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Transport properties of few-electron quantum dots in gated InGaAs/InP and InAsP structures GHISLAIN GRANGER, National Research Council Canada, S.A. STUDENIKIN, A. KAM, A.S. SACHRAJDA, P.J. POOLE, G.C. AERS, R.L. WILLIAMS, National Research Council Canada — Electron transport experiments are conducted on gated quantum dots formed in InGaAs/InP and InAsP/InP quantum well (QW) structures. These ridge-shape structures are grown by chemical beam epitaxy on pre-patterned substrates, and the InGaAs or InAsP QW are inserted at specific locations. In this system, quantum dots are formed underneath of submicron gate electrodes. Devices with split gate patterns are also under investigation. Standard Coulomb-blockade diamonds are observed up to 6 K, and a never-ending diamond indicates that the quantum dot can be completely emptied. With a bias across the dot and in the transport window corresponding to the addition of the second electron to the quantum dot, the triplet excited state becomes accessible, and the singlet-triplet transition is observed at 5 T. The observation of photon-assisted tunneling at microwave frequencies up to 50 GHz will also be presented. Due to their unique properties, such quantum dots could be useful for quantum computing experiments.

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