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Directional heat dissipation generated by surface acoustic waves in Co/Pt/$LiNbO_3$ structures.[1] FERRAN MACIA, BLAI CASALS, ICMAB-CSIC Barcelona, NAHUEL STATUTO, Universitat de Barcelona, RAFAEL CICHELERO, FLORENCIO SANCHEZ, ICMAB-CSIC Barcelona, ALBERTO HERNANDEZ-MINGUEZ, paul drude institute berlin, JOAN MANEL HERNANDEZ, Universitat de Barcelona, GERVASI HERRANZ, ICMAB-CSIC Barcelona — Surface acoustic waves (SAWs) are used as filters and oscillators in mobile telephones. SAWs are also considered as an efficient route towards low-energy control of nanomagnetic devices. For instance, SAWs can be used in spintronics to generate spin-pumping in ferromagnetic structures as well as to modulate dynamically spin states in spintronic devices. Interestingly, the shear strains associated to SAW propagation can induce local heating that eventually is used to control magnetic. Here we report an experimental study on scanning thermal microscopy that analyzes propagation and spatial distribution of the heat generated by SAWs on the surface of $LiNbO_3$ crystal. Our study reveals that heat generated by SAWs is directional and causes local temperature increases up to 10 K. We tested the effects of the SAW-induced heat dissipation in Co/Pt nanostructures having small magnetostriction and with a Curie temperature that can be engineered by film's thickness. We show that the effect of the fast and local heating can be used to variate the magnetic properties of the nanoelements. Our work provides interesting perspectives towards control magnetic nanodevices.

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Ferran Macia
CSIC - Univ Auto Barcelona

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