Simulations of the intermediate state in type-I superconductors
A.D. HERNANDEZ, D. DOMINGUEZ, Centro Atomico Bariloche, Argentina —
We present simulations of the intermediate state of type-I superconducting films. We solve numerically the time dependent Ginzburg-Landau equations taking into account the demagnetizing fields via the Biot-Savart law. We reproduce several features of the intermediate state observed in experiments, particularly droplet and laberynthine striped patterns are obtained depending on the applied field $H_a$ and magnetic history. For small square samples we find an important influence of the surface barriers which leads to a saw-tooth behavior of the magnetization as a function of $H_a$ and very geometric patterns when slowly increasing $H_a$, and to a positive magnetization and symmetry-breaking structures when slowly decreasing $H_a$. As a general feature we find that there is a strong influence on the initial conditions and magnetic history in the structures of the intermediate state patterns observed.

Daniel Dominguez
Centro Atomico Bariloche, Argentina

Date submitted: 02 Dec 2004