bremsstrahlung, neutrons, electrons, protons, deuterons, alpha particles, heavy ions, other particles*

*(interactions of radiations with bulk matter and radiation transport: scattering, absorption, diffusion of radiations as they pass through macroscopic systems, including thermalization, multiplication, and moderation of neutrons, solution of the neutron transport equation and theoretical neutron transport in matter in general geometric configurations such as spheres, cylinders, plates, etc., range-energy relations, energy loss mechanisms and absorption mechanisms, shielding calculations and experiments for which no more appropriate category is identifiable)*

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**S74 ATOMIC AND MOLECULAR PHYSICS**

**Theory of electronic structure of atoms and molecules:** general theory of electronic structure and transitions, specific calculations and results for atoms relevant to nuclear physics or technology, such as hydrogen, deuterium, tritium, helium, fission products, lanthanides, scandium, technetium, yttrium, and elements with Z greater than 83, and for molecules of hydrogen, deuterium, tritium, helium, fission products, and compounds of technetium and elements with Z greater than 83, effects of molecular interactions on electronic structure of the atoms and molecules specified above, corrections to electronic structure, e.g. hyperfine interactions, isotope effects, radiative and relativistic effects, for the atoms specified above, excited states of the atoms and molecules specified above

**Atomic and molecular spectra, interactions with photons:** Zeeman and Stark effects, electron paramagnetic resonance (EPR) and relaxation, optical activity, dichroism, magneto-optical and electro-optical effects, and photon collisions with atoms of hydrogen, deuterium, tritium, helium, fission products, lanthanides, scandium, technetium, yttrium, and elements with Z greater than 83, molecules of hydrogen, deuterium, tritium, helium, fission products, compounds of technetium and elements with Z greater than 83, and elements of interest for thermonuclear fusion, such as lithium, beryllium, boron, carbon, oxygen, neon, magnesium, aluminium, silicon, argon, titanium, vanadium, chromium, iron, nickel, copper, gallium, krypton, niobium, molybdenum, xenon, tantalum and tungsten, fluorescence and phosphorescence of promethium and its compounds and the atoms and molecules specified above, use of nuclear phenomena and techniques in studies of any aspects of atomic and molecular properties and structure, e.g., nuclear magnetic resonance (NMR), nuclear quadrupole resonance (NQR), multiple resonances (DNMR, ENDOR, etc.), Moessbauer effect for the atoms or molecules specified above

**Collision phenomena:** general theories and models, experimental and theoretical studies of elastic scattering, excitation, de-excitation, excitation transfer, ionization, dissociation, charge exchange, electron capture, electron loss, electron attachment, or electron detachment in electron-ion, electron-atom, electron-molecule, ion-ion, ion-atom, ion-molecule, atom-atom, and atom-molecule collisions, involving atoms, molecules or ions of nuclear relevance or of interest for thermonuclear fusion **Experimentally derived information on atomic and molecular properties:** masses, abundances, moments, polarizability, fine- and hyperfine-structure constants, ionization potentials, electron affinities, bond strengths, dissociation energies, rotation, vibration and vibration-rotation constants, etc., of atoms of hydrogen, deuterium, tritium, helium, fission products, lanthanides, scandium, technetium, yttrium, and elements with Z greater than 83, molecules of hydrogen, deuterium, tritium, helium, fission products, compounds of technetium and elements with Z greater than 83, and for elements of interest for thermonuclear fusion **Special atoms and molecules:** positronium, muonium, muonic and mesic atoms and molecules, hyperonic atoms and molecules, i.e. atoms in which the nucleus is a positron or muon, or which have one or more particles other than electrons in the electronic structure, quantum properties of macromolecules and atomic and molecular clusters, other special atoms and molecules

