

Metriplectic foundations of gyrokinetic Vlasov–Maxwell–Landau theory

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This contribution reports on a metriplectic formulation of collisional, nonlinear full- f electromagnetic gyrokinetic theory compliant with energy conservation and monotonic entropy production. In an axisymmetric background magnetic field, the toroidal angular momentum is also conserved. Notably, a new collisional current, contributing to the gyrokinetic Maxwell–Ampère equation and the gyrokinetic charge conservation law, is obtained. Although small, the new current is mandatory to retain the conservation laws in the system.