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Charge and Shape Effects on the Carrier Dynamics of 25 Atom Au Nanoclusters MATTHEW SFEIR, Brookhaven National Laboratory, HUIFENG QIAN, RONGCHAO JIN, Carnegie Mellon University — We study a series of semiconducting gold clusters that exhibit strong quantum confinement effects on their optical properties. In contrast to larger metallic nanoparticles, the surface plasmon resonance disappears a large optical gap (> 1.3 eV) is formed. Recent synthetic advances have permitted the study of truly monodisperse clusters with precise control on the atomic scale. Using femtosecond and nanosecond transient absorption spectroscopy, we have investigated the excited state relaxation dynamics of spherical and prolate 25 atom isomers. We have determined that these particles exhibit long excited state lifetimes and that the carrier dynamics that are strongly influenced by the charge state and the physical arrangement of the atoms.

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