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|--|---------|
| For: - electronic structure and transitions in condensed matter                      | use S75 |
| - electron-electron interactions   | use S72 |
| - nuclear reactions  | use S73 |
| - thermonuclear reactions, or collisions in fusion plasmas, or muon-catalyzed fusion | use S70 |
| - positron annihilation as a tool for studies in condensed matter                    | use S75 |
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**S74 ATOMIC AND MOLECULAR PHYSICS*****Comprehensive coverage is not obligatory for ETDE***

*Theory of electronic structure of atoms and molecules (general theory of electronic structure and transitions, specific calculations and results for atoms relevant to nuclear physics or technology, such as hydrogen, deuterium, tritium, helium, fission products, lanthanides, scandium, technetium, yttrium, and elements with Z greater than 83, and for molecules of hydrogen, deuterium, tritium, helium, fission products, and compounds of technetium and elements with Z greater than 83, effects of molecular interactions on electronic structure of the atoms and molecules specified above, corrections to electronic structure, e.g. hyperfine interactions, isotope effects, radiative and relativistic effects, for the atoms specified above, excited states of the atoms and molecules specified above); Atomic and molecular spectra, interactions with photons (Zeeman and Stark effects, electron paramagnetic resonance (EPR) and relaxation, optical activity, dichroism, magneto-optical and electro-optical effects, and photon collisions with atoms of hydrogen, deuterium, tritium, helium, fission products, lanthanides, scandium, technetium, yttrium, and elements with Z greater than 83, molecules of hydrogen, deuterium, tritium, helium, fission products, compounds of technetium and elements with Z greater than 83, and elements of interest for thermonuclear fusion, such as lithium, beryllium, boron, carbon, oxygen, neon, magnesium, aluminium, silicon, argon, titanium, vanadium, chromium, iron, nickel, copper, gallium, krypton, niobium, molybdenum, xenon, tantalum and tungsten, fluorescence and phosphorescence of promethium and its compounds and the atoms and molecules specified above, use of nuclear phenomena and techniques in studies of any aspects of atomic and molecular properties and structure, e.g., nuclear magnetic resonance (NMR), nuclear quadrupole resonance (NQR), multiple resonances (DNMR, ENDOR, etc.), Moessbauer effect for the atoms or molecules specified above);*

*Collision phenomena (general theories and models, experimental and theoretical studies of elastic scattering, excitation, de-excitation, excitation transfer, ionization, dissociation, charge exchange, electron capture, electron loss, electron attachment, or electron detachment in electron-ion, electron-atom, electron-molecule, ion-ion, ion-atom, ion-molecule, atom-atom, and atom-molecule collisions, involving atoms, molecules or ions of nuclear relevance or of interest for thermonuclear fusion),*

*Experimentally derived information on atomic and molecular properties (masses, abundances, moments, polarizability, fine- and hyperfine-structure constants, ionization potentials, electron affinities, bond strengths, dissociation energies, rotation, vibration and vibration-rotation constants, etc., of atoms of hydrogen, deuterium, tritium, helium, fission products, lanthanides, scandium, technetium, yttrium, and elements with Z greater than 83, molecules of hydrogen, deuterium, tritium, helium, fission products, compounds of technetium and elements with Z greater than 83, and for elements of interest for thermonuclear fusion).*

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## INIS Scope Descriptions

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### S75 CONDENSED MATTER PHYSICS, SUPERCONDUCTIVITY AND SUPERFLUIDITY

**Nuclear techniques in condensed matter physics:** advances in the use of nuclear techniques or measurement methods in studies of the structure, including electronic structure, of solids and liquids (e.g., neutron diffraction and scattering, spin-polarized electron scattering, synchrotron -source X-ray scattering, nuclear magnetic resonance and relaxation, including ENDOR, DNMR), muon spin rotation and relaxation, Moessbauer effect and other gamma -ray spectroscopy, positron annihilation

**Solid-state plasma, physics of surfaces, interfaces and thin films:** studies of solid-state plasma in bulk matter, surfaces, interfaces and thin films, including electron-hole droplets, physics studies of surfaces, interfaces and thin films of indicated interest for nuclear science and technology

