

Abstract Submitted
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Zeeman-limited Superconductivity in Crystalline Al Films¹

PHILIP ADAMS, Louisiana State University, HYOUNDO NAM, CHIN-KANG SHIH, The University of Texas, GIANLUIGI CATALANI, Peter Grünberg Institut (PGI-2), Forschungszentrum Jülich — We report the evolution of the Zeeman-limited superconducting phase diagram (PD) in ultra-thin crystalline Al films. Parallel critical field measurements, down to 50 mK, were made across the superconducting tricritical point of epitaxially-grown Al films ranging in thickness from 7 monolayers (ML) to 30 ML. The resulting phase boundaries were compared with the quasi-classical theory of a Zeeman-mediated transition between a homogeneous BCS condensate and a spin polarized Fermi liquid. Films thicker than ~ 20 ML showed good agreement with theory, but thinner films exhibited an anomalous PD that cannot be reconciled within a homogeneous BCS framework.

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Philip Adams
Louisiana State Univ - Baton Rouge

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