Proceedings of the Korean Superconductivity Society Meeting 2000
(KSS 2000), YongPyung, Kangwondo, Korea, Aug. 16-18, 2000

Coherent motion of microwave-induced fluxons in intrinsic Josephson junctions of HgI_2-intercalated $Bi_2Sr_2CaCu_2O_{8+x}$ single crystals

Jinhee Kim*, Yong-Joo Doh, Sung-Ho Chang, Hu-Jong Lee, Hyun-Sik Chang, Kyu-Tae Kim*, Eue-Soon Jang**, and Jin-Ho Choy**

Dept. of Physics, Pohang Univ. of Science and Technology, Pohang 790-784, Korea

**Electricity Group, Korea Research Institute of Standards and Science, Taejon 305-600, Korea*

***Dept. of Chemistry, Seoul National Univ., Seoul 151-742, Korea*

Microwave response of intrinsic Josephson junctions in mesa structure formed on HgI2-intercalated Bi2Sr2CaCu2O8+x single crystals was studied in a wide range of microwave frequency. With irradiation of 73~76 GHz microwave, the supercurrent branch becomes resistive above a certain onset microwave power. At low current bias, the current-voltage characteristics show linear behavior, while at high current bias, the resistive branch splits into multiple sub-branches. The voltage spacing between neighboring sub-branches increase with the microwave power and the total number of sub-branches is almost identical to the number of intrinsic Josephson junctions in the mesa. All the experimental results suggest that each sub-branch represents a specific mode of collective motion of Josephson vortices generated by the microwave irradiation. With irradiation of microwave of frequency lower than 20 GHz, on the other hand, no branch splitting was observed and the current-voltage characteristics exhibited complex behavior at high bias currents. This result can be explained in terms of incoherent motion of Josephson vortices generated by non-uniform microwave irradiation.