

UNL Department of Physics and Astronomy presents:
**Structure and Dynamics of Variable Size Matter Studied in the
Gas Phase: From Atoms to Condensed Matter**

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ABSTRACT

Gas phase studies on the structure and dynamics of variable size matter ranging from atoms to isolated nanoscopic condensed matter are reviewed. Selected examples from spectroscopic experiments are presented, which include: (i) excited-state atoms in well-defined quantum states for enhancing knowledge on astrophysically relevant species; (ii) electronic properties of molecular cations and coherent control of molecular dissociation; (iii) structural and electronic size effects of matter occurring in small clusters bridging properties of isolated atoms and macroscopic condensed matter; (iv) size effects in photoionization of isolated nanoparticles and photoionization dynamics induced by phase-stabilized laser pulses reaching into the attosecond time regime. Finally, recent results on the dynamics of laser-driven nanoplasma formation in differently shaped nanoparticles are presented.