Evidence for coherent transport in GaAs hole open quantum dots. S. FANIEL, B. HACKENS, A. VLAD, C. GUSTIN, L. MOLDOVAN, S. MELINTE, V. BAYOT, Cermin, Universite catholique de Louvain, Louvain-la-Neuve, Belgium, M. SHAYEGAN, Department of Electrical Engineering, Princeton University, Princeton, New Jersey 08544 — We report magnetotransport measurements in GaAs hole open quantum dots. Our samples were fabricated from a $p$-type GaAs quantum well with a density of $2.2 \times 10^{15} \text{ m}^{-2}$ and a mobility of $35 \text{ m}^2/\text{Vs}$. Two different dots were patterned using e-beam lithography and wet etching. A top gate was added in order to control the dots openings and the hole density. The measurements were performed down to $30 \text{ mK}$ with the magnetic field applied perpendicular to the plane of the two-dimensional system. We observed large, reproducible conductance fluctuations associated with the coherent transport of holes inside the dots at lowest temperatures which vanish above $500 \text{ mK}$. From the variance of these fluctuations and from the Random Matrix Theory, we extracted the hole dephasing time $\tau_{\phi}$. The temperature dependence of the calculated $\tau_{\phi}$ lies between a $T^{-1}$ and $T^{-2}$ behavior and exhibits a saturation at very low temperature which is similar with $\tau_{\phi}$ measured in 2D electron systems$^1$.


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