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Anomalous electronic transport features in a lateral quantum dot array sample WEI PAN, R.G. DUNN, J.L. RENO, J.A. SIMMONS, Sandia National Laboratories, D. LI, S.R.J. BRUECK, CHTM, University of New Mexico — We will present in this talk experimental results obtained in a lateral quantum dot array sample, with a pitch size of $\sim$ 350 nm and a designed dot size of $\sim$ 150nm. The starting material is a high quality quantum well with the two-dimensional electron gas buried 200 nm below the surface. The quantum dot array is defined by a Ti/Au metal grid, which was fabricated using the interferometric lithograph and lift-off techniques. Around zero magnetic field, a pronounced positive magnetoresistance is observed, which can be explained by the semi-classical model of magnetic breakdown. The so-called commensurability oscillations together with the usual Shubnikov- de Hass oscillations are also observed. Surprisingly, in a pure DC measurement of longitudinal resistance, an anomalous resistance spike is clearly seen. The magnetic field position of this resistance spike depends on the amplitude of applied DC bias (V_{ds}) between source and drain, and shows roughly a $1/V_{ds}$ dependence.
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