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Effects of a resonant cavity on macroscopic quantum tunneling of fluxons in long Josephson junctins JU KIM, RAMESH DHUNGANA, University of North Dakota — We investigate the effects of a resonant cavity on the tunneling rate of a Josephson vortex (i.e., fluxon) which is pinned by a microresistor in long Josephson junction (LJJ). In a single LJJ, we find that the tunneling rate can be enhanced significantly when the fluxon couples to the electromagnetic field of the resonant cavity. Here the main effect of the cavity is reducing the barrier potential for the trapped fluxon. In a two LJJs that are coupled by the magnetic induction effect, the tunneling rate is determined by the competition between the strength of pinning due to the microresistor which tends to break the phase-locking behavior of the fluxons and the cavity mode which tends to promote collective motion of these fluxons. We discuss the effects of the resonant cavity on the tunneling of phase-locked fluxon-fluxon and fluxon-antifluxon pairs.

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