Abstract Submitted
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Energy-momentum-conserving Landau form of the guiding-center Fokker-Planck collision operator[1] J. BURBY, PPPL, A.J. BRIZARD, SMC, E. HIRVIJOKI, Chalmers University of Technology (Sweden) and Aalto University (Finland) — The guiding-center Fokker-Planck collision operator [1] describes particle collisions in the five-dimensional guiding-center phase space [2], where the fast gyroangle is asymptotically eliminated at lowest order in the slow collisional time scale. The test-particles and field-particles are treated independently in terms of full guiding-center distributions without the need of linearization. For the field-particle guiding-center representation, guiding-center Rosenbluth potentials are introduced. The phase-space divergence form of the guiding-center Fokker-Planck collision operator immediately guarantees its particle-conserving property, while its Landau form guarantees its energy-momentum-conserving properties, even when the guiding-center transformation is truncated at finite order. A linearized guiding-center Fokker-Planck collision operator suitable for gyrokinetic particle simulations is derived and compared with recent linearized gyrokinetic collision operators [3,4].

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