GOETHE
UNIVERSITÄT
FRANKFURT AM MAIN

Fachbereich Physik
Institut für Theoretische Physik

CONDENSED MATTER THEORY SEMINAR

Subject: **Multiloop functional renormalization group that sums up all parquet diagrams**

Speaker: **Fabian Kugler / Prof. Dr. Jan von Delft (LMU München)**

Date & time: **Friday, April 27th, 2018 at 3.15 p.m.**

Venue: **Seminar room 1.114**

The functional renormalization group (fRG) is a versatile, quantum-field-theoretical formulation of the powerful RG idea and has seen a large number of successful applications. The main limitation of this framework is the truncation of the hierarchy of flow equations, where, typically, effective three-particle interactions are neglected altogether. Here, we present multiloop fRG flow equations for the four-point vertex and the self-energy [1], which are based on the truncated fRG flow and further simulate the effect of the six-point vertex on parquet diagrams. The multiloop flow consists of successive one-loop calculations and sums up all parquet diagrams to arbitrary order, enabling improvement of many fRG computations. Using the X-ray-edge singularity as an example, we introduce the formalism and illustrate our findings with numerical results [2].

[1] F. B. Kugler and J. von Delft, PRB 97, 035162 (2018) [2] F. B. Kugler and J. von Delft, PRL 120, 057403 (2018)