PHYSICS AND ASTRONOMY COLLOQUIUM

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The National Ignition Facility: Pathway to Energy Security and Physics of the Cosmos

The National Ignition Facility (NIF), at Lawrence Livermore National Laboratory in Livermore, California, is the world's most energetic laser system. NIF is capable of producing over 1.8 MJ and 500 TW of ultraviolet light, 100 times more than any other operating laser. Completed in March 2009, it is maturing rapidly and transitioning into the world's premier high-energy-density science experimental facility, while supporting its strategic security, fundamental science, and energy security missions.

By concentrating intense laser energy into target only millimeters in length, NIF can, for the first time, produce conditions emulating those found in planetary interiors and stellar environments and creating fusion energy to power our future. The extreme conditions of energy density, pressure, and temperature will enable scientists to pursue fundamental science experiments designed to address a range of scientific questions, from observing new states of matter to exploring the origin of ultrahigh-energy cosmic rays. Early experiments have been successfully completed in support of materials equations of state, materials strength, and radiation transport in extreme temperature and pressure conditions.

This talk will describe the unprecedented experimental capabilities of the NIF, its role in strategic security and fundamental science, and the pathway to achieving fusion ignition to create a clean and secure energy future.

THURSDAY, APRIL 11, 2013 | 4:00 PM | HAWKING AUDITORIUM

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