Hi Everyone
We will be offering two short courses at the end of the summer. Each course will be about 6-8 lectures. The first will be offered by Stefan Hau-Riege and tentatively, we have scheduled it for the week of August 27. The second course by Hui Chen will occur mid-September. We will be broadcasting the course via WebX and the lectures will be recorded. Please let me know if you are interested.
Best,
Frank

Short Courses

Interaction of X Rays with Matter

In this course, we will provide an overview of the interaction of x rays with matter, ranging from low-intensity continuous-wave to high-intensity short-pulse x-ray radiation as produced by x-ray free-electron lasers. We will discuss the relevant physical processes, including the interaction of the x-ray field with electrons, the coupling of the electrons to the ions, and the x-ray induced microscopic and macroscopic changes in materials. As far as time allows, a full quantum mechanical description of the interaction of radiation with matter will be given. Several applications taken from the recent scientific literature will be discussed.

About the instructor: Dr. Stefan Hau-Riege is a computational and experimental physicist who utilizes x-ray–free–electron–laser (XFEL) based imaging, scattering, and spectroscopic techniques to study the structure, dynamics, and electronic properties of materials transitioning from condensed to warm-dense matter. Part of his current research addresses methods to understand ultrafast processes in materials irradiated by high-intensity x-rays and to alleviate the effect of x-ray damage in XFEL atomic-resolution bioimaging. Dr. Hau-Riege received his M.S. in physics from University of Hamburg in 1996 and his Ph.D. in materials science from MIT in 2000. After working for Intel Corporation as a senior engineer, he joined the LLNL staff in 2001. Dr. Hau-Riege is currently serving as the associate division leader for LLNL's Applied Physics organization. He is an acknowledged expert in the field of x-ray science and the sole author of the *High-Intensity X-Rays--Interaction with Matter* and *Nonrelativistic Quantum X-Ray Physics* books, published by Wiley in 2011 and 2015, respectively.

Introduction to High-Energy-Density Laser-Plasma Experiments and Diagnostics

This several-week short course surveys the basics of laboratory high-energy-density (HED)

plasmas produced by energetic lasers, and principles of several diagnostic instruments used to measure their properties. The course is intended for advanced undergraduates and beginning graduate students interested in pursuing graduate studies in HED physics, and for scientists trained in related fields who seek a broad knowledge of HED physics. At the end of the course, students are expected to be familiar with the field and able to begin studying individual topics in detail, with a holistic understanding of the key principles and relationships linking the various sub-disciplines.
Course topics include:

1. Introduction to laser matter interaction physics in the “short pulse” (picoseconds) and “long” (nanoseconds) pulse regimes
2. Principles of laser-driven HED experimental techniques
3. Physical Principles of Diagnostic Instruments for High-Energy-Density Plasmas
4. Current HED experiments using lasers, and their underlying physics

About the instructor: Dr. Hui Chen completed her undergraduate degree in physics at Sichuan University in Chengdu, China. She received her Ph.D. in plasma physics in 1999 from Imperial College, London, with a thesis on impurity ion transport in the JET tokamak. Dr. Chen then joined the Physics Division at Lawrence Livermore National Laboratory and has been a staff scientist there since 2001. Her chief research interests are high temperature plasma physics, including intense laser produced relativistic electron-positron pairs, novel sensors for gated x-ray imaging, and x-ray spectroscopy of highly charged ions. Dr. Chen is an internationally recognized physicist who has made important contributions to several areas of plasma physics, most notably in the new field of relativistic positron generation via intense laser-matter interactions. In 2016 she became a Fellow of the American Physical Society (APS) from the Division of Plasma Physics (DPP) for her work in this field. She currently serves as Secretary-Treasurer of APS-DPP, and over the years she also has served on various committees for the APS DPP, the LMJ PETAL project in Europe and the Omega and Jupiter Laser Facility user groups. She has supervised several Ph.D. students and summer interns.