

# Dynamic Structure of the Vortex Lattice as Revealed by Bitter Magnetic Decoration

Flavio Pardo

*Lucent Technologies, Bell Labs, Murray Hill NJ07974, USA*

## Abstract

We extended the Bitter decoration technique to the study of the dynamic structure of the vortex lattice by imaging moving and quenched lattices. In this way we observed that surface steps in the sample act as vortex diodes, preventing the motion in one direction but not in the opposite. By studying the energetics of the lattice near these steps we were able to extract an elastic correlation length along the vortex line in a new way, in a range of fields inaccessible to the SANS technique. We also studied the structure of the vortex lattice as a function of vortex velocity and effective random disorder. For moderate disorder we confirmed the existence of a narrow plastic region at the onset of motion and showed its broadening as the disorder increases. At higher velocities we observed for first time evidence of two theoretically proposed novel phases: the smectic glass for strong disorder and the dynamic Bragg glass for moderate disorder.