Defining B-c, B* and B-phi for YBCO Thin Films

The accommodation field, B*, is generally defined to be the field at which the cross over from single vortex pinning to collective pinning occurs. It is determined from magnetization curves as the point where the Jc plateau ends and it used as a convenient way of comparing the pinning properties of superconducting films. Similarly, the characteristic field, Bc, can be obtained from magneto-optical (MO) images from when the flux fronts meet in the middle of the film. The matching field, B phi, at which there is one vortex line per pinning site, is sometimes thought to be the same as B*, but in BaZrO3-doped YBa2Cu3O7 films the calculated B phi is much higher than the observed B*. B phi can be determined from angular dependent transport measurements. All of the field values correspond to some special case in the flux pinning in the film and relate to Jc. In this work we have determined B c, B* and B phi for different kinds of YBCO films using MO, magnetization and transport measurements to reveal the deeper meaning of the special fields.

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