

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Electron Energy Levels in the 1D-2D Transition¹ MICHAEL PEPPER, KUMAR SANJEEV, KALARIKAD THOMAS, GRAHAM CREETH, DAVID ENGLISH, London Centre for Nanotechnology, University College London, DAVID RITCHIE, University College London, JONATHAN GRIFFITHS, IAN FARRER, GERAINT JONES, Cavendish Laboratory, University of Cambridge — Using GaAs-AlGaAs heterostructures we have investigated the behaviour of electron energy levels with relaxation of the potential confining a 2D electron gas into a 1D configuration. In the ballistic regime of transport, when the conductance shows quantized plateaux, different types of behaviour are found according to the spins of interacting levels, whether a magnetic field is applied and lifting of the momentum degeneracy with a source-drain voltage. We have observed both crossing and anti-crossing of levels and have investigated the manner in which they can be mutually converted. In the presence of a magnetic field levels can cross and lock together as the confinement is altered in a way which is characteristic of parallel channels. The overall behaviour is discussed in terms of electron interactions and the wavefunction flexibility allowed by the increasing two dimensionality of the electron distribution as the confinement is weakened.

¹Work supported by UK EPSRC

Michael Pepper
University College London

Date submitted: 08 Nov 2015

Electronic form version 1.4