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Fractional Fluxon dynamics in Long Josephson Junctions LAWRENCE RHOADS, VAN MAYES, JU KIM, RAM SHOHAM, Univ of Houston - Clear Lake — Fluxons are promising candidates for qubits in superconducting quantum computers. Fluxons are quantized loops of magnetic flux found in long Josephson Junctions. These fluxons arise due to the time reversal symmetry breaking in a long Josephson junction (LJJ) with two-band superconductors. The spatial dependence of the critical current density can generate magnetic flux in the insulator layer, creating two fractional fluxons. The interaction between the them is repulsive at short distances, but attractive at long distances, causing the formation of a fractional fluxon bound pair. An investigation of the dynamics of this pair as a function of various parameters is presented. The separation distance between fluxons as a function of bias current, the observability of each fluxon, and Macroscopic Quantum Tunneling (MQT) behavior through a barrier are examined.

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