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Numerical simulations of anisotropic plasmas using a modified ZEUS-MP BENJAMIN CHANDRAN, VARUN TANGRI, AVEEK SARKAR, JEAN PEREZ, University of New Hampshire, PRATEEK SHARMA, Indian Institute for Sciences — Three dimensional linear and nonlinear simulations of collisionless one-fluid plasmas with pressure anisotropy are presented using the Chew-Goldberger-Low (CGL-MHD) and double-isothermal models. For this purpose, the code ZEUS-MP [J. C. Hayes *et. al.* The APJ Supplement Series **165** (2006) 188.] has been modified. Major modifications include a changed method of characteristics, new compressive and non-compressive forces, and a "hard wall" limit on pressure anisotropy that is intended to mimic the effects of plasma micro-instabilities that limit the temperature anisotropy. For purposes of validation, more than 100 test simulations of linear waves (Alfven, slow and fast), instabilities (firehose and mirror) and nonlinear vortices (Orszag-Tang) are presented for a number of initial conditions and parameters. Finally, this model is used to investigate the way that Alfven-wave turbulence leads to a spreading of the temperature-anisotropy probability distribution in the solar wind. Analysis is completed with a detailed analysis of the fluctuation data.

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