

# Measurement of Sub-structure in the Dual Energy Gap of Magnesium Diboride below 1 Kelvin

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Among conventional, phonon-mediated (BCS) superconductors, magnesium diboride ( $\text{MgB}_2$ ) stands out as the only material demonstrated to have two distinct superconducting energy gap values. This has been widely reported in both theoretical and experimental studies. However, some theoretical analyses and experimental results suggest substructure within both gaps - a result which remains controversial. We present results of our tunneling spectroscopy experiments on  $\text{MgB}_2$ /insulator/Pb Josephson junctions, at temperatures as low as 20 mK, which are in clear agreement with theoretical predictions for this substructure<sup>1</sup>.

<sup>1</sup>Choi, H. J., Roundy, D., Sun, H., Cohen, M. L. and Louie, S. G., The origin of the anomalous superconducting properties of  $\text{MgB}_2$ . Nature 418, 758-760 (2002).