**Interactions between beams and condensed matter:** (effects, including channeling, blocking, ion implantation and generation of crystal defects, from bombardment with laser radiation, X-rays, gamma rays, electrons, positrons, neutrons, ions, atoms, and molecules where the interest is in the effect itself at the microscopic level and not in the material in which it takes place, impact phenomena, Auger emission, secondary emission, sputtering, etc., from the collisions of electrons, ions, atoms and molecules with surfaces

**Quantum physics aspects of condensed matter** such as **superconductivity** (*both low-temperature and high-temperature superconductivity*) (basic superconductivity studies **relevant to nuclear technology**, basic theory, review studies, general properties, such as magnetization curves, thermodynamic properties, response to electromagnetic fields, nuclear magnetic resonance, flux pinning, critical currents), **superconducting devices** (application of superconductivity in magnets or other devices of use in nuclear science, including devices using superconductors or superconducting junctions as components; *routine applications are excluded*), **superfluidity** (phenomenology, hydrodynamics, transport processes, models, etc., of superfluid helium-4 (He II), superfluid helium-3 and He II-He-3 mixtures), other **quantum aspects** of condensed matter (e.g. studies of phenomena relying on quantum statistics, electron-phonon coupling, spin-lattice relaxation, energy bands)

- For: - nuclear techniques in studies of atomic and molecular properties use  
S74  
- Moessbauer effect in nuclear physics use S73  
- physical properties and structure of materials of nuclear interest , or  
processing and fabrication of materials of nuclear interest  
using radiations or particle beams (including plasma processing) use  
S36  
- energy loss and range relations use S73  
- radiation effects on mechanical integrity or physical properties of  
specific materials use S36  
- radiation effects on chemical properties of fluids and solids use S38  
- radiation effects on instruments, components or electronic devices use S46  
- superconducting properties of materials see also S36  
- superconducting devices that are components of larger devices see category  
for the larger  
device
-

**S75 CONDENSED MATTER PHYSICS, SUPERCONDUCTIVITY AND SUPERFLUIDITY**

*Comprehensive coverage is not obligatory for ETDE*

*Nuclear techniques in condensed matter physics (advances in the use of nuclear techniques or measurement methods in studies of the structure, including electronic structure, of solids and liquids (e.g., neutron diffraction and scattering, spin-polarized electron scattering, synchrotron -source X-ray scattering, nuclear magnetic resonance and relaxation, including ENDOR, DNMR), muon spin rotation and relaxation, Moessbauer effect and other gamma -ray spectroscopy, positron annihilation);*

*Solid-state plasma, physics of surfaces, interfaces and thin films (studies of solid-state plasma in bulk matter, surfaces, interfaces and thin films, including electron-hole droplets, physics studies of surfaces, interfaces and thin films of indicated interest for nuclear science and technology);*

*Interactions between beams and condensed matter (effects, including channeling, blocking, ion implantation and generation of crystal defects, from bombardment with laser radiation, X-rays, gamma rays, electrons, positrons, neutrons, ions, atoms, and molecules where the interest is in the effect itself at the microscopic level and not in the material in which it takes place, impact phenomena, Auger emission, secondary emission, sputtering, etc., from the collisions of electrons, ions, atoms and molecules with surfaces);*

*Quantum physics aspects of condensed matter such as superconductivity (both low-temperature and high-temperature superconductivity) (basic superconductivity studies relevant to nuclear technology, basic theory, review studies, general properties, such as magnetization curves, thermodynamic properties, response to electromagnetic fields, nuclear magnetic resonance, flux pinning, critical currents), superconducting devices (application of superconductivity in magnets or other devices of use in nuclear science, including devices using superconductors or superconducting junctions as components; routine applications are excluded), superfluidity (phenomenology, hydrodynamics, transport processes, models, etc., of superfluid helium-4 (He II), superfluid helium-3 and He II-He-3 mixtures), other quantum aspects of condensed matter (e.g. studies of phenomena relying on quantum statistics, electron-phonon coupling, spin-lattice relaxation, energy bands)*

