

## TESTS OF SUPERCONDUCTING MATERIALS IN A HIGH-Q RF CAVITY

C. D. Nantista, SLAC, Menlo Park, California;  
I. E. Campisi, ORNL, Oak Ridge, Tennessee;  
A. Canabal, NMSU, Las Cruces, New Mexico;  
V. A. Dolgashev, SLAC, Menlo Park, California;  
Y. Iwashita, Kyoto ICR, Uji, Kyoto;  
P. Kneisel, Jefferson Lab, Newport News, Virginia;  
T. Tajima, LANL, Los Alamos, New Mexico;  
S. G. Tantawi, SLAC, Menlo Park, California

### Abstract

Superconducting rf is of increasing importance in particle accelerators. We have developed a resonant copper cavity with high quality factor and an interchangeable wall for testing superconducting materials.\* A compact TE<sub>01</sub> mode launcher excites the azimuthally symmetric cavity mode, which allows a gap at the detachable wall and is free of surface electric fields that could cause field emission, multipactor, and rf breakdown. The shape of the cavity is tailored to focus magnetic field on the test wall, formed by a material sample. Working at X-band allows us to test small samples in a small available dewar, as well as taking advantage of available high power. We present results of cryogenic experiments conducted with this cavity. Low power tests allow characterization of the cavity parameters and their variation with temperature; high power tests allow determination of field limits for the superconducting samples. We describe our signal processing and analysis. Our experiments begin with reactor-grade niobium, followed by MgB<sub>2</sub>.

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