

Supporting Information:
On-Chip Generation of Ultrafast Current Pulses
by Nanolayered Spintronic Terahertz Emitters

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Supporting Fig. S1

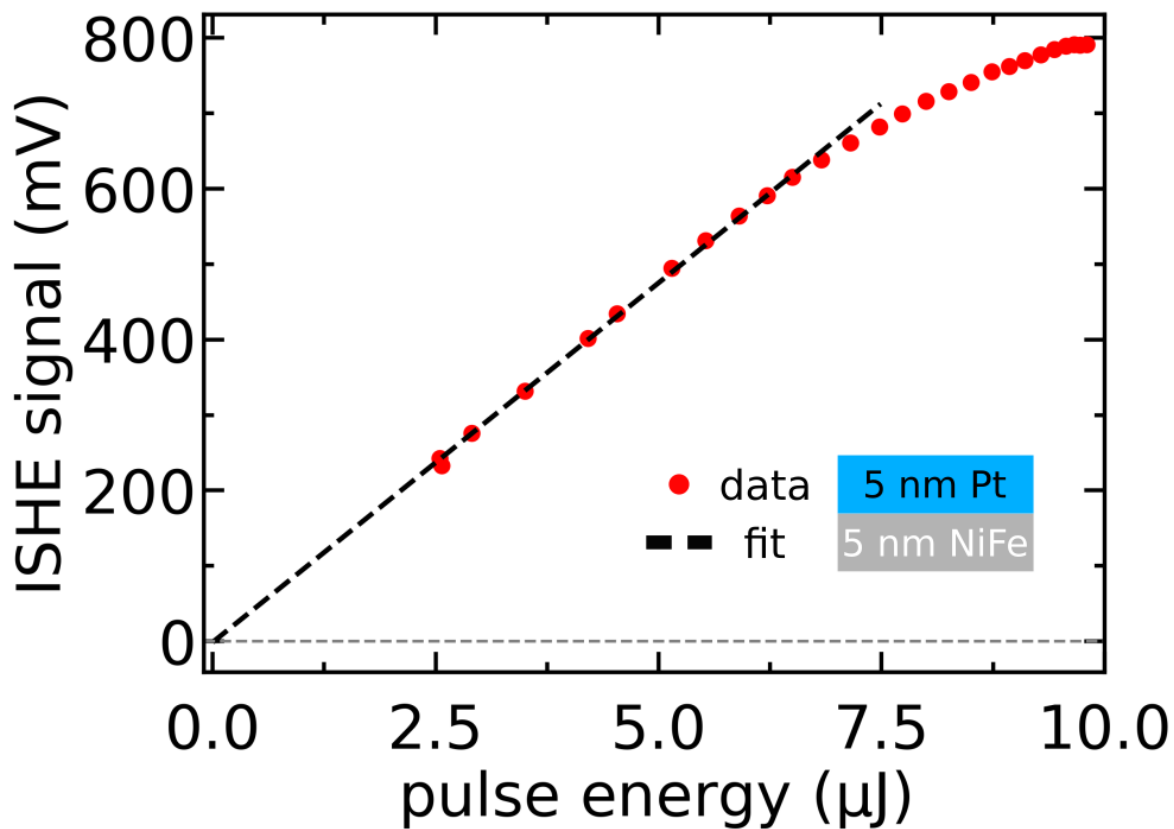


Figure S1: Dependence of the extracted ISHE amplitude on the used pump pulse energy for the $\text{Ni}_{80}\text{Fe}_{20}(5\text{ nm})/\text{Pt}(5\text{ nm})$ stack. Up to $\sim 7.5\ \mu\text{J}$ it is increasing linearly while saturating afterwards. Data points are marked as red dots and a linear fit up to $7.5\ \mu\text{J}$ with a black dashed line.

