Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Topological pairing of skyrmions and symmetry breaking in low-dimensional SU(N) antiferromagnets[1] ALEXEI KOLEZHUK, RWTH Aachen University — I study what happens to a so-called SU(N) antiferromagnet when the high SU(N) symmetry getss explicitly broken. Physically, such SU(N) antiferromagnets can be realized in cold atom systems in optical lattices (particularly, the N=3 case corresponds to spin-1 bosons), and similar models might be possibly relevant for some magnetic materials like $NiGa_2S_4$. I consider two perturbations breaking the SU(N) symmetry down to O(N) and SU(N-1), respectively, and study the phase diagram of the system. Breaking symmetry has a twofold effect: except favoring a certain type of order (spin-nematic or antiferromagnetic), it also affects the topological (Berry) phases. It is shown that the physically interesting case N=3 is very special: the effect of "topological pairing" of skyrmions leads to a change in the degeneracy of the disordered phase in case of SU(N) to O(N) perturbation, and the SU(N) to SU(N-1) perturbation brings the system into a critical phase.

[1]Supported by the Heisenberg Program of DFG.

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Date submitted: 07 Nov 2008 Electronic form version 1.4