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Effect of anisotropies on magnetic quantum phase transitions B. NORMAND, Uni. Fribourg, Switzerland, M. E. ZHITOMIRSKY, CEA Grenoble, France — We consider the effects of superexchange anisotropy and Dzyaloshinskii–Moriya (DM) interactions on the field– and pressure–driven magnetic phase transitions in quantum dimer systems. These two types of anisotropy term are introduced separately on the intra– and interdimer bonds, with spatial symmetries both commensurate and incommensurate with the magnetic order, to determine the alterations of the phase diagram and magnetic excitations. Exchange anisotropy causes a general modification of the critical properties at the field–driven transition from the XY universality class (Bose–Einstein condensation) to Ising behaviour. DM interactions may act either to remove the field–driven transition completely or to create a new transition between two different antiferromagnetic states. For certain cases we compute the magnetisation and the evolution of the excitation spectra as functions of field and pressure. Our results are directly relevant to recent measurements on $TlCuCl_3$ and CuHpCl, and may assist in the further understanding of a number of other quantum dimer systems, including $BaCuSi_2O_6$, $Sr_2Cu(BO_3)_2$ and PHCC.

Bruce Normand
University of Fribourg

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