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## INIS Scope Descriptions

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### S98 NUCLEAR DISARMAMENT, SAFEGUARDS AND PHYSICAL PROTECTION

**Legal aspects of: nuclear disarmament**, all nuclear safeguards issues, non-proliferation of nuclear weapons and nuclear-weapon free zones, including the monitoring of nuclear materials derived from arms reduction and conversion, comprehensive nuclear weapons test ban, national arms control policy and aspects of treaty compliance and verification, physical protection, peaceful nuclear explosions, peaceful uses of sea-bed and space, nuclear weapons tests

**Safeguards** (those measures designed to guard against the diversion of material, such as source and special nuclear material, from uses permitted by law or treaty, and to give timely indication of possible diversion or credible assurance that no diversion has occurred):

**Technical aspects of safeguards**: research, development and implementation of systems, techniques, instrumentation and inspection procedures to detect diversion of nuclear material or materials of special interest, such as heavy water from peaceful nuclear activities, including monitoring nuclear materials derived from arms reduction and conversion; development of nuclear materials accounting systems covering the physical security of materials in transit, in use or in storage

**Non-technical aspects of safeguards**: administrative, political, economic, organizational and other aspects of the development and application of safeguards, including implementation of safeguards to the verification arrangements for regional nuclear-weapon-free-zones and the monitoring of nuclear materials derived from arms reduction and conversion

For: - non-legal aspects of nuclear explosions use S42  
- particular instruments use S46

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### S99 GENERAL AND MISCELLANEOUS

**Organization and administration of nuclear activities**: general relevant documents dealing with organization, administration, financing and general description of nuclear institutes and programmes (e.g., directories, reference books, manuals, lists of publications, general bibliographies, training programmes), constitution of competent authorities, legal aspects of governmental bodies, international organizations, public and semi-public undertakings, private corporations, legislation on research and development, patent regimes, state security, legal aspects of emergency planning

**Nuclear documentation, data and literature handling**: descriptions and evaluations of systems, both manual and computer-based, for collecting, analysing, evaluating and publishing data, literature and bibliographic information relating to nuclear science and its applications; nuclear libraries, standardization of nuclear terminology

**Nuclear computation and simulation**: mathematical methods and models, computer codes and programs especially developed for solving problems in nuclear science and technology

*Note: only for descriptions of methods, codes and programs*

**Miscellaneous**: historical, philosophical, educational aspects of relevance to nuclear science and technology, progress reports covering several scientific disciplines of relevance to nuclear science and technology, if bibliographic subdivision is not possible or warranted

For: - non-legal aspects of emergency planning see category  
for  
installation  
  
- data collections on particular topics, or  
mathematical models appropriate to specific subjects, or  
bibliographies on particular topics see  
  
appropriate  
  
- electronic and other instrumentation for data acquisition categories  
use  
S46

## ETDE Scope Descriptions

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### **S98 NUCLEAR DISARMAMENT, SAFEGUARDS AND PHYSICAL PROTECTION**

*Legal aspects of nuclear disarmament*, of all nuclear safeguards issues, non-proliferation of nuclear weapons and nuclear-weapon-free zones, including the monitoring of nuclear materials derived from arms reduction and conversion; comprehensive nuclear weapons test ban; national arms control policy and aspects of treaty compliance and verification; legal aspects of **physical protection**; legal aspects of peaceful nuclear explosions, peaceful uses of sea-bed and space; legal aspects of nuclear weapons tests.

*Safeguards (those measures designed to guard against the diversion of material, such as source and special nuclear material, from uses permitted by law or treaty, and to give timely indication of possible diversion or credible assurance that no diversion has occurred)*. Legal aspects of all nuclear safeguards issues. Technical aspects (research, development and implementation of systems, techniques, instrumentation and inspection procedures to detect diversion of nuclear material or materials of special interest, such as heavy water from peaceful nuclear activities, including monitoring nuclear materials derived from arms reduction and conversion; development of nuclear materials accounting systems covering the physical security of materials in transit, in use or in storage). Non-Technical Aspects (administrative, political, economic, organizational and other aspects of the development and application of safeguards, including implementation of safeguards to the verification arrangements for regional nuclear-weapon-free-zones and the monitoring of nuclear materials derived from arms reduction and conversion).

