XV Krajowa Szkoła Nadprzewodnictwa
"Stulecie Nadprzewodnictwa"
Kazimierz Dolny, 9-13 października 2011 r.

Hall-array, gradiometric measurements of field, temperature and temporal variations of critical current and its anisotropy in iron-based superconductors

MARCIN KONCZYKOWSKI[1], C.J. VAN DER BEEK[2], VINCENT MOSSER[2] AND RUSLAN PROZOROV[3]

[1] Laboratoire des Solides Irradies Ecole Polytechnique, Palaiseau, France
[2] ITRON, Issy-les-Moulineaux, France
[3] Ames Laboratory, Iowa State University, USA

Hall-array placed on the surface of single crystal along c-axis or along ab-plane was used to extract critical current from Bean critical state slope. Using this technique we carried systematic measurements of magnetic field and temperature variations of J_c components along c-axis and along ab-plane in several iron-based superconductors (LiFeAs, FeSeTe, $BaK(FeAs)_2$, $Ba(Fe_{1-x}Ru_xAs)_2$). Presence of central peak in J_c attributed to strong pinning by extended defects was observed in all explored compounds. Anisotropy of critical current exhibit temperature and field dependence indicative for multiband superconductivity. Substantial magnetic relaxation, several percent per time decade, was observed in all compounds. However, from the analysis of flux creep barrier vs. current dependences, we demonstrate that the observed shielding current J, is not far from critical one and the use of collective flux creep model developed for $J << J_c$ regime is not appropriate.