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A Particle-in-Cell simulation of temporal plasma echo in the presence of Coulomb collisions B.Z. WU, Y. NISHIMURA, C.P. WANG, National Cheng Kung University — Particle-in-Cell simulation is developed to study temporal plasma echo of electron plasma wave. By imposing two external pulse electric fields to the plasma (pulse-like in time) [1] the echo signal is observed. Coulomb collisional effect manifests itself as a shift of the echo peak and the damping of the peak amplitude,[2] which can be seen by adding (rather phenomenological) frictional force to the electron equation of motion. A first principle based binary collision model [3] is incorporated into the numerical simulation.

[1]R.D.Sydora, Advanced Methods for Space Simulations, pp.47-60 (2007).
[2]C.H.Su and C.Oberman, Phys. Rev. Lett. 20, 427 (1968).
[3]T.Takizuka and H.Abe, J. Comput. Phys. 25, 205 (1978).

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