Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Energy spectrometry of electrons ejected from dynamic quantum dots driven up a potential slope by a surface acoustic wave CHRISTOPHER FORD, MATTHEW BENESH, SEOK-KYUN SON, University of Cambridge, MASAYA KATAOKA, NPL, UK, CRISPIN BARNES, ROBERT MCNEIL[1], JON GRIFFITHS, GEB JONES, IAN FARRER, DAVID RITCHIE, University of Cambridge — Surface acoustic waves (SAWs) in a GaAs/AlGaAs heterostructure generate an electrostatic wave which propagates at the sound velocity. This potential wave is capable of collecting electrons from a 2D electron gas (2DEG) and transporting them through a depleted channel. The SAW minima form a continuous series of dynamic quantum dots, each transporting a controllable number of electrons along the channel. The confinement of the electrons in each dot increases as the potential rises along the channel, ejecting electrons one-by-one back into the 2DEG above the Fermi energy. These electrons can travel several microns before thermalising. We measure their energy spectrum using a variable potential barrier upstream as the channel is squeezed by split gates, and correlate this with the SAW-driven current along the channel.

[1]Now at RWTH Aachen

Christopher Ford
University of Cambridge

Date submitted: 09 Nov 2012 Electronic form version 1.4