

Abstract Submitted
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Kinetic Study of the Collisionless Expansion of Spherical Nanoplasmas FABIO PEANO, FEDERICO PEINETTI, GIANNI COPPA, Dipartimento di Energetica, Politecnico di Torino, Italy, LUIS SILVA, GoLP/Centro de Física dos Plasmas, Instituto Superior Tecnico, Lisboa, Portugal — The collisionless expansion of spherical plasmas composed of cold ions and hot electrons is analyzed using a novel Lagrangian model [1], which allows a highly accurate, kinetic description of the radial motion of the ions and of the three-dimensional motion of nonrelativistic electrons (the validity of the model is checked both with 3D particle-in-cell simulations, performed with the OSIRIS framework [2], and using a new, ad-hoc developed particle method). The paradigmatic case of initially-Maxwellian electrons is investigated in detail for a wide range of initial conditions: simple relationships are deduced for the key expansion features [1], and a threshold in the electron energy is identified, beyond which the energy spectrum becomes monotonic and the Coulomb explosion regime is approached. Non-Maxwellian initial distributions of the electrons are also considered. [1] F. Peano *et al.*, Phys. Rev. Lett. **96**, 175002 (2006). [2] R.A. Fonseca *et al.*, Lect. Notes Comp. Sci. **2331**, 342 (Springer-Verlag, Heidelberg, 2002).

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