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Orbital and Spin Effects in Single- and Double-Quantum Dots Defined in InAs/InP Nanowire Heterostructures. ANDREAS FUHRER, LINUS FROBERG, LARS SAMUELSSON, The Nanometer Structure Consortium, Lund Universtity, Lund, Sweden — Heterostructures in semiconducting nanowires are highly promising in terms of their potential for novel physics and device applications. We present measurements on single (double) quantum dots fabricated using InP double (triple) barrier heterostructures in InAs nanowires. Transport spectroscopy measurements on single dots show that we can design few-electron quantum dots in nanowires where the well defined geometry leads to shell structure effects. We also show that the Zeeman splitting of the first few electrons can be engineered to any desired effective g-factor between |g*|=2.5 and values close to the bulk value of InAs |g*|=13 [1]. In extension of this, transport spectroscopy in the few- electron regime of double quantum dots consisting of two InAs islands in series have been performed. These double dots are tuned using a single homogenous backgate, which together with a source-drain bias allows us to controllably empty both dots down to the last electron. Again we observe a shell-structure which can be linked to the geometric cross-section of the wire and an orbital blockade effect is observed depending on the character of the wavefunctions in each dot. [1] M. Björk et al., cond-mat/0507433, 2005

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