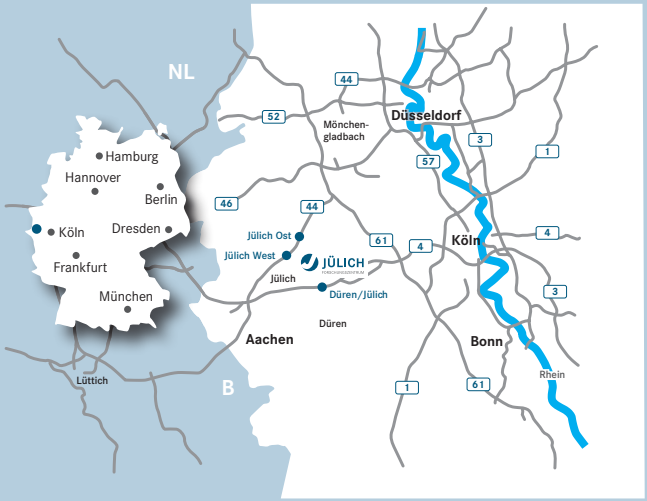
Lecturers

- Ferdi Aryasetiawan (Lund)
- Martin Eckstein (Nürnberg)
- Karsten Held (Wien)
- Erik Koch (Jülich)
- Frank Lechermann (Bochum)
- Alexander Lichtenstein (Hamburg)
- Eva Pavarini (Jülich)
- Michael Potthoff (Hamburg)
- Giovanni Vignale (Columbia)
- Dieter Vollhardt (Augsburg)
- Jan von Delft (München)
- Cedric Weber (London)
- Philipp Werner (Fribourg)

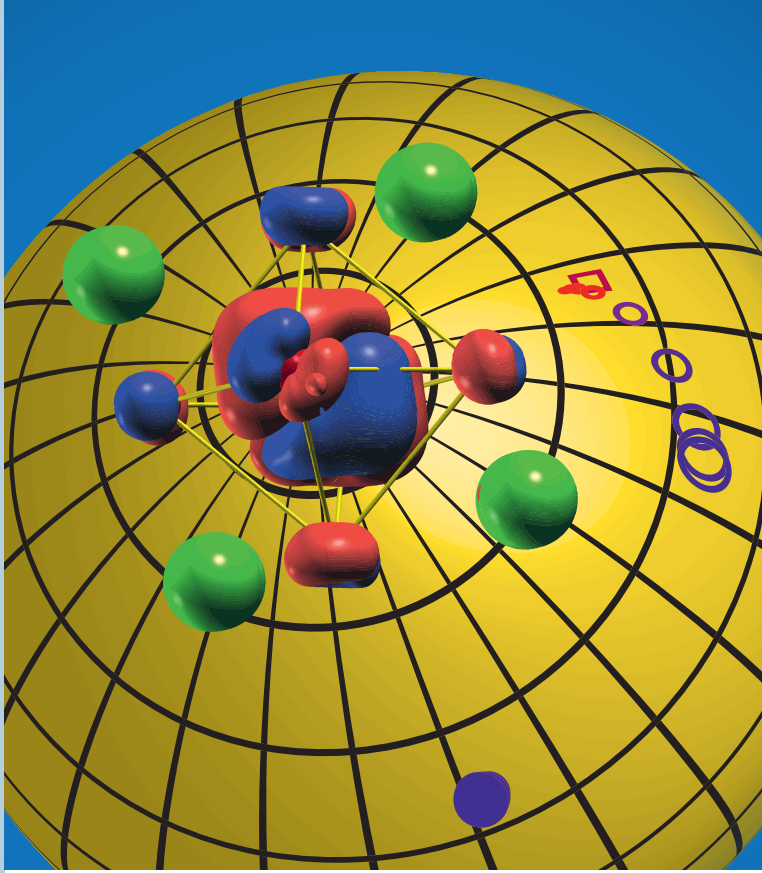


Organizers

Eva Pavarini, Forschungszentrum Jülich
Erik Koch, Forschungszentrum Jülich
Alexander Lichtenstein, Universität Hamburg
Dieter Vollhardt, Universität Augsburg

Further information

Please refer to www.cond-mat.de/events/correl22 for updated details of arrangement and final program. For further questions, please write to correl22@fz-juelich.de



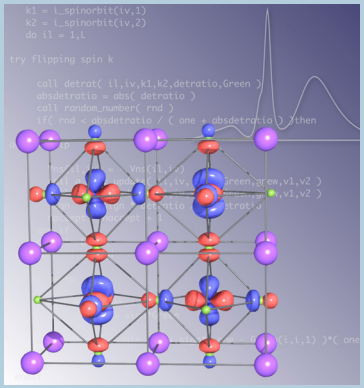
Autumn School on Correlated Electrons

Dynamical Mean-Field Theory of Correlated Electrons

4 – 7 October 2022
Forschungszentrum Jülich

JÜLICH Forschungszentrum

ICAM-I2CAM Institute for Complex Adaptive Matter



Correlated systems are characterized by strong electron-electron interactions, resulting in many-body effects eluding a static mean-field description. They thus proved largely intractable until the development of dynamical mean-field theory (DMFT). In this approach, mapping the lattice onto an auxiliary impurity problem gives a local dynamical self-energy, which captures the essence of electronic correlations. DMFT is exact in the limit of infinite dimensions, and often provides an excellent approximation for real crystal structures. This crucial insight represented a paradigm shift in the study of correlations. Solving ever more complex impurity problems nowadays allows the simulation of real materials, making contact with experiment via the calculation of spectra, dynamical response functions, and non-equilibrium properties. Even subtle non-local effects can be captured using various approaches, including clusters of impurities or diagrammatic expansions. Thus DMFT finds applications not only in correlated bulk systems but also in heterostructures, and can even be employed to understand the properties of topological phases of strongly correlated electron systems.

The goal of the school is to introduce advanced graduate students and up to this modern method for the realistic modeling of strongly correlated matter.

Lectures

Concepts

- infinite dimensions
- dynamical mean fields
- quantum impurities
- Fermi liquid theory
- path integrals

Quantum impurity solvers

- quantum Monte Carlo
- analytical continuation
- renormalization group
- machine learning

DMFT for materials

- LDA+DMFT simulations
- oxide heterostructures
- dynamical response functions
- topological phases
- non-equilibrium phenomena

Beyond DMFT

- diagrammatic expansions
- dual Fermions
- long-range order
- critical exponents

General Information

Venue: The school will take place at the Forschungszentrum Jülich, in the lecture hall of the Peter Grünberg Institute, from 4 to 7 October 2022.

Participation: The school is intended for advanced graduate or PhD students and postdocs in the field of electronic structure of materials.

Admission: Interested students should apply before May 31, 2022 at www.cond-mat.de/events/correl22. Accepted applicants will be informed by e-mail shortly after the deadline.

Accommodation: Students can apply for financial support to cover accommodation costs. Participants supported by the school will stay in the Aachen Youth Hostel www.aachen.jugendherberge.de. Funding for accommodation is limited.

ICAM Junior Travel Awards: We might be able to provide a limited number of ICAM Junior Travel Awards. For more information see icam-i2cam.org and the application form at www.cond-mat.de/events/correl22.

Transport: A shuttle bus will be operating in the mornings and evenings between the Youth Hostel in Aachen and the Forschungszentrum Jülich.

Hotels in Aachen and Jülich: Participants for whom no low-cost accommodation can be found or who wish to stay in a hotel may find hotels in Jülich or Aachen through the sites www.aachen-tourist.de and www.juelich.de/hotelsundpensionen.