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Title:	Mixed type I and type II superconductivity due to intrinsic electronic inhomogeneities in the type II Dirac semimetal PdTe ₂
Authors:	Sirohi, Anshu (/jspui/browse?type=author&value=Sirohi%2C+Anshu) Chowdhury, Rajeswari Roy (/jspui/browse?type=author&value=Chowdhury%2C+Rajeswari+Roy) Vashist, A. (/jspui/browse?type=author&value=Vashist%2C+A.) Singh, Yogesh (/jspui/browse?type=author&value=Singh%2C+Yogesh) Gayen, Sirshendu (/jspui/browse?type=author&value=Gayen%2C+Sirshendu) Das, Shekhar (/jspui/browse?type=author&value=Das%2C+Shekhar) Sheet, G. (/jspui/browse?type=author&value=Sheet%2C+G.)
Keywords:	Topological Material Display
Issue Date:	2019
Publisher:	IOP Science
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Abstract:	The type II Dirac semimetal PdTe is unique in the family of topological parent materials because it displays a superconducting ground state below 1.7 K. Despite wide speculation on the possibility of an unconventional topological superconducting phase, tunneling and heat capacity measurements revealed that the superconducting phase of PdTe follows predictions of the microscopic theory of Bardeen, Cooper and Schrieffer for conventional superconductors. The superconducting phase in PdTe is further interesting because it also displays properties that are characteristic of type-I superconductors and are generally unexpected for binary compounds. Here, from scanning tunneling spectroscopic measurements we show that the surface of PdTe displays intrinsic electronic inhomogeneities in the normal state which leads to a mixed type I and type II superconducting behaviour along with a spatial distribution of critical fields in the superconducting state. Understanding of the origin of such inhomogeneities may be important for understanding the topological properties of PdTe in the normal state.
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