

Title: Supplementary Movie 1:

Description: Temperature gradient driven transformation from skyrmion to antiskyrmion via a nontopological bubble at zero field. Live recording of a defocused LTEM micrograph showing a metastable skyrmion embedded in a helical background state under the application of constant $\nabla T = 3.8 \text{ K } \mu\text{m}^{-1}$. The skyrmion transforms into an intermediate nontopological bubble before transforming again into an antiskyrmion. Field of view is $1.88 \mu\text{m} \times 1.06 \mu\text{m}$.

Title: Supplementary Movie 2:

Description: Uniform heating of metastable skyrmions at zero field. Left panel: real space LTEM micrographs showing the evolution of the spin texture population under the application of uniform heating, scalebar $1 \mu\text{m}$. Right panel: discrete Fourier transform of the LTEM micrographs cropped to highlight the relevant spin texture frequencies, scalebar $5 \mu\text{m}^{-1}$. The initial magnetic state contains metastable skyrmions, antiskyrmions and nontopological bubbles embedded in a magnetic helical background state at $T = 300 \text{ K}$. After an initial increase to $T = 305 \text{ K}$, the temperature is increased in 1 K steps up to $T = 361 \text{ K}$. The temperature was held for $30 - 60 \text{ s}$ to allow the spin textures to stabilize before acquiring a real space image and increasing the temperature further.