Enhanced Cherenkov-Wake Amplification by an Active Medium

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A Cherenkov wake confined by perfectly reflecting transverse walls is amplified if the dielectric medium is active. Because of the multiple-reflections process, the effective gain of the wake is enhanced compared to a ray propagating in a straight line. Higher enhancement occurs when the electron velocity is close to the Cherenkov velocity. This Cherenkov wake can then accelerate a second bunch of electrons trailing the first. Gradients larger than 1 GV/m are predicted before saturation becomes a major impediment

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