

Why Should You Care About Nuclear Fusion?

A general talk on fusion science and energy

Three quick answers to that question: you owe everything to fusion (Earth and you are fusion-created stardust and all stars are powered by fusion); fusion energy will be a topic of discussion for your entire life; the science and engineering challenges in obtaining sustained fusion on earth are interesting and connect to nearly all science. The talk will define fusion and how it works in stars. The current efforts to sustain inertial and magnetic fusion in the laboratory will be summarized. The talk will describe in some detail the most interesting endeavor right now, the attempt to reach inertial fusion ignition at the National Ignition Facility in Livermore, California using the world's largest laser to drive explosion of a tiny fusion fuel target. The world's largest fusion endeavor, the International Thermonuclear Experimental Reactor (ITER) under construction in Cadarache, France, will be outlined along with the magnetic confinement of plasma that it will rely on. Connections of these fusion concepts to astrophysics and materials science will be described. Why fusion energy is so attractive and so elusive will be discussed.



Wednesday, March 18
2:00 - 3:00 p.m.
RNS 210

Cookies and Apple Cider Served!

Dr. David H. Crandall

Retired after 40 years experience in fusion-related physics for the Department of Energy, Dr. Crandall is now an independent consultant on physics and policy related to national security issues. Retired from the Department of Energy in 2013, his experience includes 16 years of physics research, 25 years of science program management, and 5 years as senior advisor to political appointees at DOE. He has led significant scientific programs in plasma physics and Fusion Energy and in nuclear weapon Stockpile Stewardship prior to his current role. He entered the federal Senior Executive Service in 1987.

Dr. Crandall conducted research in atomic collisions from 1967-83 at the University of Nebraska (thesis research), at the University of Missouri at Rolla (visiting professor), at the Joint Institute for Laboratory Astrophysics in Boulder, CO (post doctoral fellow), and at the Oak Ridge National Laboratory (researcher and program manager), with over 100 refereed publications. The basic physics he produced is applied in the fields of plasma physics, fusion energy, astrophysics and nuclear weapon analysis. Dr. Crandall is a Fellow of the American Physical Society cited for his work on atomic collisions involving multiply-charged ions.

From 1983 -2013, Dr. Crandall served at the U.S. Department of Energy in Washington, D.C. He led numerous specific projects and complex scientific programs within the department. From 1983 he served as Branch Chief and then as Division Director in the Fusion Energy Program within the Office of Energy Research. In 1995, he joined the Office of Defense Programs where he served as Director of the Offices of the National Ignition Facility, Inertial Fusion, and Defense Sciences, and then as the Assistant Deputy Administrator for Research Development and Simulation, before becoming the National Nuclear Security Administration's Chief Scientist. During 2011-13 he served as advisor to the Under Secretary for Science at DOE. He has been recipient of the Presidential Award for Meritorious Executives within the Senior Executive Service.