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Spin-dependent thermoelectric effects in superconductor/ferromagnet hybrid structures

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We report on the experimental observation of spin-dependent thermoelectric effects in superconductor-ferromagnet tunnel junctions in high magnetic fields. The thermoelectric signals are due to a spin-dependent lifting of particle-hole symmetry on the energy scale of the superconducting gap. Due to the small energy scale, the thermoelectric effects can be quite large, and we infer a maximum Seebeck coefficient of about $100 \mu\text{V}/\text{K}$ from our data. Nonlocal thermoelectric effects elucidate the coupling of spin and heat transport in high-field superconductors.

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