

Abstract Submitted
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Pauli limiting in the superconductor κ -(ET)₂Cu(NCS)₂ under pressure KYUIL CHO, BRAUNEN SMITH, CHRIS REA, MIKE VIOTTI, CHARLES AGOSTA, Clark University, JOHN SCHLUETER, Argonne National Laboratory — We have strong evidence that the organic superconductor κ -(ET)₂Cu(NCS)₂ is Pauli limited when it is compressed with a small (< 2 kbar) amount of pressure. A superconductor is considered Pauli limited when the magnetic energy, $\mu_b H$, overcomes the binding energy of the Cooper pairs to destroy superconductivity. In most situations superconductivity is destroyed by the formation of vortices. At ambient pressure, κ -(ET)₂Cu(NCS)₂ shows some behavior that is reminiscent of a Fulde Ferrell Larkin Ovchinnikov state, although no direct evidence of a transition into this state has been measured. Through a series of penetration depth measurements using a tunnel diode oscillator under pressure, we can show the evolution of the ambient pressure state to the clearly Pauli limited state at 1.75 kbar. We will also discuss the design of our new plastic, gas charged pressure cell that has allowed us to make these measurements in dc and pulsed magnetic fields. We acknowledge support from the DOE #ER46214 and the NSF #DMR-SGER-0331272.

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