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### **S99 GENERAL AND MISCELLANEOUS**

This section is intended to support research interests by organizations in the disciplines of mathematics, computing and information science, data and literature handling and general law. Includes relevant documents dealing with organizations, administration, financing, general descriptions of institutions and programs, directories, reference books, lists of publications, historical, philosophical and educational aspects. This category should be used if an item cannot be categorized elsewhere.

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## Appendix 1

### Guide for elements of nuclear interest

This list is provided as a guide to the principal elements of nuclear interest. In addition to the elements mentioned explicitly it also includes **all fission products**. Literature on elements not listed should only be included if positively identified as of nuclear interest. Even for the elements listed, judgment must be used. The study of a large molecule which incidentally includes an element of interest as a minor constituent seldom contributes to the knowledge of the properties of that element, and thus would be outside the scope of INIS.

ACTINIUM	(Ac)	NEPTUNIUM	(Np)
AMERICIUM	(Am)	NIOBIUM	(Nb)
ASTATINE	(At)	NOBELIUM	(No)
BERKELIUM	(Bk)	PLUTONIUM	(Pu)
BERYLLIUM	(Be)	POLONIUM	(Po)
BORON	(B)	PRASEODYMIUM	(Pr)
CADMIUM	(Cd)	PROMETHIUM	(Pm)
CALIFORNIUM	(Cf)	PROTACTINIUM	(Pa)
CERIUM	(Ce)	RADIUM	(Ra)
CESIUM	(Cs)	RADON	(Rn)
CURIUM	(Cm)	RHENIUM	(Re)
DYSPROSIUM	(Dy)	RUTHENIUM	(Ru)
EINSTEINIUM	(Es)	SAMARIUM	(Sm)
ERBIUM	(Er)	SCANDIUM	(Sc)
EUROPIUM	(Eu)	STRONTIUM	(Sr)
FERMIUM	(Fm)	TANTALUM	(Ta)
FRANCIUM	(Fr)	TECHNETIUM	(Tc)
GADOLINIUM	(Gd)	TELLURIUM	(Te)
HAFNIUM	(Hf)	TERBIUM	(Tb)
HOLMIUM	(Ho)	THORIUM	(Th)
INDIUM	(In)	THULIUM	(Tm)
IODINE	(I)	TUNGSTEN (WOLFRAM)	(W)
LANTHANUM	(La)	URANIUM	(U)
LAWRENCIUM	(Lr)	VANADIUM	(V)
LITHIUM	(Li)	YTTERBIUM	(Yb)
LUTETIUM	(Lu)	YTTRIUM	(Y)
MENDELEVIUM	(Md)	ZIRCONIUM	(Zr)
MOLYBDENUM	(Mo)	ALL ELEMENTS WITH $Z > 103$	
NEODYMIUM	(Nd)	ALL FISSION PRODUCTS	



