

Abstract Submitted
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DC-like phase space manipulation and particle acceleration using chirped AC fields¹ PAUL SCHMIT, Princeton Plasma Physics Laboratory, NATHANIEL FISCH, Princeton Plasma Physics Laboratory — Waves in plasmas can accelerate particles that are resonant with the wave. A DC electric field also accelerates particles, but without a resonance discrimination, which makes the acceleration mechanism profoundly different. We investigate the effect on a Hamiltonian distribution of an accelerating potential waveform, which could, for example, represent the average ponderomotive effect of two counterpropagating electromagnetic waves. In particular, we examine the apparent DC-like time-asymptotic response of the distribution in regimes where the potential structure is accelerated adiabatically. A highly resonant population within the distribution is always present, and we characterize its nonadiabatic response during wave-particle resonance using an integral method in the noninertial reference frame moving with the wave. Finally, we show that in the limit of infinitely slow acceleration of the wave, these highly resonant particles disappear and the response of the bulk distribution becomes identical to the response of a distribution to a uniform DC field.

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