Abstract Submitted
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NIMROD modeling of poloidal flow damping in tokamaks using kinetic closures[1] J. R. JEPSON, C. C. HEGNA, Univ of Wisconsin, Madison, E. D. HELD, Utah State University — Calculations of poloidal flow damping in a tokamak are undertaken using two different implementations of the ion drift kinetic equation (DKE) in the extended MHD code NIMROD. The first approach is hybrid fluid/kinetic and uses a Chapman Enskog-like (CEL) Ansatz. Closure of the evolving lower-order fluid moment equations for n, $\mathbf{V}$, and T is provided by solutions to the ion CEL-DKE written in the macroscopic flow reference frame [1]. The second implementation solves the DKE using a delta-f approach. Here, the delta-f distribution describes all of the information beyond a static, lowest-order Maxwellian. We compare the efficiency and accuracy of these two approaches for a simple initial value problem that monitors the relaxation of the poloidal flow profile in high- and low-aspect-ratio tokamak geometry. The computation results are compared against analytic predictions of time dependent closures for the parallel viscous force [2,3]. [1] J. J. Ramos, Phys. Plasmas **18**, 102506 (2011). [2] A. L. Garcia-Perciante et al, Phys. Plasmas **12**, 052516 (2005). [3] R. C. Morris et al, Phys. Plasmas **3**, 4513-4520 (1996).

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