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Vortices in superconducting MoGe pentagon TAKEKAZU ISHIDA, HO THANH HUY, MASARU KATO, Osaka Prefecture University, MASAHIKO HAYASHHI, Akita University — Vortices in bulk prefer to form a triangular lattice while a mesoscopic superconductor with a size comparable to coherence length ξ or the magnetic penetration depth λ is quite different so as to create particular configuration of vortices. The behavior of such structures in an external magnetic field is strongly influenced by the boundary conditions. Vortex states in superconducting disk, triangle and square pattern have been extensively studied both theoretically and experimentally [B. J. Baelus et al., Phys. Rev. B 69, 064506 (2004)]. We present vortex structures in MoGe pentagon disks imaged by means of a scanning quantum interference device (SQUID) microscopy [Ho Thanh Huy et al., Physica C, in press; DOI 10.1016/j.physc.2012.03.037.] Systematic measurements allow us to reveal how vortex arrangement evolves with the applied magnetic field. Moreover, we found that shell filling rule is subjected to change when a pinning center is introduced. Numerical calculations of vortex structure in pentagon disks on the basis of the nonlinear Ginzburg-Landau theory reveal that there are good agreement between experimental data and theoretical calculations.

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