

Abstract Submitted
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Detection of pairing in a new high- T_c system: Density of states in nanoclusters¹ AVIK HALDER, VITALY KRESIN, University of Southern California — A unique property of metal nanocluster particles is the “superatom”-like shell structure of the delocalized electrons. The electronic shell levels are highly degenerate, i.e., present sharp peaks in the density of states, which can enable exceptionally strong electron pairing in certain clusters composed of just tens to hundreds of atoms. This offers the potential of using them as building blocks for high- T_c materials. But how can one verify the onset of a superconducting transition in a free nanocluster? To answer this question we demonstrate the production of an intense flux of size-resolved nanoclusters with an adjustable internal temperature, and show that an accurate spectroscopic measurement of their photoelectron yield curves reveals the density of states near the Fermi level and strong changes which can occur upon reaching T_c . This has enabled our observation of a new family of high-temperature superconductors.

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