

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Magnetic phase diagram of spatially anisotropic, frustrated spin-1/2 Heisenberg antiferromagnet on square and stacked square lattices
KINGSHUK MAJUMDAR, Department of Physics, Grand Valley State University, Allendale, MI 49401 — Magnetic phase diagram of a spatially anisotropic, frustrated spin-1/2 Heisenberg antiferromagnet on a square and a stacked square lattice is investigated using second-order spin-wave expansion. It is shown that with increase in next nearest neighbor frustration the second-order corrections play a significant role in stabilizing the magnetization. We obtain two ordered magnetic phases (Neél and stripe) separated by a paramagnetic disordered phase. Within second-order spin-wave expansion we find that the width of the disordered phase diminishes with increase in the interlayer coupling (for the 3D case) or with decrease in spatial anisotropy but it does not disappear. Our obtained phase diagram differs significantly from the phase diagram obtained using linear spin-wave theory.

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Date submitted: 15 Nov 2010

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