

## ERRATA

NONCANONICAL HAMILTONIAN DENSITY FORMULATION OF HYDRODYNAMICS AND IDEAL MAGNETOHYDRODYNAMICS. Philip J. Morrison<sup>(a)</sup> and John M. Greene [Phys. Rev. Lett. **45**, 790 (1980)].

We wish to point out that the magnetic field portions of the Poisson brackets presented in Eqs. (6) and (9) require the initial condition  $\nabla \cdot \vec{B} = 0$  for the validity of the Jacobi condition. This requirement is easily removed by adding a term, proportional to  $\nabla \cdot \vec{B}$ , to these equations. The last term of Eq. (6) (within the curly braces) becomes

$$-\int_v \left\{ \vec{B} \cdot \left( \frac{1}{\rho} \frac{\delta F}{\delta \vec{v}} \cdot \nabla \frac{\delta G}{\delta \vec{B}} - \frac{1}{\rho} \frac{\delta G}{\delta \vec{v}} \cdot \nabla \frac{\delta F}{\delta \vec{B}} \right) + \vec{B} \cdot \left[ \left( \nabla \frac{1}{\rho} \frac{\delta F}{\delta \vec{v}} \right) \cdot \frac{\delta G}{\delta \vec{B}} - \left( \nabla \frac{1}{\rho} \frac{\delta G}{\delta \vec{v}} \right) \cdot \frac{\delta F}{\delta \vec{B}} \right] \right\} d\tau.$$

Similarly, the last term of Eq. (9) becomes

$$-\int_v \left\{ B_i \left( \frac{\delta F}{\delta M_i} \partial_i \frac{\delta G}{\delta B_i} - \frac{\delta G}{\delta M_i} \partial_i \frac{\delta F}{\delta B_i} \right) + B_i \left[ \left( \partial_i \frac{\delta F}{\delta M_i} \right) \frac{\delta G}{\delta B_i} - \left( \partial_i \frac{\delta G}{\delta M_i} \right) \frac{\delta F}{\delta B_i} \right] \right\} d\tau,$$

where repeated index notation is used. We emphasize that the Jacobi condition is satisfied in complete generality for these brackets,<sup>1</sup> independent of  $\nabla \cdot \vec{B} = 0$ . The dynamical equations of motion,

$$\begin{aligned} \vec{v}_i &= -\nabla \left( \frac{1}{2} v^2 \right) + \vec{v} \times (\nabla \times \vec{v}) - \rho^{-1} \nabla (\rho^2 U_\rho) \\ &\quad - \rho^{-1} \nabla \cdot \left( \frac{1}{2} B^2 \vec{I} - \vec{B} \vec{B} \right), \\ \vec{B}_i &= -\vec{B} \nabla \cdot \vec{v} + \vec{B} \cdot \nabla \vec{v} - \vec{v} \cdot \nabla \vec{B}, \end{aligned}$$

that are obtained from the Poisson bracket in this form manifestly have the symmetries of the ten-parameter Galilean group. Elsewhere one of us (P.J.M.) has shown how our brackets together with dynamical constants of magnetohydrodynamics generate the infinitesimal transformations of this group.<sup>2</sup>

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<sup>1</sup>For example, they can be obtained by first modifying the canonical form given by V. E. Zakharov and E. A. Kuznetsov {Dokl. Akad. Nauk SSSR **15**, 1288 (1971) [Sov. Phys. Dokl. **15**, 913 (1971)]} by letting  $\vec{M} = (\nabla \vec{T}) \cdot \vec{B} - \vec{B} \cdot \nabla \vec{T} - \vec{T} \nabla \cdot \vec{B} + \rho \nabla \varphi + \sigma \nabla \psi$ , where  $\vec{T}$ ,  $\varphi$ , and  $\psi$  are Clebsch-like potentials conjugate to  $\vec{B}$ ,  $\rho$ , and  $\sigma$ , respectively, and then transforming to physical variables.

<sup>2</sup>P. J. Morrison, in Proceedings of the La Jolla Institute Workshop on Mathematical Methods in Hydrodynamics and Integrability in Related Dynamical Systems, La Jolla, California, 7 December 1981, edited by M. Tabor (American Institute of Physics, New York, to be published).

EFFECTIVE HARMONIC-FLUID APPROACH TO LOW-ENERGY PROPERTIES OF ONE-DIMENSIONAL QUANTUM FLUIDS. F. D. M. Haldane [Phys. Rev. Lett. **47**, 1840 (1981)].

The condition for stability of the quantum fluid state against pinning by a substrate potential commensurate with the mean particle separation (p. 1842, top of column 2) should read: "The fluid state is only stable if the sine-Gordon coupling parameter<sup>10</sup> satisfies  $\beta^2 = 2\pi n^2 \eta > 8\pi$ , i.e.,  $\eta^{-1} < \frac{1}{4} n^2$ , or  $\eta > 4/n^2$ ." (This replaces the opposite condition  $\beta^2 < 8\pi$  in the printed text.) The condition  $\beta^2 > 8\pi$  means that the zero-point density fluctuations of the fluid are sufficiently strong to resist pinning by the substrate.

Note also that the phase field  $\varphi(x)$  [intended as  $\phi(x)$ , as in Refs. 1 and 2] should not be confused with the Bogoliubov-transformation parameter  $\varphi(q)$  introduced in Eq. (5); its boundary conditions are  $\varphi(x+L) = \varphi(x) + \pi J$ , [not  $\varphi(x) + \Pi J$ , as printed].