Accelerator Physics Seminar
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(16.00 in Room 459/30b)

Progress In Understanding Plasma Based Electron Injectors

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Abstract

Future Colliders and Coherent Light Sources will need electron sources producing transverse emittances a full order of magnitude below those currently available, namely 10-6 pi m rad. We have learned to manipulate longitudinal emittances safely with bunch compression.

Progress in experiment and theory opens up the possibility to design laser-plasma based electron sources useful for coherent light sources in the near future, and for linear colliders in the more distant time frame. A problem still to be addressed is the polarizability of such sources.

Experimental observations based on Self-Modulated Laser Wakefield Acceleration (SML-WFA) have shown that a substantial number of electrons, nano Coulombs to be precise, are accelerated beyond relativistic energies (up into the neighborhood of 10 MeV) with a surprisingly small normalized transverse emittance of a few 10-7 pi m rad. The longitudinal emittance is also small and poses an experimental and theoretical problem and opportunity. This talk describes results of an extension of the (transverse only) K-V formalism to include a coupled longitudinal phase space.

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