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High Order Vlasov Solvers for the Simulation of KEEN Wavea Including the L-B and F-P Collision Models[1] ERIC SONNENDRUCKER, IPP, Max Planck Institut Fur Plasma Physik, Garching, Germany, NICOLAS CROUSEILLES, INRIA Rennes, Bretagne Atlantique, BEDROS AFEYAN, Polymath Research Inc., Pleasanton, CA — Since the discovery of KEEN waves in 2002, it has been an open question whether the detailed phase space structures found in those well resolved simulations of Afeyan et al., would survive (essentially) intact, if instead of cubic splines, higher order interpolation schemes were used, up to spectral accuracy. In this work, the Vlasov-Poisson system is solved using Fourier-Fourier descriptions in phase space, and Fourier spline. The splines can be any order approaching spectral accuracy quickly. These simulations show what the role of numerical dissipation is for the stable simulation of driven KEEN waves, how delicate structures found in low order simulations survive and persist even when the microscope with which they are being scrutinized is much more powerful. The Fourier capability also allows truncated descriptions for the theoretical advancement of reduced models of fully formed KEEN waves, as described previously by Afeyan et al. The partitioned phase space structures they found is further tested by the use of a Lenard-Bernstein collision model on the way to including the full Fokker Planck collision operator in cylindrical (in velocity space) geometry, advanced by Greengard et al.

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