

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Toggling synchronization of nano-contact spin torque oscillators with spin wave beams¹ RANDY DUMAS, AFSHIN HOUSHANG, PHILIPP DURRENFELD, JOHAN AKERMAN, University of Gothenburg-Physics — The synchronization of multiple nano-contact spin torque oscillators (NC-STOs) [1-3] is mediated by propagating spin waves (SWs) [4]. Furthermore, it has been shown that the Oersted field in the vicinity of the NC can induce highly directional SW beams [5, 6]. Not only have we recently demonstrated the robust synchronization between two oscillators separated by over 1 micron, but also the driven synchronization of up to five oscillators by purposefully taking advantage of such SW beams [7]. Here, we demonstrate that when the NC diameters differ by a significant amount, the Oersted field scale in such a way as to promote or block synchronization depending on the SW propagation direction, allowing one to easily toggle between synchronized and un-synchronized states by simply altering the applied field direction. [1] S. Kaka, *et al.*, *Nature* **437**, 389 (2005). [2] F.B. Mancoff, *et al.*, *Nature* **437**, 393 (2005). [3] S.R. Sani, *et al.*, *Nat. Comm.* **4**, 2731 (2013). [4] M.R. Pufall, *et al.*, *Phys. Rev. Lett.* **97**, 087206 (2006). [5] R.K. Dumas, *et al.*, *Phys. Rev. Lett.* **110**, 257202 (2013). [6] M.A. Hofer, *et al.*, *Phys. Rev. B*, **77**, 144401 (2008). [7] A. Houshang, *et al.*, *Nature Nanotechnol.*, in press.

¹This work was supported by the European Commission FP7-ICT-2011 contract No. 317950 MOSAIC, ERC grant 307144 MUSTANG, VR, SSF, and the Knut and Alice Wallenberg Foundation.

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Date submitted: 06 Nov 2015

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