

Cockcroft Institute Seminar

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**Thursday, 28 August 2014, 11:00
Walton Rooms A & B, The Cockcroft Institute**

Title: Advanced methods for modelling laser-driven acceleration

Abstract:

With the significant advances in laser technology over the past several decades, laser-driven particle acceleration has become a highly attractive avenue for research into high-gradient accelerators. The two major classes of laser-driven accelerator concepts, dielectric laser acceleration (DLA) and laser-plasma acceleration (LPA), both present a much higher level of complexity relative to conventional accelerators. In DLA, optical microstructures are needed to phase-match the laser field to a relativistic particle beam. In LPA, the acceleration process involves nonlinear plasma dynamics. These complexities present significant computational challenges to modelling. We describe these challenges and how modern high-performance software can address them.

We show simulations of coupler design and fabrication error analysis in DLA structures, as well as modelling of the direct beam-structure interactions that occur in certain experiments. For LPA, we describe methods to overcome the separation of length scales among the laser wavelength, plasma wavelength, and accelerator stage length that drives the need for computational resources.

Refreshments will be available