



John Adams Institute for Accelerator Science Lecture Series

Thursday 12th February 2015 at 4:15 pm
Fisher Room, Denys Wilkinson Building

Photonics, Particle Accelerators and beyond the Standard Model

The lecture will be delivered by

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Abstract:

Driven by the possibility to overcome limiting issues in conventional technologies interest in the use of novel EM structures for particle acceleration and RF generation is growing. One possible candidate that has been receiving increasing positive interest is photonic structures. A photonic structure is a periodic array of varying permittivity's forming a lattice of scatterers. Where EM transport is governed by Bloch-Floquet theory, producing structures with unique EM properties, and offer the possibility of novel particle-wave interactions.

In this presentation we consider the application of photonic structures to Particle Accelerators and Particle Physics. We review the physical processes and length scales that define photonic structures. Looking at the use of Photonic structures for the generation of EM waves and the acceleration of particles [1]. We examine the advantages offered by these structures, the current state of the art, and the issues that can arise from their use.

We also examine the use of photonic structures as a possible tool in the search for physics beyond the standard model. Where we discuss the use of Photonic structures in the search for weakly interacting sub-eV particles such as hidden-sector photons. Demonstrating the potential to match and exceed the sensitivities of conventional experiments [2].

[1] Yiming Xu and Rebecca Seviour (2012) New J. Phys. 14 013014
<http://iopscience.iop.org/1367-2630/14/1/013014>

[2] Seviour, R., Bailey, I., Woollett, N. & Williams, P. (2014) Journal of Physics G: Nuclear and Particle Physics. 41, 3, 10 p.035005 http://eprints.lancs.ac.uk/68599/1/0954_3899_41_3_035005.pdf