

## RF Critical Magnetic Field Measurement of MgB<sub>2</sub> and NbN Thin Films Coated on Nb

T. Tajima, A. Burrell, G. Ereemeev  
LANL, Los Alamos, NM 87545, U.S.A.

V. Dolgashev, D. Martin, C. Nantista, S. Tantawi, C. Yoneda  
SLAC, Menlo Park, CA 94025, U.S.A.

B.H. Moeckly  
Superconductor Technologies, Inc., Santa Barbara, CA 93111, U.S.A.

I. Campisi  
ORNL, Oak Ridge, TN 37831, U.S.A.

E-mail: [tajima@lanl.gov](mailto:tajima@lanl.gov)

**Abstract** - Niobium (Nb) Superconducting RF (SRF) cavities have been used or will be used for a number of particle accelerators. The fundamental limit of the accelerating gradient has been thought to be around 50 MV/m due to its RF critical magnetic field of around 200 mT. This limit will prevent new projects requiring higher gradient and compact accelerators from considering SRF structures. There is a theory, however, that promises to overcome this limitation by coating thin (less than the penetration depth) superconductors on Nb. We initiated measurements of critical magnetic fields of Nb coated with various thin film superconductors, starting with NbN and MgB<sub>2</sub> using polymer assisted deposition and reactive evaporation techniques, respectively, with the goal to apply this coating to SRF cavities. This paper will present test results of the RF critical magnetic field of thin MgB<sub>2</sub> coated on Nb using a 50-MW short-pulse (1 μs or less) Klystron and a hemispherical cavity at SLAC.

IEEE/CSC & ESAS EUROPEAN SUPERCONDUCTIVITY NEWS FORUM (ESNF), No. 11, January 2010  
Published in *Journal of Physics Conf. Series (SuST)* 234, 012043 (2010)