

Abstract Submitted
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Evidence for a superconducting surface state in the half-Heusler alloy LuPtBi¹ ABHIMANYU BANERJEE, ALAN FANG, CAROLINA ADAMO, PHIL WU, ELI LEVENSON-FALK, AHARON KAPITULNIK, Stanford University, SHEKHAR CHANDRA, BINGHAI YAN, CLAUDIA FELSER, Max Planck Institute for Chemical Physics of Solids — The half-Heusler alloy LuPtBi is predicted by band structure calculations to be a potential candidate for topological superconductivity. We present experimental evidence for a superconducting surface state at much higher temperatures than the bulk T_c of 0.9K (seen from transport). STM measurements of the 111 surface show a well developed superconducting gap at temperatures below 2.4K, with an IV curve consistent with d-wave superconductivity. The ratio of $\frac{\Delta}{k_b T_c}$ is about 12.0 as opposed to the BCS value of 1.76, implying that the true T_c is about 6 – 7 K. This result is supported SQUID magnetization measurements as well as theoretical predictions for enhanced surface superconductivity due to a Van-Hove singularity in a Bi-terminated [111] surface. We discuss implications of our measurements and possible future experiments.

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