Abstract Submitted
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The effect of magnetic anisotropy on spin-dependent thermoelectric effects in nanoscopic systems[1] MACIEJ MISIORNY, Chamers Univeristy of Technology (Gothenburg, Sweden) and Adam Mickiewicz Univeristy (Poznań, Poland), JÓZEF BARNAŚ, Adam Mickiewicz Univeristy (Poznań, Poland) — Harnessing of the interplay between transport of charge, spin and energy is a prospect route towards maximizing the functional potential of nanoscopic electronic and spintronic devices. Here, we investigate theoretically spin-related thermoelectric effects in electronic, linear-response transport through a nanoscopic systems exhibiting magnetic anisotropy. As an example, a magnetic tunnel junction with a large-spin impurity −either a magnetic atom or molecule− embedded in the barrier is considered. Conduction electrons traversing the junction can then scatter on the impurity, which effectively can lead to angular momentum and energy exchange between the electrons and the impurity. As we show, such processes have a profound effect on the thermoelectric response of the system. Since the scattering mechanism also involves processes when electrons are inelastically scattered back to the same electrode, one can expect the flow of spin and energy also in the absence of charge transport through the junction. This, in turn, results in a finite spin thermopower, and the magnetic anisotropy plays a key role for this effect to occur. [1] M. Misiorny and Barnaś, Phys. Rev. B 89, 235438 (2014). [2] M. Misiorny and Barnaś, arXiv:1411.2741 (submitted for publication).

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