Abstract Submitted for the MAR16 Meeting of The American Physical Society

Observation of sub-100 nm Néel skyrmions at room temperature¹ S.G.E. TE VELTHUIS, W. JIANG, S. ZHANG, C. PHATAK, W. ZHANG, M.B. JUNGFLEISCH, J.E. PEARSON, A. PETFORD-LONG, A. HOFFMANN, Argonne National Laboratory — Magnetic skyrmions are topologically stable spin textures that have attracted tremendous attention in the field of spintronics. As compared to Bloch skyrmions, which are typical for only few bulk chiral magnets, Néel skyrmions in magnetic multilayers [1, 2, 3] may be more ubiquitous and have the advantage that included layers of heavy metals provide efficient current induced spin-orbit torques. By optimizing the stacking structure, we present an experimental strategy towards nanometer-scale skyrmions at room temperature in the absence of a magnetic field. Furthermore, we discuss the experimental challenge of identifying the chiral nature of Néel skyrmions by using Lorentz transmission electron microscopy. Our results constitute an important step for enabling skyrmion based ultra-high density data storage, and for probing topological physics at room temperature. [1] W. Jiang, et al., Science, 349, 283 (2015). [2] S. Woo, et al., arXiv:1502.07376 (2015). [3] C. Moreau-Luchaire, et al., arXiv:1502.07853 (2015).

¹Work supported by the Department of Energy, Office of Science, Basic Energy Science, Materials Sciences and Engineering Division.

S.G.E. te Velthuis Argonne National Laboratory

Date submitted: 06 Nov 2015

Electronic form version 1.4