

## Quantum Phase Transition in Quasi -two-dimensional Heisenberg Anti ferromagnet with Single-Ion Anisotropy

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**Abstract:** In the present paper, we investigate the quantum phase transition in a spatially anisotropic antiferromagnetic Heisenberg model of  $S=1$  with single-ion energy anisotropy. By using the Schwinger boson representation, we calculate the Gaussian correction to the critical value  $J_{\perp}^c$  caused by quantum spin fluctuations. We find that, for the positive single-ion energy, a nonzero value of  $J_{\perp}^c$  is always needed to stabilize the antiferromagnetic long-range order in this model. It resolves a difference among literature and shows clearly that the effect of quantum fluctuations may qualitatively change a result obtained by the mean-field theories on lower-dimensional systems.

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Key words: spatially anisotropic Heisenberg model, single-ion anisotropy, functional integration, Schwinger-Boson representation

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