

Abstract Submitted  
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**Comparative Study of Vortex Phase Transitions in Bi-2212 Single Crystals in Tilted Magnetic Fields** JOVAN MIRKOVIC<sup>1</sup>, Institute of Materials Science, University of Tsukuba, Tsukuba 305-8573, Japan, ATSUSHI NAKANO, HIROKAZU SATO, TAKASHI YAMAMOTO, KAZUO KADOWAKI — The vortex phases in high-quality  $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$  single crystals have been studied by means of the in-plane resistivity measurement in the Corbino electric contacts geometry, and the local ac-magnetic permeability measurements by using the miniature coils. For the first time, the nontrivial structural first-order phase transition has been found by both techniques, deep in the crossing lattice state. The transition separates the Abrikosov dominant (strong pinning) phase from the Josephson dominant (weak pinning) phase. The peak-effect of resistance was observed as a precursor of the lock-in vortex state in the critical angular range near the  $ab$ -plane followed by the change from the first-order to the second-order phase transition. While at lower temperatures the columnar defects affect strongly the  $H_c - H_{ab}$  phase diagram associated with the crossing lattice structure, at higher temperatures, the fingerprint of the crossing lattice is maintained even in a wider angular range than in the pristine samples.

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