

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**A second species of spinons in the  $S = 1/2$  Heisenberg anti-ferromagnet on kagome**<sup>1</sup> PAULA MELLADO, ZHIHAO HAO, OLEG TCHERNYSHYOV, Johns Hopkins University — The  $S = 1/2$  Heisenberg model on kagome can be viewed as an ensemble of spinons, fermionic quasiparticles with  $S = 1/2$  bound into small, heavy pairs whose binding energy sets the spin gap [1]. The apparent lack of a spin gap in real kagome magnets (e.g. herbertsmithite) may be associated with the Dzyaloshinskii-Moriya (DM) term  $\mathbf{D} \cdot (\mathbf{S}_i \times \mathbf{S}_j)$  in the Hamiltonian allowed by lattice symmetry. The DM term suppresses the spin gap and eventually induces long-range magnetic order [2]. A recent study [3] hints at the presence of an intermediate gapless phase without magnetic order. We propose that this phase arises as a result of condensation of a second spinon species (kinks). Here we study the motion of a single kink on the Husimi cactus, the analog of kagome in a hyperbolic plane. The kink is localized in the pure Heisenberg model and becomes mobile when  $D \neq 0$ . We calculate the one-particle density of states and the bandwidth. [1] Z. Hao and O. Tchernyshyov, Phys. Rev. Lett. **103**, 187203 (2009). [2] O. Cépas *et al.*, Phys. Rev. B 78, 140405 (2008). [3] I. Rousochatzakis *et al.*, Phys. Rev. B **79**, 214415 (2009).

<sup>1</sup>This work was supported in part by the DOE Grant DE-FG02-08ER46544.

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Date submitted: 20 Nov 2009

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