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Physical and chemical properties of supported, suspended and trapped clusters

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Investigations of physical systems of small sizes and reduced dimensionalities, exhibiting discrete quantized energy level spectra and specific structures and morphologies, open avenues for systematic explorations of the emerging unique behavior of materials at the nanoscale, as well as of the transition from the atomic and molecular domain to the condensed phase regime. We will discuss computer simulations and accompanying experiments exhibiting emergent physical and chemical behavior at the nanoscale, focusing on several confinement configurations – free, supported and trapped clusters. These include investigations of metallic, semiconducting, superconducting [1] and mixed metal/molecular [2] suspended nanowires, recent advances in understanding the structure and catalytic activity of supported gold nanoclusters and methods for controlling their dimensionality and properties [3], strongly correlated states and formation of electron (Wigner) clusters in 2D quantum dots, and crystallization of trapped finite boson clusters [4].

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