Supplemental Material for
Fact and artifact in Lorentz imaging of skyrmionic magnetic textures

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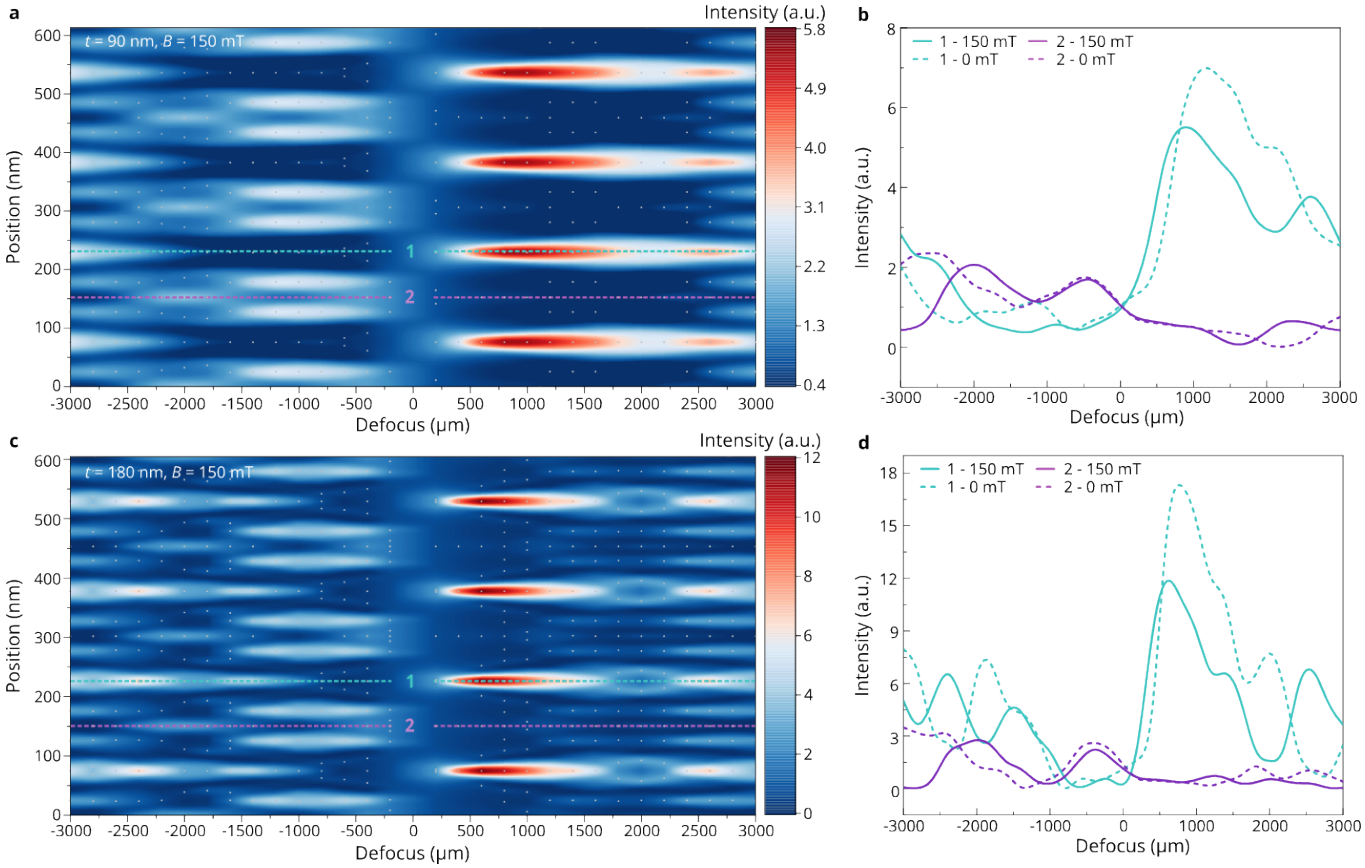
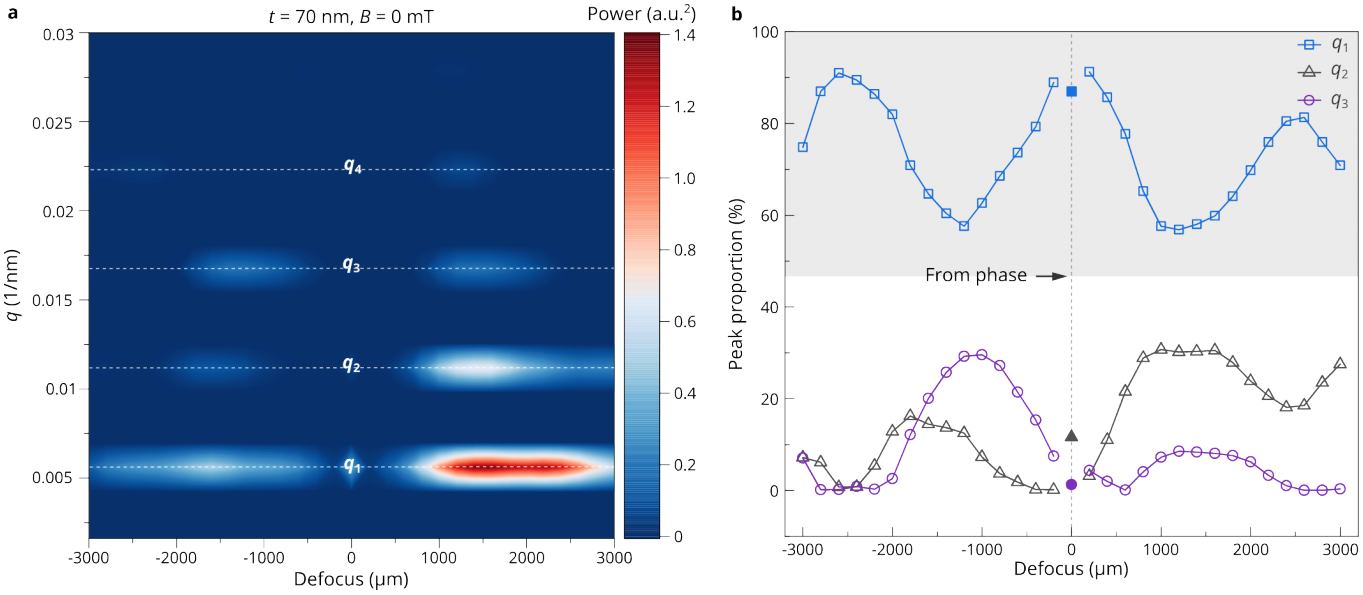
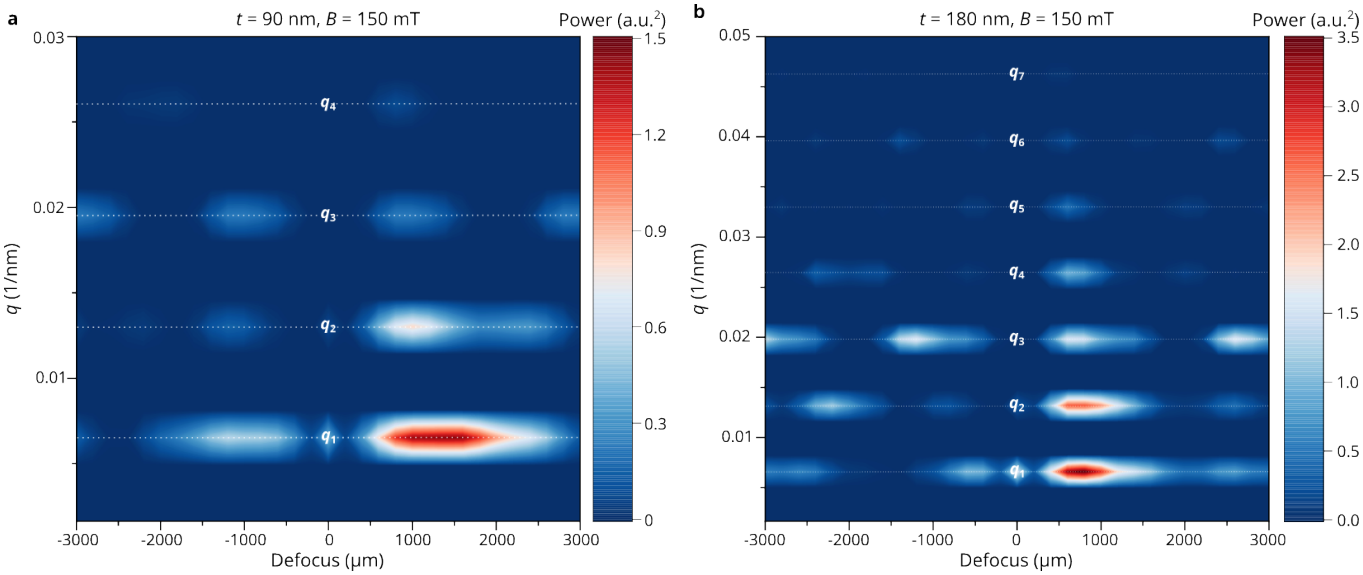


