Coherent Motion of Fluxons in Stacked Intrinsic Josephson Junctions of $Bi_2Sr_2CaCu_2O_{8+x}$ Single Crystals

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We have observed *c*-axis tunneling *IV* characteristics resulting from the microwave- and external-field-induced fluxon motion in HgI_2-Intercalated and underdoped $Bi_2Sr_2CaCu_2O_{8+x}$ Josephson stacks, respectively, in a long-junction limit. Self-field of a microwave acts as an effective magnetic field. With irradiation of high-power microwave above the junction plasma frequency the supercurrent branch becomes resistive and splits into sub-branches. Dynamics of field-induced fluxons also causes sub-branch splitting in the *IV* characteristics. Each sub-branch represents a specific mode of the collective motion of Josephson fluxons. The cutoff voltage of each sub-branch well fits the theoretical prediction in terms of fluxon motion for slow modes. In a relatively high magnetic field above 3 T a cusp-like feature appears in the *IV* characteristics, which may correspond to the fluxon configurations of different degrees of spatial disorder. The high-bias region beyond the voltage value of the second cusp may correspond to the "super-radiant" fluxon state which has been proposed theoretically.