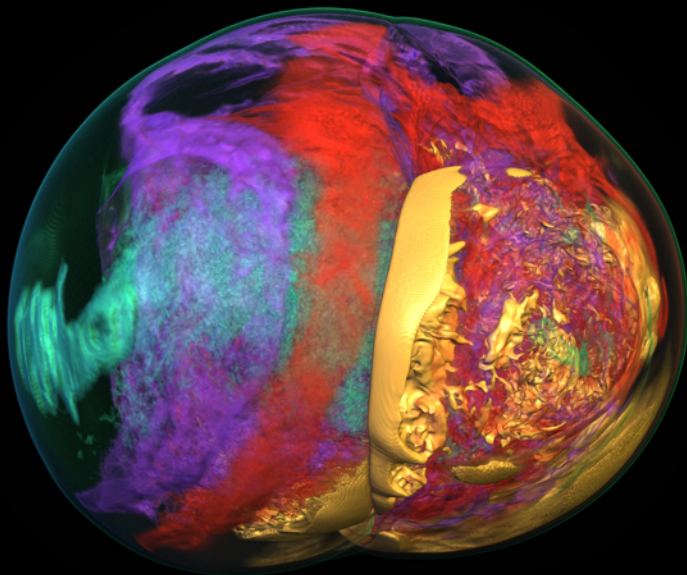


National Center for Computational Sciences

The Leadership Computing Facility (LCF), part of Oak Ridge National Laboratory's National Center for Computational Sciences (NCCS), provides an unparalleled environment for breakthrough science that will dramatically impact the nation's ability to produce a secure energy economy and increase mankind's understanding of our world, from the molecules in the air we breathe to the birth and death of the stars in the sky.



Astrophysics

The core collapse of a supernova—a massive star at the end of its life—creates a shock wave known as a stationary accretion shock instability (SASI) that might cause a star to explode. Researchers use the LCF's computing power to rapidly perform 3-D SASI simulations that provide fundamental insights into the physics of the event.

Climate

The LCF will enable much greater fidelity and complexity in simulations of the global climate, providing more accurate predictions of climate change to inform major policy decisions. Increased resolution will resolve important dynamic processes in clouds and ocean eddies. New physical processes, such as enhanced atmospheric chemistry and a full carbon cycle, will not only increase accuracy, but also open new avenues for scientific discovery and prediction.

Biology

Scientists are beginning to uncover the mysteries of life's smallest elements, such as biomolecules and molecular motors. These small wonders could one day lead to big breakthroughs, such as advances in environmental cleanup and alternative energy sources.

Chemistry

Chemists are using NCCS systems to characterize matter at increasingly detailed atomic and molecular levels. Understanding these structures and establishing exact benchmarks are critically important for a wide range of pursuits, from the study of contaminant dispersion in the environment to the development of treatments for genetic diseases.

