

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Patterns in type-I superconductors and their dynamics RINKE J. WIJNGAARDEN, MARIELA MENGHINI, Department of Physics and Astronomy, Faculty of Sciences, Free University, De Boelelaan 1081, 1081 HV Amsterdam, The Netherlands — We report on patterns and their dynamics as observed in magneto-optical experiments on type-I superconductors. We observe: (1) A stripe-spot transition that is hysteretic, leading to two modes of stripe formation: slow continuous growth and avalanche growth. (2) A wiggling instability, similar to that in ferrimagnetic garnet films. (3) A zigzag instability when a pattern of parallel lines is rotated through a sample with low pinning. (4) Breaking and reconnection of stripes as such a pattern is rotated in a sample with strong pinning. (5) Random telegraph behavior close to the depinning of such pattern in the presence of a constant driving force. The observed patterns consist of superconducting and normal domains of macroscopic size in thin lamina of type-I superconductors and are observed by an advanced magneto-optical technique. The patterns are manipulated by changing the applied magnetic field vector or by applying an electrical transport current.

Rinke J. Wijngaarden
Vrije Universiteit

Date submitted: 29 Nov 2005

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