

Linearly polarized spin waves in the antiferromagnetic Heisenberg model with exchange anisotropy toward the Ising limit

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We examine the nature of the singlet excitations introduced recently to describe the spin dynamics of the antiferromagnetic Heisenberg model with anisotropic coupling. It is shown that they excite spin waves polarized linearly, as opposed to the usual magnons, that are triplet excitations and correspond to circularly polarized waves. The approach yielding the singlet excitations give more accuracy than ordinary spin-wave theory, which shows that the absence of linearly polarized modes is an important flaw of the latter. © 1993 The American Physical Society.