

Longitudinal Charge-particle Dynamics Induced By An Ultra-short Relativistic Electron Bunch In Plasmas

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A quantum formulation of the longitudinal dynamics of a test electron bunch, while experiencing the 3D effects of plasma wake field driven by an ultra-short relativistic electron bunch, is presented. In this framework, the longitudinal test electron bunch dynamics is governed by a Schroedinger-like equation, where the potential term accounts for the plasma wake potential due to driving bunch.