Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Fabrication of magnetic heterostructures for imaging skyrmions via nitrogen-vacancy center magnetometry SARAH SCHLOTTER, Harvard University, MIT, YULIYA DOVZHENKO, FRANCESCO CASOLA, TONY X. ZHAO, Harvard University, FELIX BUETTNER, MIT, RONALD L. WALSWORTH, Harvard University, GEOFFREY S. D. BEACH, MIT, AMIR YACOBY, Harvard University — Thin film magnetic heterostructures have long been known to exhibit chiral magnetic order due to breaking of inversion symmetry in the system and the resulting interfacial Dzyaloshinskii-Moriya interaction (DMI).[1] By tuning the strength of the interfacial interaction between magnetic and nonmagnetic thin films, we can manipulate the zero-field domain patterns in these materials, creating labyrinth domains and skyrmion lattices.[2] Imaging these spin structures has presented a significant challenge to the field; we have shown that nitrogen-vacancy (NV) magnetometry provides a flexible, room temperature, and variable field method for imaging and reconstructing magnetic spin structures.[3] We present an alternative fabrication method of Pt/Co/Ta multilayers for imaging within the experimental constraints presented by NV scanning magnetometry. We further present unique deposition techniques for creating and imaging stable skyrmions within a single layer of Pt/CoFeB/MgO.

[1]M. Bode et. al., *Nature* **447**, 190-193 (2007)
[2]S. Woo et. al., *Nature Materials* **15**, 501-506 (2016)
[3]Y. Dovzhenko*, F. Casola*, et. al., arXiv: 1611.0067v1 (2016)

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Date submitted: 11 Nov 2016 Electronic form version 1.4