

## Classical and quantum anisotropic Heisenberg antiferromagnets

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We study classical and quantum Heisenberg antiferromagnets with exchange anisotropy of XXZ-type and crystal field single-ion terms of quadratic and cubic form. The magnets display a variety of phases, including the field-induced spin-flop (or, in the quantum case, spin-liquid) and biconical (corresponding, in the quantum lattice gas description, to supersolid) phases. Applying mainly ground-state considerations, MC and DMRG methods, the impact of quantum effects and lattice dimension is analysed. Interesting critical and multicritical behaviour may occur at quantum and thermal phase transitions.