



Contribution ID: 71

Type: **talk**

Controlled, High-repetition rate Plasma Accelerators

Monday, September 14, 2015 4:50 PM (20 minutes)

We will describe work towards developing a new architecture for plasma accelerators able to generate GeV-scale electron beams at kilohertz repetition rates. Our approach is based on multi-pulse laser wakefield acceleration (MP-LWFA) in which a plasma wakefield is excited by a train of low-energy laser pulses; this approach opens wakefield acceleration to rapidly evolving laser technologies, such as fibre and thin-disk lasers, which are able to deliver ultrafast multi-mJ pulses at kHz repetition rates with high wall-plug efficiency.

Generating high-quality electron bunches with high reliability and low shot-to-shot jitter requires control over electron injection. For the case of MP-LWFAs this requires the development of new methods since the wakefield will be quasi-linear regime, and hence existing techniques developed for nonlinear wakes will not be directly applicable.

We will describe progress in understanding processes which might limit the operation of MP-LWFAs, such as non-uniformities in the plasma or pulse train and the effects of ion motion and laser hosing. Possible methods for controlling injection in MP-LWFAs will be discussed.

Primary author: Prof. HOOKER, Simon (University of Oxford)

Co-authors: Mr ARRAN, Christopher (University of Oxford); Mr THORNTON, Christopher (JAI); Mr CHEUNG, Gavin (University of Oxford); Mr COWLEY, James (University of Oxford); Dr CORNER, Laura (JAI, Oxford University); Mr SHALLOO, Robert (JAI, University of Oxford); Prof. WALCZAK, Roman (University of Oxford)

Presenter: Prof. HOOKER, Simon (University of Oxford)

Session Classification: WG1 - Electron beams from plasmas

Track Classification: WG1 - Electron beams from plasmas