Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Orbital Paramagnetism of Strongly Confined Micron Width 2DEG Strips in the Extreme Quantum Limit MICHAEL HARRISON, Michigan State University, East Lansing, MI 48823 — The possibility of orbital paramagnetism in a confined degenerate electron gas arising from surface corrections was pointed out by F.S. Ham over fifty years ago [1]. Several theoretical studies of such surface effects have since been published, including confinement effects in mesoscopic systems [2,3]. Experiments have also revealed the presence of size-dependent orbital paramagnetism [4]. In this work I report the results of calculations on the orbital magnetism of strongly confined micron-width strips of 2DEG systems in the extreme quantum limit. A maximum in orbital paramagnetism is predicted at achievable steady magnetic fields for electron areal densities of 10^{10} cm^{-2}. It is suggested that such strips, when configured parallel to each other in a plane, with similar appropriately spaced plane layers, may constitute a novel paramagnetic material. 1. F.S. Ham, Phys. Rev. 92 1113 (1953) 2. B.L. Altshuler, Y. Gefen, and Y. Imry, Phys. Rev. Lett. 66 88 (1991) 3. B.L. Altshuler, Y.Gefen, Y.Imry, and G. Montambaux, Phys. Rev.B 47 10335 (1993) 4. L.P. Levy, D.H. Reich, L. Pfeiffer, and K. West, Physica B 189 204 (1993).

Michael Harrison
Michigan State University, East Lansing, MI 48823

Date submitted: 12 Jan 2005 Electronic form version 1.4