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**Interaction between fractional Josephson vortices in multi-gap superconductor tunnel junctions** JU H. KIM, Department of Physics, University of Houston-Clear Lake — In a long Josephson junction (LJJ) with two-band superconductors, fractionalization of Josephson vortices (fluxons) can occur in the broken time reversal symmetry state when spatial phase textures (i-solitons) are excited. Excitation of i-solitons in each superconductor layer of the junction, arising due to the presence of two condensates and the interband Josephson effect, leads to spatial variation of the critical current density between the superconductor layers. Similar to the situation in a  $YBa_2Cu_3O_{7-x}$  superconductor film grain boundary [1], this spatial dependence of the critical current density can self-generate magnetic flux in the insulator layer, resulting in fractional fluxons with large and small fraction of flux quantum. Similar to fluxons in one-band superconductor LJJ, these fractional fluxons are found to interact with each other. The interaction between large and small fractional fluxons determines the size of a fluxon which includes two (one large and one small) fractional fluxons. We discuss the nature of interaction between fractional fluxons and suggest that i-soliton excitations in multi-gap superconductor LJJs may be probed by using magnetic flux measurements.

1. R. Mint and I. Papiashvili, Phys. Rev. B 64, 134501 (2001).

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