

The University of Texas at San Antonio

UTSA Physics and Astronomy



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Electronic shells, states, and excitations in metal nanoclusters

Nanoclusters are agglomerates of a countable number of atoms or molecules, from a few to thousands. They form a bridge between individual molecules on one side, and quantum dots and bulk materials on the other. By studying the properties of mass-resolved free clusters, their evolution can be traced atom-by-atom and electron-by-electron. Electrons in metal clusters organize into a “superatom” shell structure which governs the particles’ stabilities, shapes, and other properties. For example, these electrons display size- and temperature-dependent work functions, the emergence of collective oscillations (plasmons), and indications of exceptionally strong superconducting pairing.

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