**Appendix 2**  
**THE INTERNATIONAL NUCLEAR EVENT SCALE**  
**for prompt communication of safety significance**

LEVEL	DESCRIPTOR	CRITERIA	EXAMPLES
<b>ACCIDENTS</b>  7	<b>MAJOR ACCIDENT</b>	<ul style="list-style-type: none"> <li>External release of a large fraction of the radioactive material in a large facility (e.g. the core of a power reactor). This would typically involve a mixture of short and long-lived radioactive fission products (in quantities radiologically equivalent to more than tens of thousands terabecquerels of iodine-131). Such a release would result in the possibility of acute health effects; delayed health over a wide area, possibly involving more than one country; long-term environmental consequences.</li> </ul>	Chernobyl NPP, USSR (now in Ukraine), 1986
6	<b>SERIOUS ACCIDENT</b>	<ul style="list-style-type: none"> <li>External release of radioactive material (in quantities radiologically equivalent to the order of thousands to tens of thousands of terabecquerels of iodine-131). Such a release would be likely to result in full implementation of countermeasures covered by local emergency plans to limit serious health effects.</li> </ul>	Kyshtym Reprocessing Plant, USSR (now in Russia), 1957
5	<b>ACCIDENT WITH OFF-SITE RISK</b>	<ul style="list-style-type: none"> <li>External release of radioactive material (in quantities radiologically equivalent to the order of hundreds to thousands of terabecquerels of iodine-131). Such a release would be likely to result in partial implementation of countermeasures covered by emergency plans to lessen the likelihood of health effects.</li> <li>Severe damage to the nuclear facility. This may involve severe damage to a large fraction of the core of a power reactor, a major criticality accident or a major fire or explosion releasing large quantities of radioactivity within the installation.</li> </ul>	Windscale Pile, UK, 1957  Three Mile Island, USA, 1979
4	<b>ACCIDENT WITHOUT SIGNIFICANT OFF-SITE RISK</b>	<ul style="list-style-type: none"> <li>External release of radioactivity resulting in a dose to the most exposed individual off-site of the order of a few millisievert.* With such a release the need for off-site protective actions would be generally unlikely expect possibly for local food control.</li> <li>Significant damage to the nuclear facility. Such an accident might include damage to nuclear plant leading to major on-site recovery problems such as partial core melt in a power reactor and comparable events at non-reactor installations.</li> <li>Irradiation of one or more workers which results in an overexposure where a high probability of early death occurs.</li> </ul>	Windscale Reprocessing Plant, UK, 1973 Saint-Laurent NPP, France, 1980  Buenos Aires Critical Assembly, Argentina, 1983
<b>INCIDENTS</b>  3	<b>SERIOUS INCIDENT</b>	<ul style="list-style-type: none"> <li>External release of radioactivity above authorized limits, resulting in a dose to the most exposed individual off site of the order of tenths of millisievert.* With such a release, off-site protective measures may not be needed.</li> <li>On-site events resulting in doses to workers sufficient to cause acute health effects and/or an event resulting in a severe spread of contamination for example a few thousand terabecquerels of activity released in a secondary containment where the material can be returned to a satisfactory storage area.</li> <li>Incidents in which a further failure of safety systems could lead to accident conditions, or a situation in which safety systems would be unable to prevent an accident if certain initiators were to occur.</li> </ul>	Vandellos NPP, Spain, 1989
2	<b>INCIDENT</b>	<ul style="list-style-type: none"> <li>Incidents with significant failure in safety provisions but with sufficient defence in depth remaining to cope with additional failures.</li> <li>An event resulting in a dose to a worker exceeding a statutory annual dose limit and/or an event which leads to the presence of significant quantities of radioactivity in the installation in areas not expected by design and which require corrective action.</li> </ul>	
1	<b>ANOMALY</b>	<ul style="list-style-type: none"> <li>Anomaly beyond the authorized operating regime. This may be due to equipment failure, human error or procedural inadequacies. (Such anomalies should be distinguished from situations where operational limits and conditions are not exceeded and which are properly managed in accordance with adequate procedures. These are typically "below scale".)</li> </ul>	
<b>BELOW SCALE / ZERO</b>	<b>DEVIATION</b>	NO SAFETY SIGNIFICANCE	

- The doses are expressed in terms of effective dose equivalent (whole body dose). Those criteria where appropriate can also be expressed in terms of corresponding annual effluent discharge limits authorized by National Authorities.

