Vortex-Lattice Orientation in the Flux-Flow State of Amorphous Superconducting Films in Oblique Fields

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The vortex-lattice orientation in the flux-flow state of amorphous superconducting films is studied for arbitrary magnetic fields by means of mode-locking experiments. In oblique fields, we find that the lattice orientation depends on the tilt direction and the direction of motion. Defining an angle ϕ between the tilt direction and the flow direction, we find that for $\phi = 0°$ the lattice orientation is parallel to the flow direction, whereas for $\phi = 90°$ it is perpendicular. The former orientation also appears for $\phi = 60°$ and the latter for $\phi = 30°$ due to hexagonal symmetry in the moving lattice.
We also study how the moving lattice is deformed as the field direction is rotated away from normal to the films. Different from a naive expectation, [1] the moving lattice is stretched in directions parallel and/or perpendicular to the flow direction, not to the tilt direction when $0° < \phi < 90°$. A striking example observed is that for $\phi = 45°$ the moving lattice is uniformly stretched and it forms like a regular hexagon in oblique fields.

[1]L. J. Campbell, M. M. Doria, and V. G. Kogan, Phys. Rev. **B 38**, 2439 (1988).