Supplementary Fig. S1. Analyses of simulated Lorentz TEM images of the skyrmion lattice. **a** and **b** are for the 90-nm-thick sample, while **c** and **d** for the 180-nm-thick sample. respectively. **a** and **c**, Intensity maps for the points along the gray line (marked in Fig.6**a** of the main text) as a function of the defocus distance. **b** and **d**, Intensity profiles for the two particular points as a function of the defocus distance. In addition, intensity profiles for the lattice at 0 mT (dashed lines) are also plotted for comparison.



Supplementary Fig. S2. Periodicity analyses of skyrmion-lattice patterns as a function of the defocus distance in the 70-nm-thick sample. The applied magnetic field in the sample is 0 mT. 2D FFT power spectra as a function of the defocus distance. The dominant peaks are localized judging from the values and labeled in each image.



Supplementary Fig. S3. Periodicity analyses of skyrmion-lattice patterns as a function of the defocus distance. The applied magnetic field in the sample is 150 mT. **a**, 2D FFT power spectra as a function of the defocus distance. The dominant peaks are localized judging from the values and labeled in each image. **b**, Evolution of the proportions of three dominant peaks (characteristic frequencies) as a function of the defocus. The dominant peaks from the phase are also plotted for comparison.

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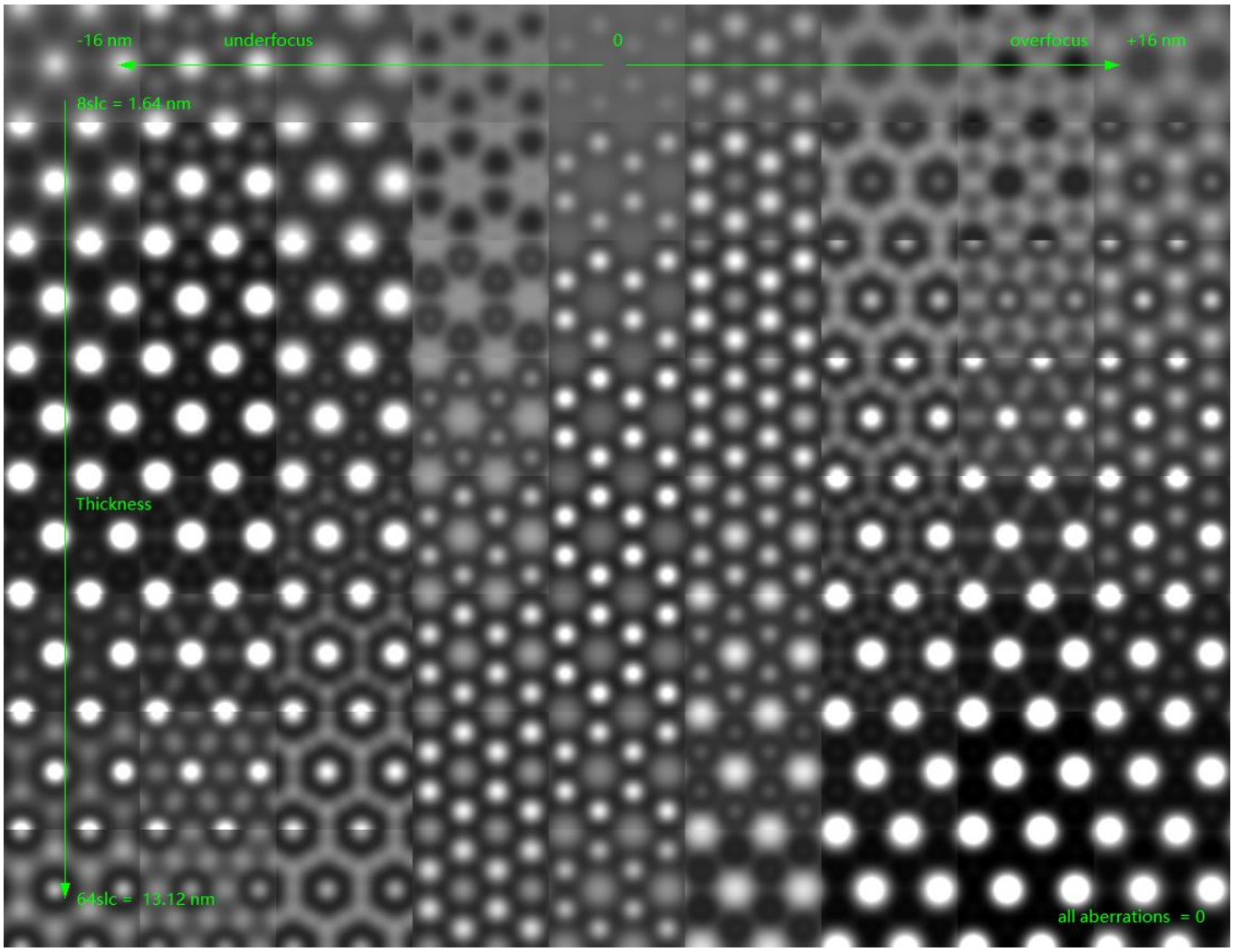

Supplementary Fig. S4. Multislice simulations of high resolution TEM images for a hexagonal cobalt crystal. The zone axis is [001]. From left to right, the defocus distance is changes from -16 nm to + 16 nm. From top to bottom, the sample thickness increases from 1.64 nm to 13.12 nm, *i.e.*, from 8 slices (8slc) to 64 slices (64slc). All lens aberrations were set to zero in the simulations.