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Determination of the spin dynamics and magnetic Dirac nodes in a Heisenberg honeycomb lattice D. BOYKO, Univ of North Florida, A.V. BALATSKY, Los Alamos National Laboratory/NORDITA, J.T. HARALDSEN, Univ of North Florida — We examine the energy ground states for different magnetic ground states of honeycomb lattices. Using linear spin wave theory, we analyze the evolution between the nearest, next-nearest, and next-next-nearest superexchange couplings for each spin configuration and compare to the ferromagnetic case. Overall, a phase diagram is determined and illustrates the spontaneous energy states in terms of exchange coupling. Furthermore, we analytically evaluate the spin dynamics and critical anisotropies for the various states, and show the presence of Goldstone modes and, in some cases, magnetic Dirac nodes for different spin configurations and couplings.

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