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Piecewise-homogeneous model for electron side injection into linear plasma waves

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An analytical-piecewise homogeneous model for side injection of an external electron beam into linear plasma waves is developed. The dynamics of transverse betatron oscillation of the electrons are studied. Based on the characteristics of the transversal motion the longitudinal motion of the electrons is described. The results of the analytical model are verified by numerical simulations in the scope of the piecewise-homogeneous model. The results predicted by this model are also compared to the results given by a more realistic inhomogeneous model. Comparison of the results to the 3D PIC simulations is discussed.

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