Tabletop Source of Hard X-Rays: Toward a Compact XFEL

Biography

Associate Professor William Graves joined the Physics Department and Biodesign Institute at ASU in 2015. He came to ASU from MIT and Brookhaven National Lab, where he spent over two decades developing novel x-ray light sources that ranged in size from tabletop scale to the largest mile-long devices using giant particle accelerators at national labs. At ASU his interests are focused on a new type of x-ray light source based on the collision of extremely short electron and laser pulses. The relativistic electrons convert the laser photons into an intense x-ray beam similar to the beams produced by the very large accelerators at national labs, but the new source is much smaller and will fit

Abstract

This talk will describe advances in accelerator and laser technologies that enable optimized production of intense beams of ultrashort x-ray pulses. The x-rays are produced by inverse Compton scattering of a high power laser pulse on a bright electron beam produced by a compact and inexpensive x-band linac and rf photo injector. The resulting x-ray beam is orders of magnitude brighter than existing laboratory sources.

We will also look into the near future to describe methods to generate nano-patterned electron beams that will produce fully coherent x-rays from a tabletop XFEL. ASU is now beginning a major effort to realize these exciting new x-ray sources. A diverse range of technologies are under development to produce the required x-ray properties including patterned crystals for patterned electron diffraction, ultra stable RF and microwave equipment and power supplies, and powerful ultrashort lasers.

Thursday, October 13, 2016
11:30 - 12:30 PM
Biodesign — Main floor, B105