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Mapping the temperature-dependent quasiparticle scattering rate over the Fermi surface of an organic superconductor[1] JOHN SINGLETON, National High Magnetic Field Laboratory, Los Alamos, PAUL GODDARD, ARZHANG ARDAVAN, STEPHEN BLUNDELL, Oxford University Physics, ROSS MCDONALD, National High Magnetic Field Laboratory, STAN TOZER, National High Magnetic Field Laboratory, Tallahassee, AMALIA COLDEA, Bristol University Physics, JOHN SCHLUETER, Argonne National Laboratory — The interlayer magnetoresistance ρ_{zz} of the organic metal κ-(BEDT-TTF)$_2$Cu(NCS)$_2$ is studied in fields of up to 45 T and at temperatures T from 0.5 K to 30 K. The peak in ρ_{zz} seen in in-plane fields, a definitive signature of interlayer coherence, remains to Ts exceeding the Anderson criterion for incoherent transport by a factor ~ 30. Angle-dependent magnetoresistance oscillations are modeled using an approach based on field-induced quasiparticle paths on a 3D Fermi surface, to yield the T dependence of the scattering rate τ^{-1}. The results suggest that τ^{-1} does not vary strongly over the Fermi surface, and that it has a T^2 dependence due to electron-electron scattering. These findings are contrasted with recent experiments on cuprates, and their implications for models of organic superconductivity (e.g. FLEX) are discussed.

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