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Zero- vs. finite-field transition in S=1 Heisenberg antiferromagnet with single-ion anisotropy PINAKI SENGUPTA, IAN YAP, ZHIFENG ZHANG, Nanyang Technological University, Singapore — We use large scale quantum Monte Carlo simulation on finite size lattices to study the ground state and finite temperature transitions in a $S = 1$ Heisenberg antiferromagnet (HAFM) with single-ion anisotropy (D) in the presence of an external magnetic field (h_z). The ground state phase diagram (in the $h_z - D$ plane) is characterized by a quantum paramegnetic phase (QPM) at large D and small h_z and an XY-AFM phase at small D and/or large h_z separated by a continuous transition. We show that the QPM to XY-AFM transition belongs to the XY universality class at $h_z = 0$ (driven by varying D) whereas it belongs to the BEC universality class at $h_z \neq 0$ (driven by either varying D at constant h_z or varying h_z at constant D). This has important implication in the behavior of the specific heat at the transition point which can be verified experimentally. Finally, we discuss the experimental relevance of our results in the case of DTN.

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