Abstract Submitted
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**Photo-conductance of a single Quantum Dot**[1] ALEXANDRE ZIMMERS, HONGYUE WANG, EMMANUEL LHUILLIER, QIAN YU, BENOIT DUBERTRET, HERVE AUBIN, Univ Pierre et Marie Curie UPMC / ESPCI Paris, PSL Research University / CNRS, Paris, FRANCE, CHRISTIAN ULYSSE, Laboratoire de Photonique et de Nanostructures (LPN), CNRS, Marcoussis, FRANCE, LPEM COLLABORATION — One promising strategy for the development of nanoscale resonant spin sensors is to measure the spin-dependent photo-current in Quantum Dots (QDots) containing spin-dependent recombination centers. To reach single spin sensitivity will require measurements of the photo-conductance of single QDots. We present here an experimental study of the conductance and photo-conductance of single HgSe QDots as function of drain and gate voltage. The evolution of the differential conductance dI/dV spectrum with the gate voltage demonstrates that single HgSe QDots are forming the junction. The amplitude of the gap measured in the differential conductance spectrum changes with the occupation level. A large inter-band gap, 0,85eV, is observed for the empty QDot, a smaller intra-band gap 0,25eV is observed for the doubly occupied QDot. These gap energies are consistent with the values extracted from the optical absorption spectrum. Upon illuminating the QDot junction, we show that the photo-conductive signal produced by this single QDot can be measured with a simple demodulation method.

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