Relativistic Langevin equation for runaway electrons[1] J.A. MIER,
Universidad de Cantabria, J.R. MARTIN-SOLIS, R. SANCHEZ, Universidad Carlos III de Madrid — The Langevin approach to the kinetics of a collisional plasma
is developed for relativistic electrons such as runaway electrons in tokamak plasmas.
In this work, we consider Coulomb collisions between very fast, relativistic electrons
and a relatively cool, thermal background plasma. The model is developed using the
stochastic equivalence of the Fokker-Planck and Langevin equations [V.I. Tikhonov
and M.A. Mironov, Markovian Processes (1977). Soviet Radio, Moscow]. The resulting Langevin model equation for relativistic electrons is an stochastic differential
equation, amenable to numerical simulations by means of Monte-Carlo type codes.
Results of the simulations will be presented and compared with the non-relativistic
Langevin equation for RE electrons used in the past [I. Fernndez-Gmez et al., Phys.
Plasmas 19 (2012) 102504].

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