Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Collisional and collisionless beam plasma instabilities ANTOINE BRET, Universidad Castilla la Mancha — Collisions are a key issue regarding the instabilities involved in the Fast Ignition Scenario for Inertial Confinement Fusion. Because of the plasma density gradient through which the relativistic electron beam travels, unstable modes are collisionless at the beginning of the path, and collisional near the target core. While some works have been done on both regimes, the transition from the former to the later remains unclear. By implementing a hot fluid model accounting for a collisional return current, a theory is presented which bridges between the two regimes. The transition from one regime to the other is detailed in terms of the beam-to-plasma density ratio and the collision frequency. Purely collisional modes are found to arise at very low k, compared to the collisionless ones, and generate beam skin-depth size structures in accordance to previous works on resistive filamentation.

Antoine Bret
Universidad Castilla la Mancha

Date submitted: 14 Jul 2010 Electronic form version 1.4