

Charge Dynamics in Condensed Matter Systems with Strong Correlations

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Diverse charge and spin structures and complex nonlinear dynamics in condensed-matter systems of reduced dimensionality have attracted much attention during last decades. Conventional charge and spin density waves formed in systems with prevailing electron-phonon and electron-electron coupling feature the collective phason mode with well established fingerprints in applied ac and dc electric fields. On the other hand, in the presence of strong Coulomb repulsion a wealth of broken symmetry insulating electronic phases with spatially inhomogeneous charge and/or spin structures is established in various transition metal oxides and quasi-2D organics. These phases feature exotic dynamics which is not well understood yet. An open issue concerns the nature of collective charge excitations and how these phases should respond to applied dc and ac fields.

In this talk I will overview recent radio-frequency measurements of the in-plane dielectric function and dc conductivity measurements in high electric fields of the charge ordered system α -(BEDT-TTF)₂I₃ and the Mott insulator system with canted antiferromagnetic ground state κ -(BEDT-TTF)₂Cu[N(CN)₂]Cl. Observed dynamics is discussed and compared with the well established examples of conventional CDW and SDW.