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Symplectic gyrokinetic Vlasov-Maxwell theory[1] ALAIN BRIZARD, Saint Michael's College — A new representation of electromagnetic gyrokinetic Vlasov-Maxwell theory is considered in which the gyrocenter symplectic structure contains the electric and magnetic field perturbations needed to yield the standard gyrocenter polarization and magnetization terms appearing in the gyrokinetic Maxwell equations. The gyrocenter Hamilton equations, which are expressed in terms of a time-dependent gyrocenter Jacobian and a gyrocenter Poisson bracket that contains electromagnetic field perturbations, satisfy the Liouville property exactly. The self-consistent gyrokinetic Vlasov-Maxwell equations are derived from a variational principle, which also yields exact energy-momentum conservation laws through the Noether method.

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