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Collisional auto-ionization of clusters exposed to intense X-ray pulses ULF SAALMANN, CHRISTIAN GNODTKE, JAN M. ROST, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany — An efficient multi-electronic ionization process mechanism in strong X-ray pulses is proposed. It occurs, e.g., in clusters or large molecules when photo-electrons, trapped in the strong Coulomb potential of the cluster ions, form a plasma with supra-atomic density and undergo multiple energy-exchanging collisions in the entire cluster volume producing fast electrons. As an example we discuss the electron spectrum obtained from a recent experiment where xenon clusters were exposed to strong femtosecond pulses of 90 eV photon energy at FLASH, causing mainly inner-shell ionization [1]. Such collisional auto-ionization is expected to be a general phenomenon occurring for strong atomic X-ray absorption in extended systems.

[1] Ch. Bostedt etal, submitted (2009).

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