

Beam By Design - Customized X-rays from Free Electron Lasers

Erik Hemsing

SLAC

November 2, 2016

4:00 p.m. - Wilson Hall, One West

Modern x-ray free electron lasers (XFELs) use relativistic electron beams to produce intense pulses of radiation for probing nature down to Angstrom wavelengths and femtosecond timescales. While the peak brightness of the pulses from XFELs exceeds conventional synchrotron sources by up to 10 orders of magnitude, a critical aspect of emerging XFELs is the capability to meet the increasing sophistication and demands of new science. I will discuss how novel new methods of "beam by design" are aimed at precisely tailoring x-ray FELs in a manner similar to the control that is demonstrated at optical wavelengths. Such laser-based manipulation techniques enable the production of fully transform-limited x-ray pulses with tunable frequency and bandwidth, multiple colors, and orbital angular momentum for probing new physics.