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Anisotropic Fermi Contour of (001) GaAs Electrons in Parallel Magnetic Fields[1] M.A. MUEED, DOBROMIR KAMBUROV, MANSOUR SHAYEGAN, L.N. PFEIFFER, K.W. WEST, K.W. BALDWIN, J.J.D. LEE, Department of Electrical Engineering, Princeton University, Princeton, New Jersey 08544, USA, ROLAND WINKLER, Department of Physics, Northern Illinois University, DeKalb, Illinois 60115, USA — We demonstrate a severe Fermi contour anisotropy induced by the application of a parallel magnetic field to high-mobility electrons confined to a 30-nm-wide (001) GaAs quantum well. We study commensurability oscillations, namely geometrical resonances of the electron orbits with a unidirectional, surface-strain-induced, periodic potential modulation, to directly probe the size of the Fermi contours along and perpendicular to the parallel field. Their areas are obtained from the Shubnikov-de Haas oscillations. Our experimental data agree semi-quantitatively with the results of parameter-free calculations of the Fermi contours but there are significant discrepancies.

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