Colloquium Notice

Sponsored by the Accelerator Division

"High Brightness sub-ps Electron Beams: Production and Application to X-ray FELs "

Dr. Luca Serafini

University of Milan and INFN-Milan

This seminar will discuss the beam dynamics of electron beams generated by advanced photoinjectors to meet the brightness demands of SASE X-ray FELs . These beams behave actually as single component relativistic cold plasmas through a quite long section of the linac, extending from the photocathode located inside the RF gun up to an unprecedented high kinetic energy - hundreds of MeV. The physical description of these quasi-laminar beams must take into account strong time-dependent space charge effects, which can be responsible for a severe emittance growth. This is minimized as far as the beam is accelerated close to a proper beam equilibrium mode, named invariant envelope, that assures a common plasma frequency to the whole bunch. The theoretical model developed during the last few years, capable to predict the optimized linac configuration to achieve maximum beam brightness, will be presented together with best performances predicted by simulations and their comparison with measurements. Finally, the new technique of velocity bunching is explained, and its potentialities in optimizing the brightness produced by an electron linac operated without magnetic compressors are described.

Tuesday, December 11, 2001
2:00 p.m.
CEBAF Center Auditorium

Coffee & Cookies before the seminar starting at **1:30 p.m.**

Jefferson Lab

For further information contact: Lia Merminga