



John Adams Institute for Accelerator Science Lecture Series

Wednesday 18th October 2017 at 4:15 pm
Dennis Sciama Lecture Theatre, Denys Wilkinson Building

Dielectric laser accelerators: towards a photonic accelerator on a chip

The lecture will be delivered by

***Dr. Joshua McNeur,
University of Erlangen-Nuremberg***

Abstract:

In order to increase the availability and reduce the footprint of particle accelerators, several novel high gradient acceleration schemes have been under active study in the previous decades. Here, one such scheme -- dielectric laser acceleration -- is discussed. Specifically, the recent progress and direction of the Accelerator on a Chip (ACHIP) project funded by the Gordon and Betty Moore Foundation is detailed.

Dielectric laser accelerators (DLAs) operate via the interaction of electrons traversing laser-induced optical near fields in the microstructured channels of photonic devices. The available acceleration gradient is only limited by the laser induced damage threshold of the materials used, typically on the order of 10 GV/m. As a result, millimeter scale footprint devices capable of imparting MeV's of energy gain to electrons are possible with this technology. Several demonstrations of high gradient acceleration, transverse control, and staged acceleration of electrons will be discussed, along with potential applications and technical challenges for this novel technology.