



Contribution ID: 119

Type: Talk

## **【603】 Ultrafast nonthermal control of a magnetic skyrmion crystal**

*Wednesday 29 June 2022 15:15 (15 minutes)*

Due to its topological properties, skyrmions offer appealing interest in both fundamental and in spintronic applications. Here, we show combining a femtosecond laser and real space imaging technique in a cryo-Lorentz Transmission Electron Microscope that we can rotate the skyrmion lattice by a discrete amount in a coherent and fully deterministic manner. Using circular polarized pulses in a double-pump experiment and micromagnetic simulation, we demonstrate that we drive via inverse faraday effect a collective magnetic mode, named breathing mode. This excitation provides the required torque to rotate the lattice at a speed nine orders of magnitude faster than previously reported. This new mechanism opens the path towards novel ultra-efficient devices.

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**Session Classification:** Nonequilibrium properties of quantum materials

**Track Classification:** Nonequilibrium properties of quantum materials