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Spiral magnetic order on an anisotropic triangular lattice in the presence of Dzyaloshinskii-Moriya interaction DENIS DALIDOVICH, RASTKO SKNEPNEK, A. JOHN BERLINSKY, JUNHUA ZHANG, CATHERINE KALLIN, Department of Physics and Astronomy, McMaster University, Hamilton, Ontario, Canada L8S 4M1 — We consider the ground state energy, magnetization and the energy spectrum of the two-dimensional antiferromagnets on the triangular lattice in the presence of anisotropy in the exchange couplings, and Dzyaloshinskii-Moriya (DM) interaction D . J and J' are meant to be the couplings along the chain direction and zigzag bonds respectively. Assuming that in the wide range of those parameters the system has the spiral Neel ordering, we consider the role of quantum fluctuations within the framework of a standard $1/S$ expansion. We show that DM interaction considerably suppresses fluctuations and seems to play an important role in stabilizing the spiral Neel ordering in this frustrated system. We discuss our theoretical results within the context of the recent experimental measurements in the frustrated quantum magnet Cs_2CuCl_4 , [R. Coldea, et. al., Phys. Rev. B, **68**, 134424, (2003)], and the recent theoretical structure factor calculations by M. Y. Veillette, et. al., Phys. Rev. B **72**, 134429 (2005)

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