### Appendix 3

#### Correlation between the previous INIS categories and the new categories

<b>B00.00</b>	<b>CHEMISTRY, MATERIALS AND EARTH SCIENCES</b>	
<b>B10.00</b>	Chemistry .....	S37, S38
<b>B11.00</b>	Chemical and Isotopic Analysis .....	S37
<b>B11.10</b>	Nuclear Methods in Chemical and Isotopic Analysis .....	S37
<b>B11.20</b>	Nonnuclear Methods in Chemical and Isotopic Analysis .....	S37
<b>B11.30</b>	Separation Procedures in Chemical and Isotopic Analysis .....	S37
<b>B12.00</b>	Inorganic, Organic and Physical Chemistry .....	S37
<b>B12.10</b>	Chemical and Physico-Chemical Studies .....	S37
<b>B12.20</b>	Isotope Effects, Isotope Exchange and Isotope.....	S37
<b>B13.00</b>	Radiochemistry and Nuclear Chemistry .....	S38
<b>B13.10</b>	Hot-Atom Chemistry .....	S38
<b>B13.20</b>	Properties of Radioactive Materials .....	S38
<b>B13.30</b>	Preparation of Radioactively-Labelled Compounds.....	S38
<b>B14.00</b>	Radiation Chemistry.....	S38
<b>B16.00</b>	Fission Fuels.....	S11
<b>B16.10</b>	Fuel Processing.....	S11
<b>B16.20</b>	Spent Fuel Reprocessing .....	S11
<b>B20.00</b>	Materials.....	S36
<b>B22.00</b>	Metals and Alloys .....	S36
<b>B22.10</b>	Preparation and Fabrication .....	S36
<b>B22.20</b>	Structure and Phase Studies .....	S36
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<b>B22.40</b>	Superconducting and Other Physical Properties .....	S36
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<b>S04</b>	OIL SHALES AND TAR SANDS	<b>C5614, F1514</b>
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<b>S24</b>	POWER TRANSMISSION AND DISTRIBUTION	<b>C5650, F1550</b>
<b>S25</b>	ENERGY STORAGE	<b>C5640, F1540</b>
<b>S29</b>	ENERGY PLANNING, POLICY AND ECONOMY	<b>C5700, F1000, F1100, F1400, F1510, F1520, E1800</b>
<b>S30</b>	DIRECT ENERGY CONVERSION	<b>E1800</b>
<b>S32</b>	ENERGY CONSERVATION, CONSUMPTION AND UTILIZATION	<b>none</b>
<b>S33</b>	ADVANCED PROPULSION SYSTEMS	<b>none</b>
<b>S36</b>	MATERIALS SCIENCES	<b>B2200-B2260, B2300- B2360, B2400-B2460</b>
<b>S37</b>	INORGANIC, ORGANIC, PHYSICAL AND ANALYTICAL CHEMISTRY	<b>B1100-B1220</b>
<b>S38</b>	RADIATION CHEMISTRY, RADIOCHEMISTRY AND NUCLEAR CHEMISTRY	<b>B1300-B1330, B1400</b>
<b>S42</b>	ENGINEERING	<b>E1000-E1530, E1700</b>
<b>S43</b>	PARTICLE ACCELERATORS	<b>E1600-E1640</b>
<b>S46</b>	INSTRUMENTATION RELATED TO NUCLEAR SCIENCE AND TECHNOLOGY	<b>E4000-E4300</b>
<b>S47</b>	OTHER INSTRUMENTATION	<b>none</b>
<b>S54</b>	ENVIRONMENTAL SCIENCES	<b>B3000-B3120, B3140- B3160, B3200-B3220, B3240-B3260, B3300- B3360, C5000, C5200, C5210, C5213, C5220, C5223, C5230, C5233, C5240, C5243, C5600, C5610, C5620, C5700</b>
<b>S58</b>	GEOSCIENCES	<b>none (B3120-40, B3220- 40, B3330-40)</b>
<b>S60</b>	APPLIED LIFE SCIENCES	<b>C4000-C4500</b>



