

Abstract Submitted
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Density of States, Entropy, and the Superconducting Pomeranchuk Effect in Pauli-Limited Al Films GIANLUIGI CATELANI, Laboratory of Atomic and Solid State Physics, Cornell University, XIAOSONG WU, PHILIP ADAMS, Department of Physics and Astronomy, Louisiana State University — We present low temperature tunneling density of states measurements of Pauli-limited Al films in which the Zeeman and orbital contributions to the critical field are comparable. We show that films in the thickness range of 6-7 nm exhibit a reentrant parallel critical field transition which is associated with a high entropy superconducting phase, similar to the high entropy solid phase of ^3He responsible for the Pomeranchuk effect. This phase is characterized by an excess of states near the Fermi energy so long as the parallel critical field transition remains second order. Theoretical fits to the zero bias tunneling conductance are in good agreement with the data well below the transition but theory deviates significantly near the transition. The discrepancy is a consequence of the emergence of e - e interaction correlations as one enters the normal state.

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