



UNIVERSITY OF LEEDS

This is a repository copy of *Time-resolved visualization of the magnetization canting induced by field-like spin-orbit torques*.

White Rose Research Online URL for this paper:

<https://eprints.whiterose.ac.uk/167486/>

Version: Supplemental Material

---

**Article:**

Finizio, S [orcid.org/0000-0002-1792-0626](https://orcid.org/0000-0002-1792-0626), Wintz, S [orcid.org/0000-0001-6138-8078](https://orcid.org/0000-0001-6138-8078), Mayr, S [orcid.org/0000-0003-4614-9874](https://orcid.org/0000-0003-4614-9874) et al. (6 more authors) (2020) Time-resolved visualization of the magnetization canting induced by field-like spin-orbit torques. Applied Physics Letters, 117. 212404. ISSN 0003-6951

<https://doi.org/10.1063/5.0029816>

---

This is protected by copyright. All rights reserved. The following article has been accepted by Applied Physics Letters. After it is published, it will be found at <https://aip.scitation.org/toc/apl/current>

**Reuse**

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

**Takedown**

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing [eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk) including the URL of the record and the reason for the withdrawal request.



[eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk)  
<https://eprints.whiterose.ac.uk/>

# SUPPLEMENTARY INFORMATION: Time-resolved visualization of the magnetization canting induced by field-like spin-orbit torques

Simone Finizio,<sup>1,\*</sup> Sebastian Wintz,<sup>2</sup> Sina Mayr,<sup>1,3</sup> Alexandra J. Huxtable,<sup>4</sup> Manuel Langer,<sup>1</sup> Joe Bailey,<sup>1,5</sup> Gavin Burnell,<sup>4</sup> Christopher H. Marrows,<sup>4</sup> and Jörg Raabe<sup>1</sup>

<sup>1</sup>*Paul Scherrer Institut, 5232 Villigen PSI, Switzerland*

<sup>2</sup>*Max-Planck-Institut für Intelligente Systeme, 70569 Stuttgart, Germany*

<sup>3</sup>*Laboratory for Mesoscopic Systems, Department of Materials,  
ETH Zurich, 8093 Zurich, Switzerland*

<sup>4</sup>*School of Physics and Astronomy,  
University of Leeds, Leeds LS2 9JT, United Kingdom*

<sup>5</sup>*École Polytechnique Fédérale de Lausanne (EPFL), 1015 Lausanne, Switzerland*

(Dated: October 27, 2020)

## Effect of the current-induced heating on the calculated FL-SOT canting angle

In this section, we show the calculated value of the FL-SOT canting angle in the time during which no current pulse is applied to the Pt/CoB/Ir microwire, but during which the heating caused by the injection of the current pulse has not yet completely dissipated. Such calculation is shown in Fig. S1, and it is possible to observe the absence of a clear canting of the magnetization.

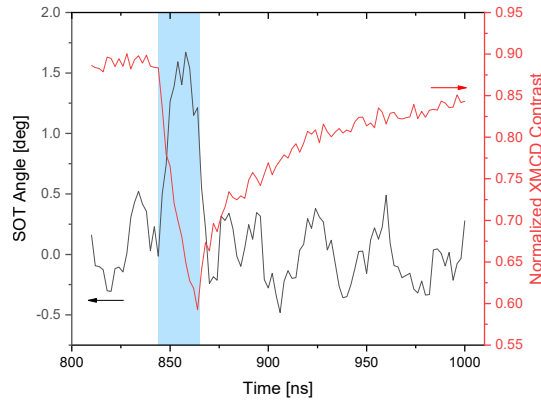


Figure S1. Calculation of the canting angle induced by the field-like SOT in a Pt/CoB/Ir microwire (black curve). The red curve shows the normalized XMCD contrast, allowing to identify the time regions where the current pulse is applied (marked by the light blue background), and where the heating induced by the current pulse is still being dissipated. No clear canting of the magnetization can be observed outside of the period during which the current pulse is injected across the Pt/CoB/Ir microwire.

---

\* Corresponding Author: [simone.finizio@psi.ch](mailto:simone.finizio@psi.ch)