Contribution ID: **26** Type: **not specified**

Time-resolved Imaging of the Gyrotropic Motion of Magnetic Bubbles

Magnetic bubbles are skyrmionic spin structures stabilized by dipolar interactions. Recent theoretical investigations predict a GHz gyrotropic motion of these topological configurations after excitation in a restoring potential, analogous to vortex gyration. However, in contrast to vortices, bubbles are predicted to exhibit inertial effects. Here we demonstrate the presence of an inertial mass in a magnetic bubble by imaging its gyrotropic trajectory using pump-probe x-ray holography. We find that the inertial mass is very large compared to other magnetic systems, which we attribute to the non-local energy reservoir of the bubble's breathing mode. The breathing mode is a unique feature of the geometrically confined skyrmionic spin structure, which is a direct consequence of its topology, and thus lends itself to describe the inertia of Skyrmions in terms of a topological mass.

Primary author: Mr BUETTNER, Felix (IOAP, TU Berlin)

Co-authors: Mr PFAU, Bastian (Institut für Optik und Atomare Physik, TU-Berlin); Mr KRÜGER, Benjamin (Institue of Physics, Johannes-Gutenberg-Universität Mainz); Mr VAZ, Carlos (Swiss Light Source, Paul-Scherrer-Institut); Dr GÜNTHER, Christian (Institut für Optik und Atomare Physik, Technische Universität Berlin); Mr MOUTAFIS, Christoforos (Swiss Ligth Source, Paul Scherrer Institute); Mr VON KORF SCHMISING, Clemens (Institut für Optik und Atomare Physik, TU-Berlin); Mr SWAGTEN, Henk J. M. (Department Appliened Physics, Center for NanoMaterials, University Eindhoven); Mr GEILHUFE, Jan (Helmholtz-Zentrum Berlin für Materialien und Energie); Mr FRANKEN, Jeroen H. (Departmen Applied Physics, Center for NanoMaterials, Eindhoven University of Technology); MOHANTY, Jyoti (Institut für Optik und Atomare Physik, TU-Berlin); Mr KLÄUI, Mathias (Institue of Physics, Johannes-Gutenberg-Universität Mainz); Mr FÖRSTER, Michael (Institue of Physics, Johannes-Gutenberg-Universität Mainz); SCHNEIDER, Michael (Institut für Optik und Atomare Physik, TU-Berlin); EISEBITT, Stefan (Max-Born-Institute); Mr SCHAFFERT, Stefan (Institut für Optik und Atomare Physik, TU-Berlin); Mr SCHULZ, Tomek (Institue of Physics, Johannes-Gutenberg-Universität Mainz)

Presenter: Mr BUETTNER, Felix (IOAP, TU Berlin)

Session Classification: Molecular dynamics 1