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Hamiltonian structure of magnetofluid models with gyroviscous-like contributions ALEXANDER WURM, Western New England University, P.J. MORRISON, RICHARD HAZELTINE, The University of Texas at Austin — Magnetofluid theories, like MHD, can be expressed in terms of Eulerian (or spatial) variables, or in terms of Lagrangian (or material) variables. The former formulation generally exhibits a noncanonical Hamiltonian structure [1]. Building on the work of Ref. [2] we generalize the gyromap to three dimensional magnetofluid theories. Starting with the 3D ideal MHD noncanonical Poisson bracket [1] and a Hamiltonian including general gyroviscous terms, we derive equations of motions and compare them to, e.g., Braginskii [3] in the collisionless limit. In addition we explore the Lagrangian version of these theories which use Hamilton's principle to derive the equations of motion [4].

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[4] W.A. Newcomb, Nuclear Fusion: 1962 Suppl. Part 2, p. 451.

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