

## Programme on

“Synergies between Mathematical and Computational Approaches  
to Quantum Many-Body Physics”

August 29 – October 21, 2016

organized by

Ali Alvai (U Cambridge & MPI Solid State Research, Stuttgart), Sabine Andergassen  
(U Tübingen), Manfred Salmhofer (U Heidelberg), Alessandro Toschi (TU Vienna)

School

September 26 – 30, 2016

## • Monday, September 26, 2016

09:00 – 09:30 **Opening & Registration**09:30 – 10:30 **Ali Alvai***Full Configuration Interaction Quantum Monte Carlo*10:30 – 11:00 *coffee / tea break*11:00 – 12:00 **Ali Alvai***Applications of FCIQMC to strongly correlated ab initio systems: from the Cr<sub>2</sub> molecule to cuprates*12:00 – 14:00 *lunch break*14:00 – 15:00 **Karsten Held***Dynamical mean field theory*15:00 – 15:30 *break*15:30 – 16:30 **Karsten Held***Dynamical vertex approximation*

## • Tuesday, September 27, 2016

09:30 – 10:30 **Walter Metzner***Functional renormalization group approach to interacting fermion systems I*10:30 – 11:00 *coffee / tea break*11:00 – 12:00 **Walter Metzner***Functional renormalization group approach to interacting fermion systems II*12:00 – 14:00 *lunch break*14:00 – 15:00 **Carsten Honerkamp***Functional RG for (some) two-dimensional materials*15:00 – 15:30 *break*15:30 – 16:30 **Nils Wentzell***High-frequency asymptotics of the vertex function: diagrammatic parametrization and algorithmic implementation*16:45 – 18:45 **Poster Session**

- **Wednesday, September 28, 2016**

09:30 – 10:30 **Emanuel Gull**

*Introduction to DCA I*

10:30 – 11:00 *coffee / tea break*

11:00 – 12:00 **Emanuel Gull**

*Introduction to DCA II*

- **Thursday, September 29, 2016**

09:30 – 10:30 **Philipp Werner**

*DMFT for models with dynamically screened local interactions*

10:30 – 11:00 *coffee / tea break*

11:00 – 12:00 **Philipp Werner**

*Extended DMFT for models with long-range Coulomb interactions*

12:00 – 14:00 *lunch break*

14:00 – 15:00 **Georg Kresse**

*Approximate methods for the correlation energy: the basics*

15:00 – 15:30 *break*

15:30 – 16:30 **Georg Kresse**

*Approximate methods for the correlation energy: the random phase approximation and improvements*

- **Friday, September 30, 2016**

09:30 – 10:30 **Lode Pollet**

*An introduction to diagrammatic Monte Carlo: polaron systems and beyond I*

10:30 – 11:00 *coffee / tea break*

11:00 – 12:00 **Lode Pollet**

*An introduction to diagrammatic Monte Carlo: polaron systems and beyond II*

12:00 – 14:00 *lunch break*

14:00 – 15:00 **Fakher Assaad**

*Recent progress in fermion Monte Carlo: deconfined phases and phase transitions*

15:00 – 15:30 *break*

15:30 – 16:30 **Roman Orus**

*Introduction to Tensor Network states and methods*

**All talks take place at the ESI, Boltzmann Lecture Hall!**