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Transitions in matter triggered by intense ultrashort X-ray pulses BEATA ZIAJA, CFEL, DESY, Hamburg & INP, Krakow, Poland, ZOLTAN JUREK, NIKITA MEDVEDEV, SANG-KIL SON, ROBERT THIELE, CFEL, DESY, Hamburg, ROBIN SANTRA, CFEL, DESY, Hamburg & Hamburg University — In my talk I will give an overview on the recent results of our theoretical investigation how the unique properties of X-ray free-electron laser (FEL) radiation can be employed to modify extended atomic or molecular assemblies, and to create new states of matter. I will discuss three topics that are related to various irradiation regimes that can be achieved, depending on the FEL pulse fluence: (i) atomic processes within laser-created plasmas, (ii) ultrafast electron kinetics in irradiated semiconductors, and (iii) radiation-induced structural changes in solids.

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