Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

On the low-temperature behavior of a geometrically frustrated Heisenberg antiferromagnet[1] STEFAN SCHNABEL, D.P. LANDAU, U. of Georgia — The thermodynamic behavior of the Heisenberg antiferromagnet on the kagome lattice and the effects of its geometrical frustration are widely understood [1]. At low temperatures planar spin configurations due to multiple zero-modes (so-called Weathervane loops) are favored entropically. These modes occur when spin clusters are bounded by spins pointing in a similar direction, so that the cluster spins revolve freely around this direction. However, it remains unclear if with decreasing temperature the number of these modes continues to increase and if this eventually leads to a highly ordered $\sqrt{3}\times\sqrt{3}$ state. In order to investigate this system we applied the simulated tempering method, combined with the Heatbath algorithm for single spins and a Metropolis loop-flip Monte Carlo move. We examined the thermodynamic properties for temperatures $\frac{k_B T}{J} \geq 10^{-6}$; and found that once the planar state is attained, the out-of-plane excitations are reduced with decreasing temperature but no further order is established. Hence, the prevailing spin structure represents a temperature independent entropy maximum where any entropy gain produced by additional zero modes is neutralized by an entropy loss in the Weathervane loop structure.

[1] J. N. Reimers and A. J. Berlinsky, Phys. Rev. B **48**, 9539 (1993).

[1]Research supported by NSF.

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Date submitted: 12 Nov 2010

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