

Abstract Submitted
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Tunable nonadiabatic excitation in a single-electron quantum dot J.D. FLETCHER, MASAYA KATAOKA, P. SEE, S.P. GIBLIN, T.J.B.M. JANSSEN, National Physical Laboratory, Hampton Road, Teddington, Middlesex TW11 0LW, United Kingdom, J.P. GRIFFITHS, G.A.C. JONES, I. FARRER, D.A. RITCHIE, Cavendish Laboratory, University of Cambridge, J J Thomson Avenue, Cambridge CB3 0HE, UK — We report observation of nonadiabatic excitation of single electrons in a quantum dot. We have developed a way of measuring the excitation spectrum of the quantum dot formed in a tunable-barrier single-electron pump. When the confinement potential is deformed at sub-nanosecond timescales, electrons are excited to states with higher back-tunneling rates leading to a measurable reduction in the pumped current. In the presence of a perpendicular magnetic field we have observed that these states follow a Fock-Darwin spectrum. Our experiments demonstrate a simple model system to study nonadiabatic processes of quantum particles.

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