



Charge dynamics in ionic materials mapped by femtosecond x-ray powder diffraction

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Charge relocations and atomic motions on ultrashort time scales play a key role for functional processes in condensed matter. X-ray diffraction methods with a femtosecond time resolution allow for spatially resolving transient structures and, in particular, spatial distributions of electrons, both being relevant for the structure-function relationships of crystalline materials. This talk provides an introduction into this new field, combining experimental aspects with recent results on ultrafast charge motions in ionic crystals. The field-driven transfer of valence electrons between ions in a superposition of quantum states will be addressed for the materials LiBH_4 and LiH . In LiH , this fully reversible process is strongly influenced by electron correlations. As a second example, charge transfer in transition metal complexes will be discussed.