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Efficient simulation of pitch angle collisions in a 2+2-D Eulerian Vlasov code[1] JEFF BANKS, R. BERGER, Lawrence Livermore National Laboratory, S. BRUNNER, T. TRAN, Ecole Polytechnique Federal de Laussane — Here we discuss pitch angle scattering collisions in the context of the Eulerian-based kinetic code LOKI that evolves the Vlasov-Poisson system in 2+2-dimensional phase space (Banks et al., Phys. Plasmas 18, 052102 (2011)). The collision operator is discretized using 4th order accurate conservative finite-differencing. The treatment of the Vlasov operator in phase-space uses an approach based on a minimally diffuse, fourth-order-accurate discretization (Banks and Hittinger, IEEE T. Plasma Sci. 39, 2198–2207). The overall scheme is therefore discretely conservative and controls unphysical oscillations. Some details of the numerical scheme will be presented, and the implementation on modern highly concurrent parallel computers will be discussed. We will present results of collisional effects on linear and non-linear Landau damping of electron plasma waves (EPWs). In addition we will present initial results showing the effect of collisions on the evolution of EPWs in two space dimensions.

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