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1P39 - A High Order Convected Scheme Solution of the Wigner-Poisson System

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We present a new code for solving the Wigner-Poisson system. Drawing from techniques for solving Vlasov-Poisson, we employ Strang splitting to divide Wigner-Poisson into an advection equation and an integral equation describing velocity space. A forward, Semi-Lagrangian scheme based on the Convected Scheme handles the advection piece while a Fourier transform handles the velocity integral operator. High order is achieved by using WENO to calculate small corrections to the displacement of the Convected Scheme and through Spectral Deferred Correction. Since Wigner-Poisson is the quantum analog of Vlasov-Poisson, we study traditional problems such as Landau damping and the two stream instability in 1D-1V and compare the two models. Eventually, we seek to incorporate our Wigner-Poisson code in a study of stopping power in DT fusion.

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