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The central peak problem in the 2d anisotropic heisenberg model[1]
BISMARCK COSTA, Universidade Federal de Minas Gerais, ANDERSON LIMA, Universidade Federal da Bahia — The origin of the central peak in the neutron scattering function, $S(q,\omega)$, for the classical 2d anisotropic Heisenberg model has been a puzzle for several years. Wiesler et al (Z. Phys. B 93, 277-297, 1994) studied the compound $CoCl_2-GIC$ by using neutron scattering. More recently some numerical simulations of the model (H.G. Evertz and D. P. Landau, PRB 54, 12302-12317, 1996) came out. Their results are inconsistent with any analytical study so far. The analytical works suppose that the central peak is due to vortex motion. The theory mimics a successful approach for the one-dimensional version of the model where the central peak is due to kink motion. In this work we show that the central peak in the 2d anisotropic heisenberg model can be explained by a vortex-anti-vortex number fluctuation due to local diffusion and a creation-annihilation process. The phenomenology we propose gives the correct behavior for $S(q,\omega)$ when compared with experimental as well spin dynamics results.

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Bismarck Costa
Universidade Federal de Minas Gerais

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