

## John Adams Institute for Accelerator Science Lecture Series

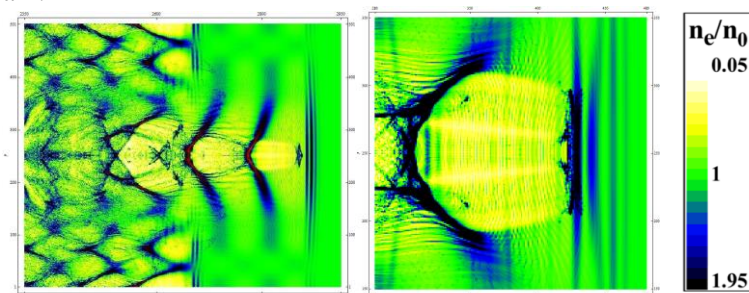
Thursday 13<sup>th</sup> October 2016 at 2:30 pm

Dennis Sciama Lecture Theatre, Denys Wilkinson Building

### **Wakefield Excitation in Plasma by Short Train of Laser Pulses**

**Prof. Vasyl Maslov,  
Kharkov Institute of Physics & Technology, Ukraine**

Modern colliders are large and expensive with limited accelerating gradient. What's the next accelerator? Topics in advanced accelerators will be discussed including: joint wakefield acceleration by laser pulse and by self-injected electron bunches; two scenarios of intensification of electron bunch acceleration by wakefield excited by laser pulse; dynamics of electron bunches at synergistic enhancement of laser plasma wakefield acceleration by (self-injected) beam acceleration. The importance of radial dynamics of electron bunches at electron acceleration by wakefield, excited by laser pulse will be presented, as well as, self-cleaning of electron bunches at wakefield excitation by laser pulse, transformation of witness-bunches into driver-bunches, charge of bunch accelerated by laser wakefield, self-cleaning of electron bunches at injection of short train of two laser pulses into the plasma, and transformation ratio at laser pulse shaping on intensity. The following will then be discussed: plasma wakefield excitation by short train of three laser pulses; simulation of resonant excitation of wakefield by resonant train of drivers; mechanism of resonant excitation of wakefield by nonresonant train of drivers; 2d3v numerical simulation of instability of cylindrical relativistic electron beam in plasma; beam-plasma instability for long shaped electron bunch, homogeneous focusing of train of drivers in plasma or ideal plasma lens; wakefield excitation in plasma by driver shaped according to linear law; transformation ration at wakefield excitation in plasma by short train of drivers shaped according to linear law; nonlinear wakefield excitation in plasma by short train of drivers shaped according to linear law with precursor; infinite periodical train of short trains of shaped drivers, interchanged by witnesses; and transformation ratio in dielectric wakefield cavity of accelerator driven by a tailored electron bunched beam.



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