

Peer Review

Review of: "Anomalous Scaling and Magnetization Temperature Dependence in Cubic Ferromagnetic Crystals"

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Overall, I find this preprint very interesting not only for the theoretical specialists in the models used but for experimentalists in the field of magnetism. The authors present a detailed review of established theories to describe ferromagnetic behaviour and a proposed theoretical model, beyond the quantum Weiss-Heisenberg Mean Field Approximation. The developed theoretical model improves correspondence with experimental results. The authors have chosen EuO (EuS) as a simple case study for theoretical prediction and experimental comparison. They develop a model that includes improvements capable of including spin wave effects in the vicinity of T_c , obtaining a closer fit to experimental results than previous theories.

The structure of the paper is unusual, though, presenting the main results summarized in the introduction, Figure 2, and the following explanation.

Very good historical explanation of the FM model, which I find very instructive, and I am glad to find it in a research work, generally restricted in this type of explanatory perspective due to a lack of space.

All theoretical models are well explained from a theoretical perspective and physical insights. The proposed diagrammatic technique, based on perturbation theory, is applied sequentially, explaining the physics involved in the results obtained in comparison with the experimental results, being very consistent and easy to follow for a general reader. Instead of giving the final solution, the authors explain the steps followed to arrive at that model, which is very instructive and enlightening.

(Please correct the typo in the summary, Weiss instead of Wess.)

Declarations

Potential competing interests: No potential competing interests to declare.