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Temperature dependence of maximum fluxoid number in an Nb micro-ring HEON-HWA CHOI, Department of Nano Science, University of Science and Technology, Daejeon 305-340, 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, JAE-HYUK CHOI, Korea Research Institute of Standards and Science, Daejeon 305-340, Korea — Using a newly developed highly sensitive static force magnetometry, which enables the observation of single fluxoids, we studied the temperature dependence of the maximum fluxoid number in an Nb superconducting micro-ring. For an 100 nm-thick ring with outer and inner radius of 4.0 μm and 2.0 μm, respectively, the maximum number ranged from 100 to 40 as the temperature increases from 4 K to 7 K, showing a slope of 2 fluxoids quantum per 0.1 K in a discrete way. Thermal escape of fluxoids and its temperature dependence were analyzed with a theoretical model.

Jae-Hyuk Choi
Korea Research Institute of Standards and Science

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