

Hybrid kinetic/gyrokinetic simulations for weakly magnetized plasmas

D. Told

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Both in fusion and space plasmas such as the solar wind, phenomena exist which can not be treated through reduced models such as the gyrokinetic theory, or standard hybrid kinetic/fluid models.

In this presentation, I will discuss the development of a hybrid kinetic/gyrokinetic model, as well as its implementation into a linear dispersion solver and its implementation into the nonlinear semi-Lagrangian code ssV.

Within the MAGYK project, a simple turbulence setup [1] in two spatial dimensions is being compared both to the gyrokinetic GENE code, and to the fully kinetic Particle-in-Cell code GEMPIC, to investigate how the this physics problem appears in the different models. Some first results from these comparisons will be presented.

[1] T. Tatsuno et al., PRL 103, 015003 (2009)