

Charter for the Joint Dark Energy Mission Science Coordination Group September 2008

Purpose: The Joint Dark Energy Mission (JDEM) Science Coordination Group (SCG) is being constituted by NASA and DOE to aid in establishing preliminary requirements for JDEM (for NASA, JDEM is a strategic mission).

Background: The importance of the development and flight of a space-based dark energy mission was first enunciated in the National Research Council's 2003 report, *Connecting Quarks with the Cosmos, Eleven Science Questions for the New Century*. To determine an interagency strategy in response to this report, an Interagency Working Group on the Physics of the Universe (IWG) was chartered by the National Science and Technology Council's Committee on Science. In 2004 the IWG completed its report, *A 21st Century Frontier of Discovery: The Physics of the Universe; A Strategic Plan for Federal Research at the Intersection of Physics and Astronomy*, with the recommendation that "NASA and DOE will develop a Joint Dark Energy Mission (JDEM). This mission would best serve the scientific community if launched by the middle of the next decade." In 2007 the National Research Council's Beyond Einstein Program Assessment Committee (BEPAC) recommended (based on scientific importance and technical readiness) that JDEM be the first of NASA's Beyond Einstein Program mission suite to fly.

Based on these recommendations, NASA and DOE plan to develop and launch JDEM by the middle of the next decade.

Figure of Merit (FoM) Science Working Group (SWG): An ad hoc JDEM FoM SWG (1) has been convened to update the pioneering work of the Dark Energy Task Force (2). This group is re-examining the overarching science goals of a space-based dark energy mission and how the science performance of a mission is to be measured. The FoM SWG will also provide methodologies for the quantitative calculation of these measures. Their report will be completed in September, 2008, and will guide the SCG in their work.

Reference Mission: A JDEM Project Office (PO) has been established at Goddard Space Flight Center. This Office has overall management responsibility for the mission, and will interact closely with JDEM scientists during all phases of the mission. The JDEM PO, in coordination with the SCG, will develop a Reference Mission (RM) pre-conceptual design which demonstrates the existence of a configuration that meets the FoM SWG science goals as well as JDEM's programmatic constraints.

JDEM Announcement of Opportunity (AO): The JDEM AO, written jointly by NASA and DOE, is anticipated to be issued by NASA by the end of 2008, with joint selection of the science investigation teams occurring in 2009.

The AO will call for dark energy science investigations only. Ancillary science investigations will not be solicited in this AO. The proposed science investigations are to be based on a RM pre-conceptual design that will be described in the AO. A letter to the

community will be released to the community in mid-October and will provide certain advance information regarding the AO.

The AO will not solicit JDEM payload designs or hardware. The selected PI-led science investigation teams will not include the provision of flight hardware. All mission hardware, including the payload, will be built by the agencies and contracted industry partners or institutions.

The selected investigations will be announced in spring/summer 2009. The PIs of the selected investigations and their collaborators will participate on the science team for the prime dark energy mission, will work with the project offices at both agencies throughout the development of the mission, and will execute the dark energy science investigations after launch and commissioning of the observatory.

SCG Tasks:

1) The SCG will determine the top-level science and observational preliminary observational requirements and instrumentation capabilities for a JDEM mission using the science performance measures from the FoM SWG, incorporating at a minimum the Baryon Acoustic Oscillation (BAO), Supernovae (SN) and Weak Lensing (WL) techniques.

2) The SCG will evaluate the science performance of an initial RM, provided by the JDEM PO, using the BAO, SN and WL techniques. The SCG should consider whether additional techniques should be included to enhance the science performance of the RM, within programmatic constraints.

3) In coordination with the SCG and based on the requirements they have determined, the JDEM PO will make modifications to the initial RM design in order to optimize the mission's science return consistent with programmatic constraints on overall mission cost target, schedule, and technical risk. The resulting RM will enable the use of the BAO, SN, WL, and possibly other techniques. Details of this process will be presented to the SCG by the JDEM PO.

4) A RM description based on the joint work of the SCG and the JDEM PO will be prepared by the JDEM PO, suitable for incorporation into the JDEM AO. All proposals for science investigations will be based on the use of this RM. The RM description will be reviewed by the SCG, and then delivered to NASA and DOE headquarters by mid December, 2008.

Reporting: Based on the work of the SCG, the Chair will prepare a report to NASA and DOE Headquarters. This report will be delivered before the release of the JDEM AO. Before the JDEM AO is released, the SCG will be formally disbanded.

(1) FoM SWG Charter [<http://jdem.gsfc.nasa.gov>]

(2) DETF – chartered by HEPAP and AAAC [<http://arxiv.org/abs/astro-ph/0609591>]