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Superfluid density in 2D organic superconductors: evidence for d-wave pairing SONIA MILBRADT, Department of Physics, Simon Fraser University, ANDREW BARDIN, Centre for Organic Photonics and Electronics, School of Mathematics and Physics, University of Queensland, COLIN TRUNCIK, WENDELL HUTTEMA, PAUL CARRIERE, Department of Physics, Simon Fraser University, BEN POWELL, Centre for Organic Photonics and Electronics, School of Mathematics and Physics, University of Queensland, PAUL BURN, SHIH-CHUN LO, Centre for Organic Photonics and Electronics, School of Chemistry and Molecular Biosciences, University of Queensland, DAVID BROUN, Department of Physics, Simon Fraser University — Organic superconductors are an exciting "playground" for low dimensional physics, with a clean, layered structure that exhibits a variety of electronic phases including superconductivity. The interactions responsible for pairing, and the symmetry of the pair wavefunction, continue to be open issues in these materials. To gain further insights, we have carried out microwave spectroscopy of two BEDT-TTF-based superconductors. Penetration depth measurements reveal a strong, linear temperature dependence of superfluid density, indicating line nodes in the order parameter and providing strong evidence for d-wave pairing. Measurements of the microwave conductivity allow us to extract the quasiparticle scattering rate, both above *and* below T_c. In the normal state, the scattering is strong, at several times the thermal energy. Below T_c there is a rapid drop in scattering, with a T^3 temperature dependence characteristic of d-wave quasiparticles scattering from antiferromagnetic spin fluctuations.

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