

Abstract Submitted  
for the APR06 Meeting of  
The American Physical Society

**Hamiltonian Closure and Symmetry** P.J. MORRISON<sup>1</sup>, Physics Department and IFS, University of Texas at Austin, C.S. JONES, Los Alamos National Laboratory — To obtain fluid theories from kinetic theories requires some kind of closure. Closure can be approximate, as is the case for asymptotic expansions of kinetic theories with collision operators, or can be exact, as is the case for water bags and its generalizations. Collisionless kinetic theories are Hamiltonian and, consequently, this must also be the case for fluid equations obtained by exact closure. A procedure for obtaining exact Hamiltonian closure to all orders will be presented. Also, the manner in which symmetries of kinetic theory induce symmetries of fluid theory will be discussed, in both the exact and approximated contexts.

<sup>1</sup>Supported by the U.S. Department of Energy under contract no. DE-FG03-96ER-54346.

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Date submitted: 13 Jan 2006

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