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Tunneling Spectroscopy of SRF Cavity Grade Niobium CHAOYUE CAO, Illinois Institute of Technology, Argonne National Laboratory, NICK GROLL, THOMAS PROSLIER, Argonne National Laboratory, JOHN ZASADZINSKI, Illinois Institute of Technology, Argonne National Laboratory — Mechanical contact tunneling measurements are presented on high purity Nb pieces from the starting plate for superconducting radio frequency (SRF) cavity construction as well as from hot spot and cold spot regions of a tested cavity. A varying scattering rate, gamma, is found which broadens the BCS density of states. Detailed fits using Shiba theory indicate that this scattering may be due to magnetic pairbreaking. Hot spot samples reveal a zero bias conductance peak that splits in magnetic field and can be fit using Appelbaum-Anderson theory of spin flip scattering. Together these measurements indicate that the native oxide of Nb can contain varying amounts of localized magnetic moment defects, possibly due to oxygen vacancies in niobium pentoxide.

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