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Study on Mesoscopic Lattices of Magnetic Fluid Thin Film Subjected to Perpendicular Fields[1] I-MIN JIANG, C.C. SHIH, C.Y. WANG, C.K. LU, D.J. JANG, Department of Physics, National Sun Yat-sen University, Kaohsiung, DEPARTMENT OF PHYSICS, NATIONAL SUN YAT-SEN UNIVERSITY TEAM — Applying a magnetic field on the magnetic fluid thin film vertically, leads a phase separation that is concentrated in particles separating from a dilute phase. The concentrated phase forms cylindrical columns that construct two-dimensional lattices. This kind of artificial lattices is a novel mesoscopic system and has been explored with optical microscope, CCD, and digital imaging analysis. The two-dimensional lattices present hexagonal phase with exotic topological defects due to distortion of the structure under excitation. We explore the melting evolution of the lattice by varying the applied field. The ordering of these extraordinary lattices is analyzed in terms of translational and bond-orientation correlation functions to address the two-dimensional melting.

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