Abstract Submitted
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**Local spin currents in magnetothermal landscapes**[1] M. WEILER[2], M. SCHREIER, H. HUEBL, M. ALTHAMMER, M. OPEL, R. GROSS, S.T.B. GOENNENWEIN, Walther-Meißner-Institut, Bayerische Akademie der Wissenschaften, 85748 Garching, Germany — Spin caloritronic effects - such as the spin Seebeck effect - are concerned with the interplay of heat and spin currents and have been experimentally studied using homogeneous thermal gradients to date. However, in order to understand the underlying magnon-phonon interactions that take place on short length scales, a spatially resolved study of spin currents in magnetothermal landscapes [1] is mandatory. We here use a focussed, scannable laser beam to generate local thermal perturbations in thin film multilayers incorporating the ferromagnetic insulator $Y_3Fe_5O_{12}$ (YIG). In both, YIG/Pt thin film bilayers and YIG/Au/Pt trilayers, the laser heating results in a difference of the magnon and electron temperatures in the YIG and Pt, respectively, as quantitatively modeled in numerical simulations. In the presence of this temperature difference, we experimentally observe a local in-plane electric field in the YIG/Pt and YIG/Au/Pt samples. This electric field is ascribed to the detection of the local longitudinal spin Seebeck effect via the inverse spin Hall effect in Pt. Our experiments allow to, e.g., electrically image magnetic texture in a magnetic insulator and provide a local, bipolar, magnetically controllable spin current source. [1] M. Weiler et al. PRL 108, 106602

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