

Abstract Submitted  
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**Beatification: Flattening Poisson brackets for plasma theory and computation**<sup>1</sup> P. J. MORRISON, IFS Univ of Texas, Austin, T. F. VISCONDI, I. CALDAS, Institute of Physics, University of Saõ Paulo, Saõ Paulo, Brazil — A perturbative method called beatification<sup>†</sup> is presented for producing nonlinear Hamiltonian fluid and plasma theories. Plasma Hamiltonian theories, fluid and kinetic, are naturally described in terms of noncanonical variables. The beatification procedure amounts to finding a transformation that removes the explicit variable dependence from a noncanonical Poisson bracket and replaces it with a fixed dependence on a chosen state in the phase space. As such, beatification is a major step toward casting the Hamiltonian system in its canonical form, thus enabling or facilitating the use of analytical and numerical techniques that require or favor a representation in terms of canonical, or beatified, Hamiltonian variables. Examples will be given.

<sup>†</sup> P. J. Morrison and J. Vanneste, *Ann. Phys.* **368**, 117 (2016); T. F. Viscondi, I. L. Caldas, and P. J. Morrison, *Phys. Plasmas* **24**, 032102 (2017); *J. Phys. A* **49**, 165501 (2016).

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