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Size effect on supercurrent screening in large array superconducting anti-dot thin films[1] HSIANG-HSI KUNG, TING-HUI CHEN, CHIA-TSO HSIEH, CHI-CHIH HO, Institute of Physics, Academia Sinica, Nankang, Taipei, Taiwan R.O.C., KEN-HUI LIN, Institute of Physics and Research Center of Applied Science, Academia Sinica, Nankang, Taipei, Taiwan R.O.C., WEN-TAU JUAN, WEI-LI LEE, Institute of Physics, Academia Sinica, Nankang, Taipei, Taiwan R.O.C. — We fabricated well-ordered and large array niobium (Nb) anti-dot thin films using a monolayer of polymer/nanosphere hybrid as a template. The hole diameter and center-to-center distance can be tuned independently. By applying a perpendicular magnetic field, we observed pronounced oscillations with field in both magnetization and resistivity due to the criteria of the flux quantization, which is reminiscent of the well-known Little-Parks experiment in a thin-walled superconducting cylinder. By varying the hole diameter, the detailed size effect on supercurrent screening can be explored and will be discussed.

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