Supporting Fig. S2

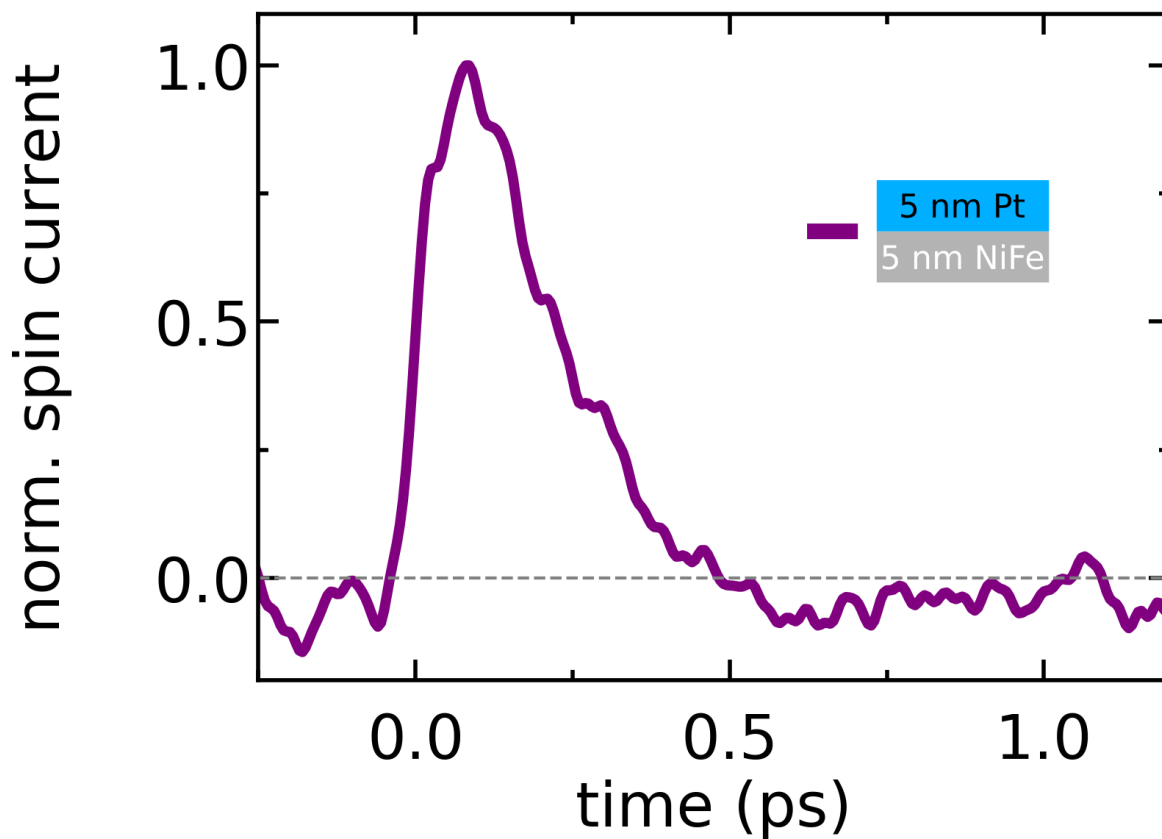


Figure S2: Normalized spin current extracted out the THz data for the $\text{Ni}_{80}\text{Fe}_{20}(5\text{ nm})/\text{Pt}(5\text{ nm})$ stack. Its FWHM of $\sim 250\text{ fs}$ is the time scale for the underlying effect.

Supporting Fig. S3

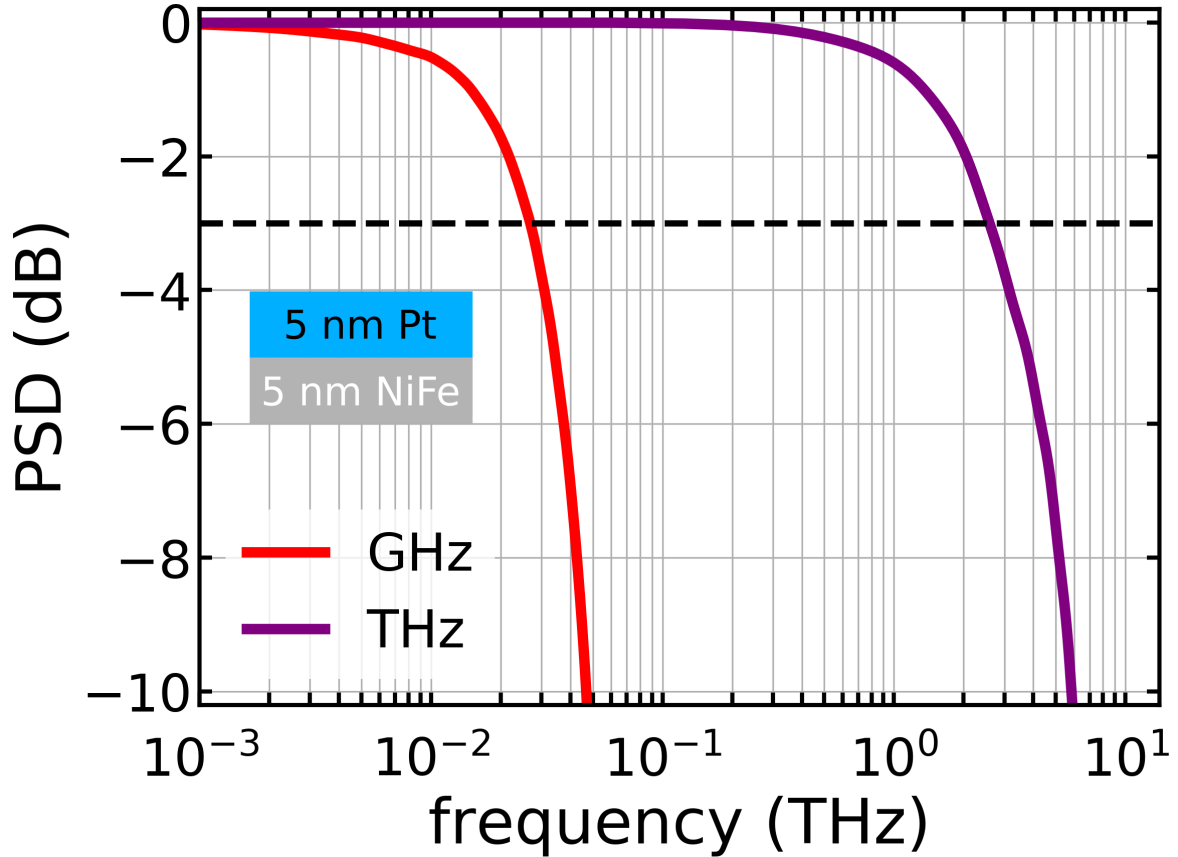


Figure S3: Power spectra of the detected signals shown in Fig. 3a) (GHz) and Fig. 4b) (THz): The electrically measured signal (red solid line) and the signal measured by electro-optic sampling (purple solid line). Threshold frequencies for a loss of -3 dB in PSD are ~ 25 GHz for the GHz regime and ~ 3 THz for the THz regime.