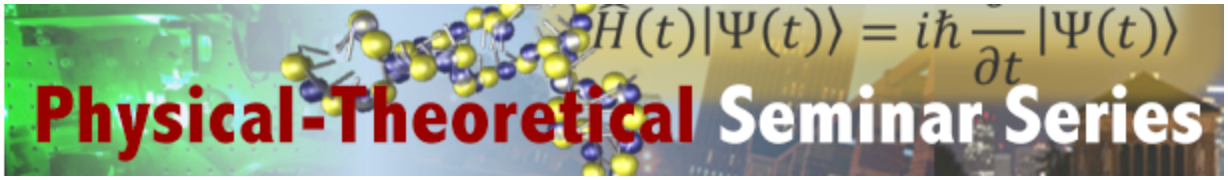

Monday, September 23, 2019, 12:00 pm
Zumberge Hall of Science, ZHS 159

Professor Rolf Schäfer

Department of Physical Chemistry
Darmstadt University of Technology, Germany

Dielectric and magnetic behavior of pure and doped clusters

The combination of magnetic (Stern-Gerlach) and electric (Stark) beam deflection experiments and density functional theory enables the systematic study of how molecular structure influences the magnetic response of pure and doped clusters.

The clusters are produced in a laser vaporization source with a temperature controlled nozzle to probe the influence of thermally activated molecular degrees of freedom, especially on the magnetic response. The dielectric properties of the clusters are investigated to identify the molecular structure of the clusters. In the high-temperature regime all clusters show exclusively high magnetic field seeking response and magnetic dipole moments are extracted from the shift of the molecular beam. At low-nozzle temperatures some of the clusters display considerably broadened beam profiles due to a non-uniform deflection in the magnetic field. Results reflect the influence of the transition metals chemical environment on the magnetic properties of atomic domain magnetic nanoalloys. Factors causing variations of spin orientation are discussed qualitatively. Since some of the clusters show an atomic like behavior at low nozzle temperatures, double Stern-Gerlach experiments have been performed to study the clusters' refocusing properties. This paves the way to future magnetic resonance experiments on endohedrally doped metal clusters.

Suggested reading: Dielectric Properties of Isolated Clusters, S. Heils and R. Schafer. PDF file. singlespin.usc.edu/teaching/CHEM575/Dielectric.pdf

Hosted by Professor Vitaly Kresin

The scientific community is invited

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