

Abstract Submitted
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New modes of propagation of high-intensity charged particle beams¹ HONG QIN, Plasma Physics Laboratory, Princeton University and Dept. of Modern Physics, University of Science and Technology of China, RONALD DAVIDSON, Plasma Physics Laboratory, Princeton University — A class of new modes of propagation of high-intensity charged particle beams in a general focusing lattice is discovered. It generalizes the classical Kapchinskij-Vladimirskij solutions of the Vlasov-Maxwell equations and the associated envelope equations. For a given lattice, the classical KV solution is specified by two free parameters, while the generalized distribution functions and the envelope equations are specified by ten free parameters. The class of solutions discovered captures a wider range of dynamical behavior of high-intensity charged particle beams, and can be used as a new theoretical tool to study the collective dynamics of high-intensity beams.

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