Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

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, Departement 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 2.2×10^{15} m^{-2} and a mobility of 35 m^2/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 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 mK. From the variance of these fluctuations and from the Random Matrix Theory, we extracted the hole dephasing time τ_φ. The temperature dependence of the calculated τ_φ lies between a T^{-1} and T^{-2} behavior and exhibits a saturation at very low temperature which is similar with τ_φ measured in 2D electron systems[1].

[1]B. Hackens *et al.*, Phys. Rev. Lett. **94**, 146802 (2005)

Sebastien Faniel
Cermin, PCPM and DICE labs, Universite Catholique de Louvain

Date submitted: 15 Dec 2005 Electronic form version 1.4