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Proximity effect and magnetic coupling in ultrathin GdN/NbN/GdN trilayers.[1] JUAN PEDRO CASCALES SANDOVAL, MIT, YOTA TAKAMURA, MIT;JSPS,Japan;Tokyo Tech,Japan, RAFAEL S. GONCALVES, MIT;Federal Univ.Viosa,Brazil, ATILGAN ALTINKOK, Giresun Univ., Turkey, CLODOALDO I.L. DE ARAUJO, MIT;Federal Univ.Viosa,Brazil, VALERIA LAUTER, Oak Ridge National Lab, JAGADEESH S. MOODERA, MIT, MOODERA GROUP TEAM — In general the coupling between magnetic layers is typically controlled by the RKKY interaction through non-magnetic spacers [1]. The antagonistic character of superconductivity and ferromagnetism has drawn much interest as to how these two states with opposing spin configurations can be controlled by the proximity effect in superconducting spintronic devices [2]. We present magnetization and transport measurements on ferromagnetic insulator (FI) and superconductor (SC) GdN/NbN/GdN trilayer structures, fabricated by reactive sputtering at room temperature. The magnetic and transport behavior of these trilayers dramatically changed in the superconducting state of the NbN spacer. The superconductive state was found to heavily influence the indirect coupling of the FI layers for certain FI/SC/FI thickness combinations. The interplay between magnetism and superconductivity, along with interfacial exchange coupling play major roles on the resulting magnetic coupling which depends on the FI thickness and FI/SC thickness ratio, producing a rich variety of effects. [1] P. Bruno, PRL 67, 2592 (1991). [2] B. Li et al., PRL 110, 097001 (2013), K. Senapati et al., APL 103, 132406 (2013), Y. Zhu et al., Nat. Mat. 2016.

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