

Abstract Submitted
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Gyrokinetic Magnetohydrodynamics and the Associated Equilibrium¹ W. W. LEE, S. R. HUDSON, C. H. MA, Princeton Plasma Physics Laboratory, Princeton University — A proposed scheme for the calculations of gyrokinetic MHD and its associated equilibrium is discussed related a recent paper on the subject [1]. The scheme is based on the time-dependent gyrokinetic vorticity equation and parallel Ohm's law, as well as the associated gyrokinetic Ampere's law. This set of equations, in terms of the electrostatic potential, ϕ , and the vector potential, \mathbf{A} , supports both spatially varying perpendicular and parallel pressure gradients and their associated currents. The MHD equilibrium can be reached when $\phi \rightarrow 0$ and \mathbf{A} becomes constant in time, which, in turn, gives $\nabla \cdot (\mathbf{J}_{\parallel} + \mathbf{J}_{\perp}) = 0$ and the associated magnetic islands. Examples in simple cylindrical geometry will be given. [1] W. W. Lee, "Magnetohydrodynamics for collisionless plasmas from the gyrokinetic perspective," Phys. Plasmas **23**, 070705 (2016).

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