

# Effects of heat current on magnetization dynamics in ferromagnetic insulator

F.A. Vetrò,<sup>1</sup> S.D. Brechet,<sup>1</sup> and J-Ph. Ansermet<sup>1</sup>

<sup>1</sup>*Ecole Polytechnique Fédérale de Lausanne*

The work presented here is aimed at investigating the interplay between spin dynamics and heat currents in single-crystal Yttrium Iron Garnet (YIG).

The irreversible thermodynamics for a continuous medium [1] predicts that a thermal gradient, in the presence of magnetization waves, produces a magnetic induction field, thus a magnetic analog of the well-known Seebeck effect. Time-resolved transmission measurements of magnetizations waves propagating along the thermal gradient of a thin slab of YIG crystal provided an experimental observation of this Magnetic Seebeck effect [2].

In order to characterise further this effect, we have also conducted a study on magnetization dynamic in normally magnetized YIG disk subjected to a temperature gradient perpendicular to the plane of the disk and parallel to the applied magnetic field. For this experiment a standard FMR technique at x-band frequencies has been used.

## References:

- [1] S. D. Brechet and J.-P. Ansermet, “Thermodynamics of a continuous medium with electric and magnetic dipoles,” *Eur. Phys. J. B*, vol. 86, no. 7, pp. 1–19, Jul. 2013.
- [2] S. D. Brechet, F. A. Vetrò, E. Papa, S. E. Barnes and J.-P. Ansermet, “Evidence for a Magnetic Seebeck effect”, *Physical Review Letters* 111, 8, 087205 (August 22, 2013).