

Abstract Submitted
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Canonicalizable gyrocenter and structure-preserving geometric algorithms for the Vlasov-Maxwell system¹ HONG QIN, Princeton Plasma Physics Laboratory and University of Science and Technology of China — Littlejohn's introduction of the non-canonical symplectic structure for the gyrocenter dynamics [1] revolutionized plasma kinetic theory. The discovery of the non-canonical symplectic algorithm for gyrocenters [2] initiated the search for symplectic algorithms for the gyrokinetic system. This effort is enforced by the recent discovery of canonical and non-canonical symplectic algorithms for the Vlasov-Maxwell (VM) system [3-5]. However, symplectic algorithms for the gyrokinetic system remain elusive despite intense effort. In retrospect, the success of the symplectic algorithms for the VM system can be attributed to its global canonicalizability. Darboux's theorem ensures that any symplectic structure is locally canonicalizable, but not necessarily globally. Indeed, Littlejohn's gyrocenter is not globally canonicalizable. In this talk, I will show to construct a different gyrocenter that is globally canonicalizable. It should be a good starting point for developing symplectic algorithms for the gyrokinetic system. [1] R. G. Littlejohn, Plasma Phys. 29, 111 (1983). [2] H. Qin & X. Guan, PRL 100, 035006 (2008). [3] H. Qin et al., Nuclear Fusion 56, 014001 (2016). [4] J. Xiao et al, PoP 22, 112504 (2015). [5] Y. He et al., PoP 22,124503 (2015).

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