International Conference

Strongly Coupled Coulomb Systems

30 July – 4 August 2017, Kiel

Keynote Speakers

Gordon Baym (Illinois, USA)
Siegfried H. Glenzer (Stanford, USA)
Stefan Kuhr (Strathclyde, UK)
Stephane Mazevet (Paris, France)
Carlo Pierleoni (L'Acquila, Italy)
Andrea Tomadin (Genoa, Italy)

Invited Speakers

Bernard Bernu (Paris, France)
Ben van Duppen (Antwerp, Belgium)
Tobias Dornheim (Kiel, Germany)
Yan Feng (Soochow, China)
V.E. Fortov (Moscow, Russia)
Martin French (Rostock, Germany)
Fabian Heirich-Meisner (Munich, Germany)
Y.E. Lozovik (Moscow, Russia)
Manoel Manghi (Toulouse, France)
Andrea Perali (Camerino, Italy)
Alessandro Principi (Nijmegen, Netherlands)
Niclas Schlünzen (Kiel, Germany)
Luciano Silvestri (Boston, USA)
Jan Vorberger (Dresden, Germany)
Ulf Zastrau (Hamburg, Germany)

Local Organizing Committee SCCS 2017
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Wednesday, August 2

Session VII: High-energy-density plasmas in the laboratory

10:15 Coffee break and informal discussions

Session VIII: Confined and mesoscopic Coulomb systems

12:30 Lunch and informal discussions

Conference excursion to Lübeck

14:00–20:00

Diffusion in two-dimensional quasi-magnetized rotating dusty plasmas

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Transport phenomena in two dimensions are of ongoing interest due to unsolved theoretical challenges and the recent appearance of an increasing number of (effectively) two dimensional materials. Strongly coupled dusty plasmas have proven to provide unique possibilities for the microscopic understanding of classical macroscopic phenomena.

Transport properties of single layer dusty plasmas have been in the focus of strongly coupled dusty plasma research since the early years of the field. These efforts have provided very detailed analysis of the non-magnetized systems by means of both laboratory experiments and numerical simulations. Until recently, the effect that an external magnetic field played was accessible only through numerical investigations. This is due to the fact that experimentally, the application of real magnetic fields has shown to induce two fundamental problems, namely the disturbance of the background gas discharge and the need for unrealistically high magnetic fields to magnetize the dust component.

In our case the high quasi-magnetic field is experimentally applied to a single layer dusty plasma by rotating the particle cloud and observing the particle trajectories in a co-rotating frame. Based on the Larmor-theorem, effective magnetic fields up to 3000 Tesla can be achieved without disturbing the discharge. The self-diffusion in these quasi-magnetized strongly coupled systems is measured through the mean square displacement, and is compared to numerical simulations of magnetized two-dimensional Yukawa systems. Experiments and simulations show reasonable agreement supporting the predicted super-diffusion in such systems at the accessible time-scales.

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