

Abstract Submitted
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Large variance of T_c at large length scales in granular mesoscopic Nb islands RITA GARRIDO MENACHO, MALCOLM DURKIN, University of Illinois at Urbana-Champaign, SARANG GOPALAKRISHNAN, Harvard University, JIAN-MIN ZUO, NADYA MASON, University of Illinois at Urbana-Champaign — Superconductivity in granular mesoscopic islands, in which the average grain size is smaller than the superconducting coherence length, remains largely unstudied. We performed transport measurements of single Nb islands to study the relation between the critical temperature (T_c) and the island diameter. We found that T_c is largely suppressed at scales much larger than the coherence length of Nb. This can be explained by considering a proximity effect between the grains in the island in which the largest grains define the onset of superconductivity. Following this logic, the grain distribution is proportional to the island area and large T_c fluctuations are expected as the diameter of the island decreases. We perform a T_c variance study of large sets of islands at various diameters, and demonstrate an exponential decay relation reaching bulk Nb properties as the island diameter increases.

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