

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Mechanical detection of single-quantum-level fluxoid relaxation in an Nb micro-ring** JAE-HYUK CHOI, HEON-HWA CHOI, YUN-WON KIM, Division of Physical Metrology, Korea Research Institute of Standards and Science, Daejeon, Korea, SOON-GUL LEE, Department of Display and Semiconductor Physics, Korea University, Jochiwon, Chungnam, Korea, MAHN-SOO CHOI, Department of Physics, Korea University, Seoul, Republic of Korea — We developed a highly sensitive static force magnetometry, originally proposed for sub-pico-newton force standard, which enabled the observation of single fluxoids selectively and their dynamics in a superconducting micro-ring. For an Nb ring with inner diameter of  $4.0 \mu\text{m}$ , the magnetic moment of a single fluxoid quantum was determined as 7.4 pico-emu, corresponding to the static force of 74 femto-newton, in good agreement with a theoretical estimate within 8%. The magnetic relaxation of moderate number of fluxoids, ranging from 20 to 60, was also measured at temperatures of  $4 \sim 6 \text{ K}$  and at zero magnetic field. The relaxation results with single-quantum-step feature were analyzed with a theoretical model for thermally activated transition.

Jae-Hyuk Choi  
Korea Research Institute of Standards and Science

Date submitted: 07 Nov 2012

Electronic form version 1.4