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Hamiltonian formulation of reduced Vlasov-Maxwell equations CRISTEL CHANDRE, Centre de Physique Théorique - CNRS, ALAIN J. BRIZARD, Saint Michael's College — We present a Hamiltonian formulation of the reduced Vlasov- Maxwell equations which is expressed in terms of the macroscopic fields $\mathbf{D}$ and $\mathbf{H}$. These macroscopic fields are themselves expressed in terms of the Lie-transform operator $\exp \pounds_{\mathcal{S}}$ generated by the functional $\mathcal{S}$, where $\pounds_{\mathcal{S}} \mathcal{F} \equiv [\mathcal{S},\ \mathcal{F}]$ is expressed in terms of the Poisson bracket [,] for the exact Vlasov-Maxwell equations. Hence, the polarization vector $\mathbf{P} \equiv (\mathbf{D} - \mathbf{E})/4\pi$ and the magnetization vector $\mathbf{M} \equiv (\mathbf{B} - \mathbf{H})/4\pi$ are defined in terms of the expressions $4\pi\, \mathbf{P} \equiv [\mathcal{S},\ \mathbf{E}] + \cdots$ and $4\pi\, \mathbf{M} \equiv -\,[\mathcal{S},\ \mathbf{B}] + \cdots$, where lowest-order terms yield dipole contributions.

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