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Implementation of parallel moment equations in NIMROD[1] HANKYU Q. LEE, ERIC D. HELD, JEONG-YOUNG JI, Utah State University — As collisionality is low (the Knudsen number is large) in many plasma applications, kinetic effects become important, particularly in parallel dynamics for magnetized plasmas. Fluid models can capture some kinetic effects when integral parallel closures are adopted. The adiabatic and linear approximations are used in solving general moment equations[2] to obtain the integral closures. In this work, we present an effort to incorporate non-adiabatic (time-dependent) and nonlinear effects into parallel closures. Instead of analytically solving the approximate moment system, we implement exact parallel moment equations in the NIMROD fluid code. The moment code is expected to provide a natural convergence scheme by increasing the number of moments.

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[2]J.-Y. Ji and E. D. Held, Phys. Plasmas 15, 102101 (2008).

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