

Polarised Neutron and X-ray Studies of Spin Caloritronic Materials

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Developments in the field of spin electronics promise to extend its scope far beyond the original vision of applications in computing and information technologies. Recent discoveries have shown that an even far broader scope of applications can be accessed by the coupling of spin, charge and heat currents in one and the same material. One particularly promising extension of spintronic phenomena is in thermoelectric generation, broadly termed spin caloritronics. Spin caloritronics, provides a novel thermoelectric approach based on the spin Seebeck effect (SSE) [1,2]. However, optimising material properties towards SSE devices requires a more complete microscopic description of this effect, including elucidating the roles of magnetic excitations and domain structure with the thermoelectric conversion. In this talk, recent polarised neutron and X-ray studies of the structure and dynamics of prototypal Spin Seebeck device materials will be discussed [3].

[1] E. Saitoh, M. Ueda, H. Miyajima, G. Tatara

Conversion of spin current into charge current at room temperature: Inverse spin-Hall effect. *Appl. Phys. Lett.* **88**, 182509 (2006).

[2] G. E. W. Bauer, E. Saitoh, B. J. van Wees

Spin caloritronics. *Nature Mater.* **11**, 391-399 (2012).

[3] D. Mannix et al. Submitted 2020.