

Field-free deterministic creation and inertial properties of single skyrmions

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Magnetic skyrmions are currently the most promising option to realize current-driven magnetic shift registers. Generation, transport and annihilation of skyrmions are fundamental operations in this context. We study the generation and intrinsic dynamics of skyrmions via static and time-resolved x-ray holography, combining sub-30 nm spatial resolution with sub-100 ps temporal resolution.[1,2] It is demonstrated that single skyrmions can be generated deterministically on subnanosecond timescales in magnetic racetracks using spin orbit torque pulses. Externally applied in-plane magnetic fields are not required in the process.[3] Furthermore, results on the GHz dynamical behavior of bubble skyrmions are presented, where precision observation of the skyrmion trajectory is indicative of the presence of an inertial mass, connected to the skyrmion topology.

References:

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