



# Physikalisches Kolloquium

**Valerii M. Vinokur, Argonne National Laboratory**

**»Vortices in superconductors: New matter and new dynamics«**

*Einführung: A. Mirlin*

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The advent of High  $T_c$  era led to focused attention on the vortex state of all varieties of superconductors by a major fraction of condensed matter physicists, material scientists and engineers, and the experts on the solid state and electronic devices. Vortex matter was recognized as one of the most fundamental areas of the modern condensed matter physics, the view that was evidenced by awarding the 2003 Nobel Prize to Alex Abrikosov for the conception of the vortex state. Vortex systems appeared to be an ideal tunable system with controllable parameters that allowed for the experimental verification of many fundamental concepts of contemporary condensed matter physics. In particular, dynamics of vortex structures revealed a rich variety of behaviors generic to all disordered systems: slow glassy dynamics at low driving forces, nonlinear response, critical behavior, and dynamic phase transitions between the different regimes of motion. We review the vortex dynamics, focusing on the vortex creep, depinning transition and dynamic melting phenomena. We establish the connection between the vortex dynamics and the properties of underlying potential energy relief and show that the wealth of the dynamic behaviors is closely connected to the deep statistical property of real world which is governed by the extreme value statistics.

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**Freitag, 02.06.2006, 17 Uhr c.t.,**

**Universität Karlsruhe (TH), Otto-Lehmann-Hörsaal, Physik-Flachbau (Geb. 30.22).  
Anschließend Nachsitzung im Gastdozentenhaus „Heinrich Hertz“**