

Sub-picosecond dynamics of the laser-cluster interaction probed by spectroscopy

The project:

Large clusters (nano-objects of a few thousands of atoms), similarly to solids, couple very efficiently to intense sub-picosecond laser pulses. Near 100 % of the laser radiation can be absorbed giving rise to the observation of highly charged ions with energies reaching MeV and electrons with energies up to a few keV. One fascinating feature of this interaction is its efficiency for converting photons in the eV range to x-rays with keV energies, which may lead to novel non-polluting and renewable x-ray sources of a sub-millimeter resolution. Whereas the spectroscopy of the emitted ions and electrons extracts information from the system a few microseconds after the femtosecond laser pulse and the cluster disintegration, x-ray spectroscopy allows performing measurements on a very short time scale. Our recent findings have shown evidence of new features allowing for an identification of the mechanisms responsible for x-ray production. We propose to perform further experimental investigations at the LUCA* facility in Saclay in order to precisely determine the dynamics of the nanoplasma on a short time scale and to test the mean field theoretical approach based on Monte Carlo simulation that we recently worked out.

**LUCA: Laser UltraCourt Accordable*

About the group:

The work will be carried out in the “Clusters and Surfaces under Strong Excitation” team at the Institut des NanoSciences de Paris (INSP), a laboratory from the French Agency of research (CNRS) and the P&M Curie University (UPMC). The experiments will be performed at the Saclay Laser Interaction Center (SLIC), a research infrastructure dedicated to ultrafast photoscience and member of the European consortium of laser infrastructures “LASERLAB-EUROPE 2”.

The candidate:

The successful candidate will have a PhD degree in physics, ideally with experience in atomic physics and experience in femtosecond laser systems and/or electron, ion or x-ray spectroscopy.

Terms of employment:

The research project will contribute to the recently founded Helmholtz Alliance “Extremes of Density and Temperature: Cosmic Matter in the Laboratory”, coordinated by the “Extreme Matter Institute” (EMMI) at GSI Darmstadt and the position is intended as full-time appointment over at least one year and up to twenty months starting from March 2010.

Applications:

To apply, please send, as soon as possible, a CV (including publication list and a letter of recommendation) with a cover letter to:

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