

Two topics in particle accelerator beams

by

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Abstract

This thesis has two parts. In the first part I present results from my studies of the Vlasov-Maxwell system which was developed, together with a code, in collaboration with Bassi, Ellison and Warnock. The emphasis is on the link between the theory and the self-consistent numerical computations performed by the code. The Vlasov-Maxwell system models electron beams, typically in synchrotron light sources. In the second part I present results from my studies of the dynamics of spin polarized beams. Here the emphasis is on improvements of the theoretical basis of beam simulations by using topological methods.