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Resonant Fluorescence from Quantum Dot Molecular Excitonic Transitions MARK KERFOOT, University of California, Merced, ALLAN BRACKER, DANIEL GAMMON, Naval Research Laboratory, MICHAEL SCHEIBNER, University of California, Merced, UNIVERSITY OF CALIFORNIA, MERCED COLLABORATION, NAVAL RESEARCH LABORATORY COLLABORATION — Quantum dot molecules formed by two vertically stacked quantum dots are a rich testing ground for basic concepts regarding the measurement and control of quantum states. The well defined geometry is ideal for studying interaction mechanisms, such as the interaction of two dipoles each located in one of the quantum dots of the quantum dot molecule. A prerequisite for doing so is the ability to detect the interaction mediated changes in the properties of the individual, uncoupled quantum dots. Here we use resonant fluorescence to study exciton transitions in quantum dot molecules. We measure the photoluminescence of the same transition we optically excite with a narrow band laser. With this method, features on the scale of the homogeneous line width of the intradot exciton transition are well resolved. This enables us to study the fine-structure of different charge and spin configurations with high sensitivity.

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