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Numerical Simulation of Colliding Ion Acoustic Solitons Y. NISHIMURA, Y.H. CHEN, C.Z. CHENG, National Cheng Kung University — The ion acoustic wave dispersion relation $\omega = kC_s$ we are familiar with, is in the long wave length limit. Inclusion of short wave-length (Debye length) scale through Poisson equation gives rise to the Korteweg de Vries (KdV) equation. We simulate propagation of solitary waves by solving the KdV equation in one dimensional and two dimensional planer geometries (Kadomtsev–Petviashvili equation).^{1,2} On the other hand, a different nonlinear term, ponderomotive force gives rise to Langmuir solitons by the interaction between high frequency Langmuir waves and low frequency ion acoustic waves.³ We discuss our studies on 1d-1v Vlasov-Poisson system employing the splitting scheme⁴ (by the method of characteristics).

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