



Contribution ID : 23

Type : **invited oral**

Spin-dependent thermoelectric effects in superconductor/ferromagnet hybrid structures

giovedì 20 giugno 2019 17:30 (30)

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 $100 \mu\text{V/K}$ from our data. Nonlocal thermoelectric effects elucidate the coupling of spin and heat transport in high-field superconductors.

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Session Classification : session 5