Comparison Between Modelling and Experimental Results of Magnetic Flux Trapped in YBCO Bulks

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Abstract — An electromagnetic simulation of YBCO bulks was performed and the resulting trapped magnetic flux density was compared to Field Cooling experimental measurements. Due to the underlying symmetry of the experiment and considering an appropriate set of assumptions, an axisymmetric problem relying on an A-formulation of the Maxwell's equations was solved by means of the Finite Element Method. Thus, time evolutions of measured magnetic flux densities were computed over the bulk. To express its electrical conductivity, a classic power law was adopted that included the dependence of the critical current density upon temperature and external magnetic field. This dependence was modelled on the basis of a Modified Kim-Anderson relation.

Keywords (Index Terms) — Critical state models, trapped magnetic flux, YBCO bulk modelling.