

Abstract Submitted
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Two-Fluid Plasma Steady States¹ LINDA SUGIYAMA, M.I.T., H.R. STRAUSS, N.Y.U., J. BRESLAU, G. FU, P.P.P.L. — Two-fluid plasma models, which allow the electron and ion fluids to move independently, have important consequences for magnetically confined plasma behavior, compared to MHD. Two-fluid steady states can be described analytically in terms of the canonical momenta and generalized vorticities of the two species (eg [1]), but the models contain free functions and do not really describe the conditions that hold in nonlinear numerical simulations. The plasma edge and surrounding vacuum region, which supplies global boundary conditions for the plasma in MHD, possesses additional degrees of freedom in a two-fluid model, including possible large localized poloidal flows, radial electric fields, and separate species pressure gradients. Non-fluid, kinetic effects may also be important. These questions are investigated for high temperature fusion plasmas. with the help of the M3D initial value code.

[1] L.C. Steinhauer, *Phys. Plasmas* **6** 2734 (1999).

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