PHYSICS COLLOQUIUM

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"High brightness electron accelerators across length scales"

The study of high brightness particle accelerators is a unique discipline of applied physics, which has traditionally dealt with the study of beams in large scale devices such as kilometer-length linear and circular accelerators for either high energy physics (colliders) or for high intensity x-ray synchrotron light sources. In most cases, the brightest bunched beams in linear accelerators are produced via photoemission, and our understanding of the acceleration and transport processes have progressed to the point where even the very small transverse momentum distribution of the photoemission process is a prominent feature of the beam's phase space distribution kilometers away from the photoemission source.

In this talk, I'll give an overview of the recent rapid progress in photoemission accelerator physics and the key large scale applications it has enabled, such as x-ray free electron lasers (XFEELs), which have revolutionized our ability to see sub-picosecond processes in materials with atomic detail. Next, I will discuss a growing trend of using similar accelerator technology to employ the electrons themselves as probes in ultrafast microscopy and diffraction. Using our lab at Cornell as an example, I'll show how these ultrafast electron accelerators can produce imaging that is complementary to XFEELs, but with beamlines only a few meters in length.

Jared Maxson got his B.S. in physics from Lehigh University in 2009, and then went on to Cornell University for graduate school where he entered the field of accelerator physics. After getting his PhD in 2015, he did his postdoctoral work at the particle beam physics in UCLA, and returned to Cornell as an assistant professor in the summer of 2017, where he works on producing high quality beams with sub-picosecond pulse duration for ultrafast electron diffraction and microscopy.

Thursday, Nov. 16, 2017 at 4:10PM in LL. 316

Refreshments at 3:45PM in LL. 317