

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Fractional Josephson vortices in two-gap superconductor long Josephson junctions** JU KIM, University of North Dakota — We investigated the phase dynamics of long Josephson junctions (LJJ) with two-gap superconductors in the broken time reversal symmetry state. In this LJJ, spatial phase textures (i-solitons) can be excited due to the presence of two condensates and the inter-band Josephson effect between them. The presence of a spatial phase texture in each superconductor layer leads to a spatial variation of the critical current density between the superconductor layers. We find that this spatial dependence of the critical current density can self-generate magnetic flux in the insulator layer, resulting in Josephson vortices with fractional flux quanta. Similar to the situation in a  $YBa_2Cu_3O_{7-x}$  superconductor film grain boundary [1], the fractionalization of a Josephson vortex arises as a response to either periodic or random excitation of i-solitons. This suggests that magnetic flux measurements may be used to probe i-soliton excitations in multi-gap superconductor LJJs.

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

Ju Kim  
University of North Dakota

Date submitted: 15 Nov 2013

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