Dynamic order parameter correlation function of the SSS-model

M. Weiretmayr[1], R. Folk[1], and G. Moser[2],
[1] *Institute for Theoretical Physics, Linz University, A-4040 Linz, Austria*
[2] *Department for Material Research and Physics, Paris Lodron University Salzburg, A-5020 Salzburg, Austria*

We consider the dynamic properties of the SSS-model at $T = T_c$ defined by the equations of motion for an n-component order parameter (OP) and $n(n-1)/2$ conserved density (CD) dynamically coupled to the OP. For $n = 3$ the dynamics of the isotropic antiferromagnet is described, wheras the case $n = 2$ describes approximately (up to asymmetric terms) the critcal dynamics at the superfluid transition.

We calculate the dynamic correlation functions characterized by their widths and shapes. Deviations from the Lorentzian shape are most prominently expected at T_c. The results are presented in scaling form (exponentiated) leading to expressions finite also in the large frequency limit.

We apply the method of field theoretic renormalization group to obtain the relevant functions for the calculation of the dynamic correlations. The perturbation calculation will be performed in one loop order [1]. For the parameters of the dynamical model - the static fourth order coupling, the dynamic mode coupling and the time scale ratio - we inserted the two loop order fixed point values and compared with former results using the one loop order values. Especially the time scale ratio is changed considerably from its one loop value [2] thus changing the shape function of the OP.

We also compare our results with experimental data of the three-dimensional Heisenberg antiferromagnet $RbMnF_3$ [3]. Although the discrepancy at T_c (a theoretical dip instead of an experimental observed peak) is weakend, it remains.

This work was supported by the Fonds zur Förderung der wissenschaftlichen Forschung under Project No. 19583

[1] H.-K.Janssen: *Renormalized Field Theory of the Critical Dynamics of O(n)-Symmetric Systems*, 1977 *Z.Phys.* B **26** 187;
[2] R.Folk and G.Moser: *Critical dynamics: a field-theoretical approach*, 2006 *J. Phys.* A: Gen. **39** R207-R313
[3] R.Coldea and R.A.Cowley, T.G.Perring, D.F.McMorrow, B.Roessli: *Critical behavior of the three-dimensional Heisenberg antiferromagnet $RbMnF_3$*, 1998 *Phys. Rev.* B **57** 9