CONDENSED MATTER THEORY SEMINAR

Subject: **Exact Renormalization Group for Quantum Spin Systems**

Speaker: **Prof. Dr. Peter Kopietz, Goethe-Universität Frankfurt**

Date & time: **Friday, November 9th, 2018 at 3.15 p.m.**

Venue: **Seminar room 1.114**

We show that the generating functional of the time-ordered connected spin correlation functions of an arbitrary quantum spin system satisfies an exact renormalization group flow equation [1]. Formally, this flow equation resembles bosonic version of the so-called Wetterich equation. The SU (2) spin algebra is taken into account by integrating the renormalization group flow with a non-trivial initial condition.

Our method is closely related to a diagrammatic approach to quantum spin systems developed many years ago in a seminal work by Vaks, Larkin, and Pikin [2].

As a first application, we show that our method gives the critical temperature of spin-S Ising and Heisenberg models with high accuracy. We also discuss applications to quantum spin systems without long-range magnetic order.

[1] J. Krieg and P. Kopietz, arXiv:1807.02524 [2] V. G. Vaks, A. I. Larkin, and S. A. Pikin, Sov. Phys. JETP 26, 188 (1968).