

Abstract Submitted
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Long Range Effects in Tunable Superconducting-Magnetic Proximity Systems¹ THOMAS E. BAKER², ADAM RICHIE-HALFORD, OVIDIU E. ICREVERZI, ANDREAS BILL, California State University, Long Beach — We analyze Josephson junctions that contain an exchange spring magnet as interlayer between the two superconductors. Widening the interlayer and varying its magnetic properties have dramatic effects on the current. Here, we accurately model the exchange spring magnet and show that placed as interlayer in the Josephson setup produces not only a long range part to the order parameter but also a new type of $0-\pi$ current transition resulting from the triplet component. The domain wall in the exchange spring is tunable and thus all effects in the junction are tunable as well. We also investigate the transition of the triplet pairs back into singlets due to the variable magnetization and a resulting re-emergent singlet current through very wide Josephson junctions.

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