Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Spin-Orbit effects in Quantum Dots: Interplay of disorder and interactions HAKAN E. TÜRECI, Y. ALHASSID, A. DOUGLAS STONE, Center for Theoretical Physics, Sloane Physics Laboratory, Yale University, New Haven, CT 06520 — Disordered or chaotic quantum dots with a large Thouless conductance g provide a tractable experimental and theoretical system for studying electron-electron interactions within the framework of the universal Hamiltonian. In particular, good agreement between theory and experiment is observed for the mesoscopic fluctuations of the conductance in dots with negligible spin-orbit scattering[1]. Here we focus on the effects of a tunable spin-orbit scattering within the universal Hamiltonian model. The presence of spin-orbit scattering was shown to introduce new symmetry limits of the single-particle Hamiltonian[2]. We present results for ground state and finite temperature properties in the crossover regime between symmetries. Furthermore, we study the signatures of a quantum critical regime dominated by collective critical fluctuations[3].

References

[1] Y. Alhassid and T. Rupp, Phys. Rev. Lett. 91, 056801 (2003).

[2] I.L. Aleiner and V.I. Fal'ko, Phys. Rev. Lett. **87**, 256801 (2001).

[3] G. Murthy, Phys. Rev. B **70**, 153304 (2004).

Hakan E. Tureci
Center for Theoretical Physics, Sloane Physics Laboratory, Yale University, New Haven, CT 06520

Date submitted: 30 Nov 2005 Electronic form version 1.4