

Abstract Submitted  
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**Energy conserving and phase space area preserving fluid-kinetic plasma equations** H. VERNON WONG, Institute for Fusion Studies, University of Texas — Low frequency fluid-kinetic plasma equations, in which the total energy is conserved and the particle trajectories preserve their phase space area, are discussed. In a recent drift-kinetic analysis of the Vlasov equation [1], exact to order  $\epsilon^2$ , where the ordering parameter  $\epsilon$  is formally proportional to  $m/e$  (maximal ordering), these conservation properties are satisfied. Many terms, however, are typically small, and it is often the case that subsidiary orderings can be introduced to reduce the number of relevant terms and thereby simplify the equations. A procedure for introducing subsidiary orderings is described, while at the same time maintaining the above conservation properties, and a reduced set of fluid-kinetic equations is presented, equations which can be used to simulate the low frequency electromagnetic behaviour of magnetized plasmas. [1] H. Vernon Wong Phys. Plasmas 12, 112305 (2005)

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