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**Evidence from tunneling spectroscopy for a quasi-one-dimensional origin of superconductivity in $Sr_2RuO_4$** S. LEDERER, Stanford University, I.A. FIRMO, Cornell University, Brookhaven National Laboratory, C. LUPIEN, University of Sherbrooke, A.P. MACKENZIE, University of St. Andrews, Mac Planck Institute for Chemical Physics of Solids, J.C. DAVIS, Cornell University, Brookhaven National Laboratory, University of St. Andrews, S.A. KIVELSON, Stanford University — To establish the mechanism of unconventional superconductivity in $Sr_2RuO_4$, a prerequisite is direct information concering the momentum-space structure of the energy gaps $\Delta_i(k)$, and in particular whether the pairing strength is stronger ("dominant") on the quasi-one-dimensional ($\alpha$ and $\beta$) or on the quasi-two-dimensional ($\gamma$) Fermi surfaces. We present scanning tunneling spectroscopy measurements of the density of states spectra in the superconducting state of $Sr_2RuO_4$ for $0.1T_c < T < T_c$ and analyze them along with published thermodynamic data using a simple phenomenological model. We show that our observation of a single superconducting gape scale with maximum value $2\Delta \approx 5T_c$, along with a spectral shape indicative of line nodes is consistent, within a weak-coupling model, with magnetically mediated odd-parity superconductivity generated by dominant, near-nodal Cooper pairing on the $\alpha$ and $\beta$ bands.

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