

Long-range spin transport in superconductors

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We report on non-local transport in multiterminal superconductor-ferromagnet structures, which were fabricated by means of e-beam lithography and shadow evaporation techniques. In the presence of a significant Zeeman splitting of the quasiparticle states, we find signatures of spin transport over distances of several μm , exceeding other length scales such as the coherence length, the normal-state spin-diffusion length, and the charge-imbalance length. The relaxation length of the spin signal shows a nearly linear increase with magnetic field, hinting at a freeze-out of relaxation by the Zeeman splitting. We propose that the relaxation length is given by the recombination length of the quasiparticles rather than a renormalized spin-diffusion length.