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Characterization of plasma wake excitation and particle trapping in the nonlinear bubble regime[1] CARLO BENEDETTI, CARL SCHROEDER, ERIC ESAREY, WIM LEEMANS, Lawrence Berkeley National Laboratory — We investigate the excitation of nonlinear wake (bubble) formation by an ultra-short ($k_pL \sim 2$), intense ($eA_{\rm laser}/mc^2 > 2$) laser pulse interacting with an underdense plasma. A detailed analysis of particle orbits in the wakefield is performed by using reduced analytical models and numerical simulations performed with the 2D cylindrical, envelope, ponderomotive, hybrid PIC/fluid code INF&RNO, recently developed at LBNL. In particular we study the requirements for injection and/or trapping of background plasma electrons in the nonlinear wake. Characterization of the phase-space properties of the injected particle bunch will also be discussed.

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