

MO investigations of flux pinning, granularity and turbulent relaxation

M. R. Koblishka

SRL/ISTEC, 1-16-25 Shibaura, Minato-ku, Tokyo 105, Japan and

University of Oslo, P.O. Box 1048, N-0316 Oslo, Norway

Abstract

The observation of flux pinning effects using various experimental ways of performing a magneto-optic (MO) observation experiment is discussed, presenting results on pure and carbon-nanotube embedded Bi-2212 superconductors as well as on melt-textured NdBCO and (Nd,Eu,Gd)BCO samples. To establish a correlation between the local flux pattern and the microstructure, we suggest the use of field-cooled states, taken in various applied fields. Granularity in high- T_c superconductors is modelled using an YBCO thin film patterned into an array of disks. The MO observations reveal the flux pattern and current flow in the effective medium between the disks ("grains") as well as flux penetrating the disks. This model sample is capable to reproduce several features seen in Bi-2223 tapes. Furthermore, a new kind of relaxation (turbulent relaxation) is observed in a narrow temperature window between 60 and 65 K in several different high- T_c samples.