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Infrared spectroscopy of magnetic field-induced quantum criticality in $Sr_3Ru_2O_7$ JESSE S. HALL, McMaster University, URMAS NAGEL, TOOMAS RÕÕM, National Institute of Chemical Physics and Biophysics (Tallinn), J.F. MERCURE, University of St Andrews, ROBIN S. PERRY, The University of Edinburgh, ANDREW P. MACKENZIE, University of St Andrews, Max Planck Institute for Chemical Physics of Solids (Dresden), THOMAS TIMUSK, McMaster University, Canadian Institute for Advanced Research — Infrared spectroscopy performed on the model quantum critical system $Sr_3Ru_2O_7$ offers an opportunity to study the frequency dependence of the magnetic field-tuned quantum critical behaviour. The temperature dependence of the resistivity is well characterized in magnetic fields, as is the Fermi surface, so the relevant optical properties can be determined and compared to the theory for non-Fermi liquids. We report infrared reflectance measurements from 1- 12 meV at temperatures below 10 K and magnetic fields up to 17 T. A sharp field-dependent feature appears in the reflectance at 3.8 meV, combined with a broad suppression of the reflectance across the measurement region. The optical scattering rate will be compared to other measurements and the implications for the understanding of quantum criticality will be discussed.

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