

Abstract Submitted
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Interaction Determined Electron Energy Levels in One-Dimension¹ MICHAEL PEPPER, SANJEEV KUMAR, KALARIKAD THOMAS, University College London, LUKE SMITH, Cavendish Laboratory, University of Cambridge, GRAHAM CREETH, University College London, IAN FARRER, DAVID RITCHIE, GERAINT JONES, GRIFFITHS JONATHAN, Cavendish Laboratory, University of Cambridge, UCL COLLABORATION, CAVENDISH LABORATORY COLLABORATION — We have investigated electron transport in a quasi-one dimensional electron gas in the GaAs-AlGaAs heterostructure designed so that the confinement potential can be progressively weakened. This causes the energy levels to decrease in energy relative to each other, however this decrease occurs at different rates, a feature attributed to the energy being determined by both confinement and the electron-electron repulsion which varies with the shape of the wavefunction. It is found that the initial ground state crosses the higher levels so resulting in missing plateaux of quantised conductance. A change in the nature of the ground state to a more extended form causes an increase in the capacitance between the confining gates and the electrons. Both crossings and anti-crossings of the levels are found and these will be discussed along with other consequences of the form of the level interactions. The effects of level crossing on the spin dependent 0.7 structure will be presented.

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Michael Pepper
University College London

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