33. Title: Cavity Resonance Effects on Phase-Locking of the Flux-Flow in Bi-2212 Intrinsic Josephson Junctions

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Abstract: We report on the appearance of high-speed flux-flow branches characterized by velocity-matching the maximum mode velocities in quasi-one-dimensional Bi-2212 intrinsic Josephson junctions. As the external magnetic field lower than 0.1 T parallel to the superconducting CuO2 layers decreased, rapid progress of flux-flow velocity toward the maximum mode velocity was observed below a certain field. We show that the progressions of flux-flow velocities are depicted by a universal dependence on the number of vortices in the junctions. This strongly suggests that such a high-Q cavity resonance in Bi-2212 IJJ as the Fiske resonance governs the collective vortex motion interacting with the in-phase electromagnetic mode excited in the junction.