Abstract Submitted
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Don't worry. Lagrangian drift kinetics is OK[1] JOSHUA BURBY, Princeton University — I show that standard Lagrangian (i.e. variational) drift kinetics with $u_{E\times B} \propto v_{\rm th}$ and $H_{\rm gc} = H_o + \epsilon H_1 + \epsilon^2 H_2$ has an unphysically-large phase space; where a valid initial condition ought to consist of $(F, \mathbf{E}, \mathbf{B})$ specified at $t = 0$, Lagrangian drift kinetics requires initial time derivatives of the electromagnetic field to be specified as well. This phenomenon occurs because the guiding center coordinate transformation depends on time derivatives of the electromagnetic field, and this leads to the appearance of a time derivative of $\mathbf{E}$ in H_2. I also show how to "renormalize" the Lagrangian approach to drift kinetics in a way that manifestly preserves the correct structure of the initial value problem. Starting from this modified Lagrangian procedure, I derive the drift kinetic system's Poisson bracket.

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