SES08-2008-000014

Abstract for an Invited Paper
for the SES08 Meeting of
the American Physical Society

Metal Clusters as Superatoms and Nanostructures

VITALY KRESIN, University of Southern California

Atomic nanoclusters are agglomerates of a discrete number of atoms, from a few to thousands, forming a bridge between small molecules and crystalline materials. By studying the properties of size-resolved clusters, the evolution of finite systems can be traced as a function of the precisely known number of atoms. In addition, nanoclusters can serve as model sensors and as potential building blocks for novel materials. In many metallic clusters, size-quantized electronic levels give rise to a striking shell structure pattern, akin to that of atoms and nuclei, which controls particle stabilities, shapes, and other physical and chemical properties. The talk will touch upon shell effects, collective excitations (plasmons), fast electron-hole recombination (escaping the phonon bottleneck), the determination of work functions, and the possibility of strengthened pairing.