

Abstract Submitted  
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**Nonlinear Wave and Soliton Excitations in Coasting Charged Particle Beams Using a Kinetic g-Factor Model**<sup>1</sup> RONALD DAVIDSON, EDWARD STARTSEV, HONG QIN, PPPL — Making use of a one-dimensional kinetic model based on the Vlasov-Maxwell equations, this paper describes nonlinear wave and soliton excitations in coasting charged particle beams. The kinetic description is based on the recently-developed g-factor model [1] that incorporates self-consistently the effects of transverse density profile shape at moderate beam intensities. The nonlinear evolution of wave and soliton excitations is examined [2] for disturbances both moving faster and moving slower than the sound speed, incorporating the important effects of wave dispersion. Analytical solutions are obtained for nonlinear traveling wave pulses, and the results of nonlinear perturbative particle-in-cell simulations are presented that describe the stability properties and long-time evolution.

(1) R. C. Davidson and E. A. Startsev, Phys. Rev. ST Accel. Beams 7, 024401 (2004).

(2) R. C. Davidson, E. A. Startsev and H. Qin, Proceedings of the 2007 Particle Accelerator Conference, in press (2007)

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