

Abstract Submitted
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Measurements of Multiple Gap Substructure in MgB₂ Below 1 Kelvin¹ STEVEN CARABELLO, JOSEPH LAMBERT, ROBERTO RAMOS, Department of Physics, Drexel University — The two superconducting energy gaps of magnesium diboride (MgB₂) are well established. First-principles calculations have also predicted substructure within the sigma- and pi-band gaps. However, due to anticipated intraband impurity scattering, there is controversy as to whether these finer structures can be observed in real samples. Prior experimental evidence above 1 Kelvin has provided evidence supportive of these features. We have performed tunneling spectroscopy experiments on MgB₂/insulator/Pb Josephson junctions on SiC substrates, at temperatures as low as 20 mK. By measuring differential conductance at low temperatures, and by using extremely clean MgB₂ thin films, we have resolved features within the energy gaps to under 1 meV. We report results of these experiments, which are in remarkable agreement with theoretical predictions for this substructure.

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