



Contribution ID: 8

Type: **oral presentation**

Understanding the Dynamics of Particles in Intense Laser Fields

Wednesday, 10 July 2013 15:00 (20 minutes)

During the next few years a number of new laser facilities are expected to come online (such as ELI and XCELS). These will provide fields of unprecedented powers and intensities, allowing us to explore a range of physics under extreme conditions. In this talk I intend to discuss both classical and quantum aspects of laser-particle interactions and the boundary between the two regimes. I will begin by considering electron motion in an intense field, explaining what happens as we make the transition from continuous (classical) emissions of radiation to discrete (quantum) emissions. I will next describe how a laser pulse can be optimally focussed in order to lower the intensity threshold for pair production. Finally, I will discuss the dynamics of the created pairs and the impact of radiation damping on their dynamics.

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Session Classification: LASERs and Simulations