Abstract Submitted
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Spin-triplet superconductivity induced by PdNi alloy in Co-based Josephson junctions[1] TRUPTI KHAIRE, MAZIN KHASAWNEH, WILLIAM PRATT, NORMAN BIRGE, Dept. of Physics and Astronomy, Michigan State University, East Lansing, MI, 48824 — The conventional proximity effect in superconducting/ferromagnetic (S/F) hybrid systems decays over a short length scale in the ferromagnet, as the two electrons from the spin-singlet Cooper pair enter different spin bands and rapidly lose phase coherence. Spin-triplet Cooper pairs are not subject to this constraint, hence a spin-triplet proximity effect should extend much further into the ferromagnet [1,2]. We report observation of a spin-triplet supercurrent in S/F/S Josephson junctions containing Co(d)/Ru(0.6 nm)/Co(d) trilayers as thick as 2d = 28 nm. The spin-triplet pair correlations are induced by thin layers of $Pd_{0.88}Ni_{0.12}$ alloy placed between the central Co and outer Nb layers. The spin-triplet critical supercurrent in our junctions exhibits no discernable decay with increasing Co thickness, whereas the supercurrent decays exponentially with a decay length of 2.4 nm in similarly-prepared junctions without PdNi [3]. When 2d = 20 nm, junctions containing PdNi exhibit a supercurrent more than 100 times greater than that of junctions without PdNi.

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