



COLLOQUIUM

CREATING, DIAGNOSING AND
CONTROLLING HIGH-ENERGY-
DENSITY MATTER WITH LASERS

DR. YUAN PING
LAWRENCE LIVERMORE NATIONAL LAB

TUESDAY, OCT 22, 2013 - 3:00PM

MBG AUDITORIUM

REFRESHMENTS AT 2:45PM

Since their invention in 1960's, lasers with power spanning from Kilo-Watt to PetaWatt have been widely used in almost every branch of science, leading to numerous discoveries and novel techniques. At present, lasers are capable of creating extreme states of matter in a laboratory, at conditions resembling those most extreme in the Universe: they heat matter up to the temperatures inside stars, they create electric field and magnetic fields orders of magnitude higher than the most powerful accelerators, they generate x-rays, gamma rays and ultra-relativistic particles, and they could be employed to achieve fusion energy. In this talk I will give a brief overview of high-energy-density physics, and introduce some aspects of the laser-matter interaction, particularly in the warm dense matter regime, a "malfunction junction" between solid, liquid, gas and plasma, where exotic behavior occurs, and where both theoretical and experimental studies remain challenging.

THE PRINCETON PLASMA PHYSICS LABORATORY IS A U.S. DEPARTMENT OF ENERGY FACILITY