

## **RF tests of an 805 MHz Pillbox Cavity at Lab G of Fermilab**

Derun Li, J. Corlett, R. MacGill, J. Wallig, M. Zisman  
Lawrence Berkeley National Laboratory  
A. Moretti, Z. Qiao, V. Wu  
Fermi National Accelerator Laboratory  
R. Rimmer  
Jefferson Laboratory  
J. Norem  
Argonne National Laboratory  
Y. Torun  
Illinois Institute of Technology

We report recent RF tests on an 805 MHz RF pillbox cavity with demountable windows for beam apertures at Lab G of Fermilab, a dedicated facility for testing of MUCOOL (muon cooling) components. The cavity is installed inside a superconducting solenoidal magnet. A 12 MW peak RF power klystron is used for the tests. The cavity has been processed both with and without magnetic field. Without magnetic field, a gradient of 34 MV/m was reached rather quickly, with very low sparking rate. With a 2.5-T solenoidal field, a gradient of only about 16 MV/m was achieved, and even that took many weeks of conditioning. More severe multipacting effects and higher radiation levels were observed during the processing with magnetic field. Preliminary understanding of the cavity conditioning in a strong magnetic field and cavity surface inspection results will be presented.

*This work was supported by the director, Office of Science, Office of High Energy and Nuclear Physics, Division of High Energy, of the U.S. Department of Energy under contract No. DE-AC03-76SF00098.*