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Dynamic Study of an Intense Relativistic Electron Beam Transported in an Over-Dense Plasma ALAIN PIQUEMAL, CEA/DIF Departement de Physique Theorique et Appliquee F-91680 Bruyeres-le-Chatel — We want to investigate the evolution of an intense relativistic electron beam when it is transported in an over-dense plasma. It is known that a collision-less beam which undergoes selfsimilar deforming, does not see emittance growth, even if it is submitted to non-linear electromagnetic forces. This property is still verified in an ionised gas in which the beam emittance growth is due only to collisions with the atoms and molecules of the medium. In this case, the beam goes progressively to a Bennett profile. But the problem is the understanding of the routes the beam follows, to go from a phase space limited distribution function (d.f.) at the generator output, to a Bennett-Maxwell d.f. when the beam parameters are degraded. We study some diagnostics taken from the chaos mechanics and propose some ideas about the internal structure of intense relativistic beams and associated mechanisms of thermalization.

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