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Variational principle for the parallel-symplectic representation of electromagnetic gyrokinetic theory[1] ALAIN BRIZARD, Saint Michael College — The nonlinear (full-f) electromagnetic gyrokinetic Vlasov-Maxwell equations are derived in the parallel-symplectic representation from an Eulerian gyrokinetic variational principle. The gyrokinetic Vlasov-Maxwell equations are shown to possess an exact energy conservation law, which is derived by Noether method from the gyrokinetic variational principle. Here, the gyrocenter Poisson bracket and the gyrocenter Jacobian contain contributions from the perturbed magnetic field. In the full-f formulation of the gyrokinetic Vlasov-Maxwell theory presented here, the gyrocenter parallel-Ampère equation contains a second-order contribution to the gyrocenter current density that is derived from the second-order gyrocenter ponderomotive Hamiltonian.

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