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Direct evidence of two superconducting gaps in FeSe_{0.5}Te_{0.5}: SnS-Andreev spectroscopy and the lower critical field

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Abstract

© 2016, Pleiades Publishing, Inc. We present direct measurements of the superconducting order parameter in nearly optimal FeSe Te single crystals with the critical temperature $T_C \approx 14$ K. Using the intrinsic multiple Andreev reflection effect (IMARE) spectroscopy and measurements of the lower critical field, we directly determined two superconducting gaps, $\Delta_L \approx 3.3\text{--}3.4$ meV and $\Delta_S \approx 1$ meV, and their temperature dependences. We show that a twoband model fits well the experimental data. The estimated electron-boson coupling constants indicate a strong intraband and a moderate interband interaction.

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