Clusters in Nanodroplets exposed to intense sculptured laser pulses

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The helium nanodroplet pick-up technique is used to generate small particles within an ultracold environment. Upon excitation with intense laser pulses the system transforms into a transient state called a nanoplasma. The process is highly nonlinear and show aspects of correlation and collective behavior. In particular the Mie resonance can be used to generate energetic and highly charged ion[1]. With the preparation of clusters in helium nanodroplets a core shell system is produced which allows to study the onset of collective excitations as function of size or the plasmonic responses of impurity and environment. We use sculptured ultrashort laser pulses to analyze and control the dynamics on a femtosecond timescale. The results of optimization experiments will be compared to molecular dynamics simulations[2].

[1] J. Passig, R. Irsig, N.X. Truong, Th. Fennel, J. Tiggesbäumker, K.H. Meiwes-Broer, New J. Phys. 14, 085020 (2012)

[2] N.X. Truong, P. Hilse, S. Göde, A. Przystawik, T. Döppner, Th. Fennel, Th. Bornath, J. Tiggesbäumker, M. Schlanges, G. Gerber, K.-H. Meiwes-Broer, Phys. Rev. A 81, 013201 (2010)