Numerical simulations of Vlasov-Maxwell equations for laser plasma based on Poisson bracket

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Résumé

In this talk, Poisson bracket for a reduced Vlasov model describing laser plasma interaction is proposed, which can be derived from the the Poisson bracket of Vlasov-Maxwell system by a coordinate transformation. Then a splitting method is proposed based on the decomposition (into three parts) of the Hamiltonian; in the quasi-relativistic case, the solutions of these three subsystems can be written out explicitly. Fourier spectral method and finite volume method are used in phase space discretization. The splitting is extended to the fully relativistic case combined with conservative splitting methods. Finally, some numerical experiments are conducted to confirm good long time behaviors of our schemes.

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