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Odd-Triplet Superconductivity in SmCo/Py/Nb Thin Films¹ SAMUEL HEDGES, MIKHAEL SEMAAN, JIYEONG GU, Cal State Univ- Long Beach — An s-wave superconductor in close proximity to a nonhomogeneous magnetic field will have the singlet component of the superconducting condensate converted to the odd-triplet component at the superconductor/ferromagnet (S/F) interface. The odd-triplet component can penetrate into the ferromagnet over long distances and is insensitive to the ferromagnet's exchange field. Using an exchangespring system consisting of SmCo/Py, the noncollinearity of the field can be varied by adjusting the direction and strength of an applied external field. Nb/Py/SmCo thin films were sputtered onto a silicon substrate using DC magnetron sputtering. The resistance and superconducting critical temperature were measured as functions of the applied field strength, direction, temperature, and thickness of the layers. The resistance was found to vary non-monotonically with increasing noncollinearity, which cannot be explained by the proximity effect alone. The behavior could be due to new proximity effects involving exchange spring systems that display complicated magnetic switching behavior.

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