<b>S61</b>	RADIATION PROTECTION AND DOSIMETRY	<b>C5300-C5500, F2300</b>
<b>S62</b>	RADIOLOGY AND NUCLEAR MEDICINE	<b>C6000-C6400</b>
<b>S63</b>	RADIATION, THERMAL, AND OTHER ENVIRONMENTAL POLLUTANT EFFECTS ON LIVING ORGANISMS AND BIOLOGICAL MATERIALS	<b>C1000-C1500, C2000- C2120</b>
<b>S70</b>	PLASMA PHYSICS AND FUSION TECHNOLOGY	<b>F1120, F1220, G5000- G5190, G5200-G5280</b>
<b>S71</b>	CLASSICAL AND QUANTUM MECHANICS, GENERAL PHYSICS	<b>G1000-G1300</b>
<b>S72</b>	PHYSICS OF ELEMENTARY PARTICLES AND FIELDS	<b>G2000-G2440</b>
<b>S73</b>	NUCLEAR PHYSICS INCLUDING RADIATION PHYSICS	<b>G3000-G3620</b>
<b>S74</b>	ATOMIC AND MOLECULAR PHYSICS	<b>G4000-G4500</b>
<b>S75</b>	CONDENSED MATTER PHYSICS, SUPERCONDUCTIVITY AND SUPERFLUIDITY	<b>G6000-G6520</b>
<b>S98</b>	NUCLEAR DISARMAMENT, SAFEGUARDS AND PHYSICAL PROTECTION	<b>F2800, F4000-F4200</b>
<b>S99</b>	GENERAL AND MISCELLANEOUS	<b>F2000, F2700, F3000- F3200 F5000-F5100, F6000</b>

**Appendix 5**  
**Correlation between the old ETDE categories and the new common categories**

In general the first two digits of the former six-digit ETDE categories are identical with the new common ETDE/INIS category beginning with the letter S. Deviations are due to the splitting of single ETDE-categories into two or more categories.

The list below contains the deviations written in bold letters.

<b>Old Category</b>	<b>New</b>	<b>Old Category</b>	<b>New</b>
01..	S01	<b>400000 to 400500</b>	<b>S37</b>
02..	S02	<b>400600 to 400703</b>	<b>S38</b>
03..	S03	<b>400800</b>	<b>S37</b>
04..	S04	42..	S42
<b>050000 to 051000</b>	<b>S11</b>	43..	S43
<b>052000 to 052002</b>	<b>S12</b>	<b>440000 to 440200</b>	<b>S46</b>
<b>053000 to 054000</b>	<b>S11</b>	<b>440400 to 440800</b>	<b>S47</b>
<b>0550..</b>	<b>S98</b>	54.. S54	
<b>056000</b>	<b>S11</b>	<b>550000 to 550501</b>	<b>S60</b>
07..	S07	<b>5506..</b>	<b>S62</b>
08..	S08	<b>550700 to 553006</b>	<b>S60</b>
09..	S09	<b>560000</b>	<b>S60</b>
10..	S10	<b>560100</b>	<b>S63</b>
13..	S13	<b>560101</b>	<b>S61</b>
14..	S14	<b>560120 to 560162</b>	<b>S63</b>
15..	S15	<b>560180 to 560190</b>	<b>S61</b>
16..	S16	<b>560200 to 560400</b>	<b>S63</b>
17..	S17	<b>570000</b>	<b>S60</b>
20..	S20	<b>570100</b>	<b>S22</b>
21..	S21	58..	S58
220000 to 220504	S22	<b>660000</b>	<b>S71, S72</b>
<b>220600</b>	<b>S21</b>		<b>S73, S74</b>
220900 to 220901	S22		<b>or S75</b>
24..	S24	<b>661..</b>	<b>S71</b>
25..	S25	<b>662..</b>	<b>S72</b>
29..	S29	<b>663..</b>	<b>S73</b>
30..	S30	<b>664..</b>	<b>S74</b>
32..	S32	<b>665..</b>	<b>S75</b>
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This index is included to assist the user in quickly locating keywords or phrases in the category titles or category scope notes. It should not be used when assigning categories or when searching; the text should always be consulted before performing either function.

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