SFB/TRR 21 - Seminar
19. Januar 2010, Stuttgart

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Continuous zero-temperature transitions and quantum-dynamical scaling

Antiferromagnetic heavy fermion metals close to their quantum critical points display a richness in their physical properties unanticipated by the traditional approach to quantum criticality. Most notably are relaxation rates in the so-called quantum-relaxational regime which are linear in temperature and turn out to be a hallmark of quantum-dynamical or energy(ω)/temperature(T) scaling. For a particular system, $YbRh_2Si_2$, such a linear-in-T relaxation rate and consequently ω/T-scaling of the single-particle Green function was recently inferred from Hall coefficient and magnetoresistance measurements.
This talk addresses the origin of scaling and the particular content of "quantum-dynamical" scaling. We demonstrate, why the linear-in-T relaxations rates cannot be explained by the traditional theory for quantum criticality. Finally, the link between the Hall coefficient of $YbRh_2Si_2$ and a linear-in-T relaxation rate for the single-particle Green function is established.

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