

“Relativistic laser matter interactions: from fundamental plasma physics to next generation x-ray and particle sources”

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Hammond Auditorium (Engineering 120)

Abstract

The first demonstration of a laser took place a little over six decades ago when Theodore Maiman excited a ruby rod with a flash lamp to generate a pulsed red laser with a peak power on the order of a kilowatt. Since that day, the output power of lasers has increased by a factor of over a trillion times. As these precision light sources mature, the growing number of applications has been nothing short of astonishing. With current peak powers exceeding a petawatt (10^{15} W), these systems are being utilized to study the fundamental physics of high energy density plasmas, x-ray generation, particle acceleration, and more. The Advanced Laser for Extreme Photonics (ALEPH) system at Colorado State University has been developed with these different classes of experiments in mind. Capable of operating at 0.85 PW at Hz level repetition rates, this system has demonstrated robust electron acceleration up to 7 GeV, microfocus x-ray sources for computed tomography of dense objects, and ultrahigh energy density plasmas for studying fusion and atomic physics at near solid density. Current and future work will be presented along with plans for a future, high power laser facility at CSU.

Biography

Dr. Reed Hollinger is currently an Assistant Professor in Electrical and Computer Engineering at Colorado State University and has developed several experimental platforms at the ALEPH facility. He completed his PhD using this system to explore the interaction of highly relativistic laser pulses with ordered nanostructures. He is actively involved with LaserNetUS as a beamline scientist helping visiting researchers plan and execute nearly three dozen experiments in the last 5 years. Originally from central New York, he completed degrees in Electrical Engineering and Physics at Clarkson University before moving to Fort Collins for graduate school. Outside of work, he stays busy with his family and his many hobbies including backcountry skiing, mountain biking, and perpetual home renovations.