Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

**Effect of frequency and phase fluctuations in multi laser beam systems on wakefield excitation**[1] VISHWA BANDHU PATHAK, JOANA MARTINS, RICARDO FONSECA, LUIS SILVA, GoLP/Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Lisboa, Portugal — The next generation of ultra high intensity laser systems for laser driven fusion and plasma accelerator facilities will combine multiple lasers beams to achieve very high intensities. These beams may have small frequency and phase mismatches, due to the separate optics involved. We study the effect of random variation in the frequencies and/or the phases of the multiple laser drivers on wakefield generation in underdense plasmas with averages over statistical ensembles of PIC simulations. In our 2D PIC simulations, we have explored the conditions close to optimal excitation of the wake field, by using up to 10 laser pulses. Taking advantage of the absolute reproducibility of the numerical features of the simulations in Osiris, we take ensemble averages over a large number of runs to explore the effects associated with the enhanced laser bandwidth due to frequency fluctuation, and the effects of phase mismatch. Laser wakefield generation can also be seen as a manifestation of stimulated forward Raman scattering(SFRS) in underdense plasmas. We compare the simulation results with our theoretical model for SFRS by a partially coherent laser pump.

[1]Work partially supported by FCT (Portugal).

Luis Silva
GoLP/Instituto de Plasmas e Fusão Nuclear,
Instituto Superior Técnico, Lisboa, Portugal

Date submitted: 17 Jul 2009 Electronic form version 1.4