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A finite mass based method for Vlasov-Poisson simulations[1]
DAVID LARSON, LLNL, CHRISTOPHER YOUNG, Stanford Plasma Physics Laboratory — A method for the numerical simulation of plasma dynamics using discrete particles is introduced. The shape function kinetics (SFK) method is based on decomposing the mass into discrete particles using shape functions of compact support. The particle positions and shape evolve in response to internal velocity spread and external forces. Remapping is necessary in order to maintain accuracy and two strategies for remapping the particles are discussed. Numerical simulations of standard test problems illustrate the advantages of the method which include very low noise compared to the standard particle-in-cell technique, inherent positivity, large dynamic range, and ease of implementation.

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