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Systematic exploration of spin-triplet superconductivity in Co-based Josephson junctions[1] MAZIN KHASAWNEH, TRUPTI KHAIRE, WILLIAM PRATT, NORMAN BIRGE, Dept. of Physics and Astronomy, Michigan State University East Lansing, MI 48824 — The discovery that a few nm of PdNi alloy near a Nb superconductor induces spin-triplet superconducting correlations [1] begs the question: what other materials produce a similar effect? In this talk we will discuss several other materials we have tried in place of PdNi. So far, only $Cu_{0.48}Ni_{0.52}$ alloy has been successful, producing a factor of 20 enhancement of the supercurrent for Josephson junctions containing 20 nm of Co. We speculate that the key ingredients in the success of PdNi and CuNi alloys are small magnetic domain size and out-of-plane magnetocrystalline anisotropy. The latter, when combined with in-plane shape anisotropy of thin magnetic films, can lead to canting of the domain magnetization and hence the non-collinear domain magnetizations crucial to the appearance of the spin-triplet correlations [2,3].

[1] T.S. Khaire, M.A. Khasawneh, W.P. Pratt, Jr., and N.O. Birge, previous abstract.
[2] F.S. Bergeret, A.F. Volkov, & K.B. Efetov, *Phys. Rev. Lett.* **86**, 4096 (2001).
[3] A. Kadigrobov, R.I. Shekhter, & M. Jonson, *Europhys. Lett.* **54** (3), 394 (2001).

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