

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Unusual vortex dynamics and phase transitions in mesoscopic superconducting islands¹ RITA GARRIDO MENACHO, MALCOLM DURKIN, NADYA MASON, University of Illinois at Urbana-Champaign — Granular mesoscopic niobium (Nb) islands provide a stage for strong confinement and pinning effects for vortex dynamics. We performed magnetotransport measurements on single Nb islands with varying diameters. We observed non-periodic oscillations in magnetoresistance along the superconducting transition which suggest non-trivial vortex configurations. Furthermore, we found strong indications of a quantum phase transition as a function of diameter. At large diameters (above 2 μm) we observed an apparent crossing point in the magnetoresistance at the critical field (B_c) coupled with a magnetoresistance peak when the field is increased further. These signatures suggest a superconductor-to-metal transition and a quantum critical point at B_c , at resistances far below the quantum of resistance R_Q .

¹This work was supported by the DOE Basic Energy Sciences under DE-SC0012649.

Rita Garrido Menacho
Univ of Illinois - Urbana

Date submitted: 11 Nov 2016

Electronic form version 1.4