Direct Atomic-scale Imaging of a Screw Dislocation Core Structure in Inorganic Halide Perovskites

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1. Structure characterizations

The STEM experiments were performed at 300 kV on a Thermofisher Themis Z scanning transmission electron microscope equipped with double Cs-correctors and Super-EDS detector system. The collection angle of the detector was between 50-200 mrad and the convergence angle was ~21.6 mrad. A wiener filter was used to improve the quality of the HAADF-STEM images. CsPbBr3 were dispersed in toluene and dropped on carbon film grids.

2. Surface plots and intensity line profiles

Three dimensional surface plots of the dislocation core structures are displayed in Figure S1. The plot shows a zigzag shape across the screw dislocation core, which is the projection of the helicoid structure along the direction perpendicular to the dislocation line.

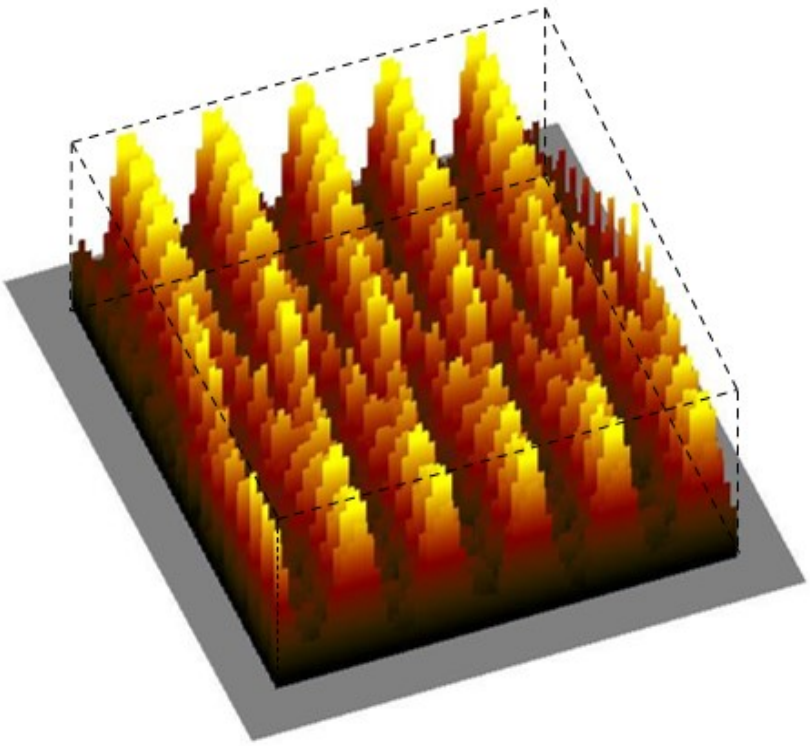

Figure S1. Surface plots of the screw dislocation core.

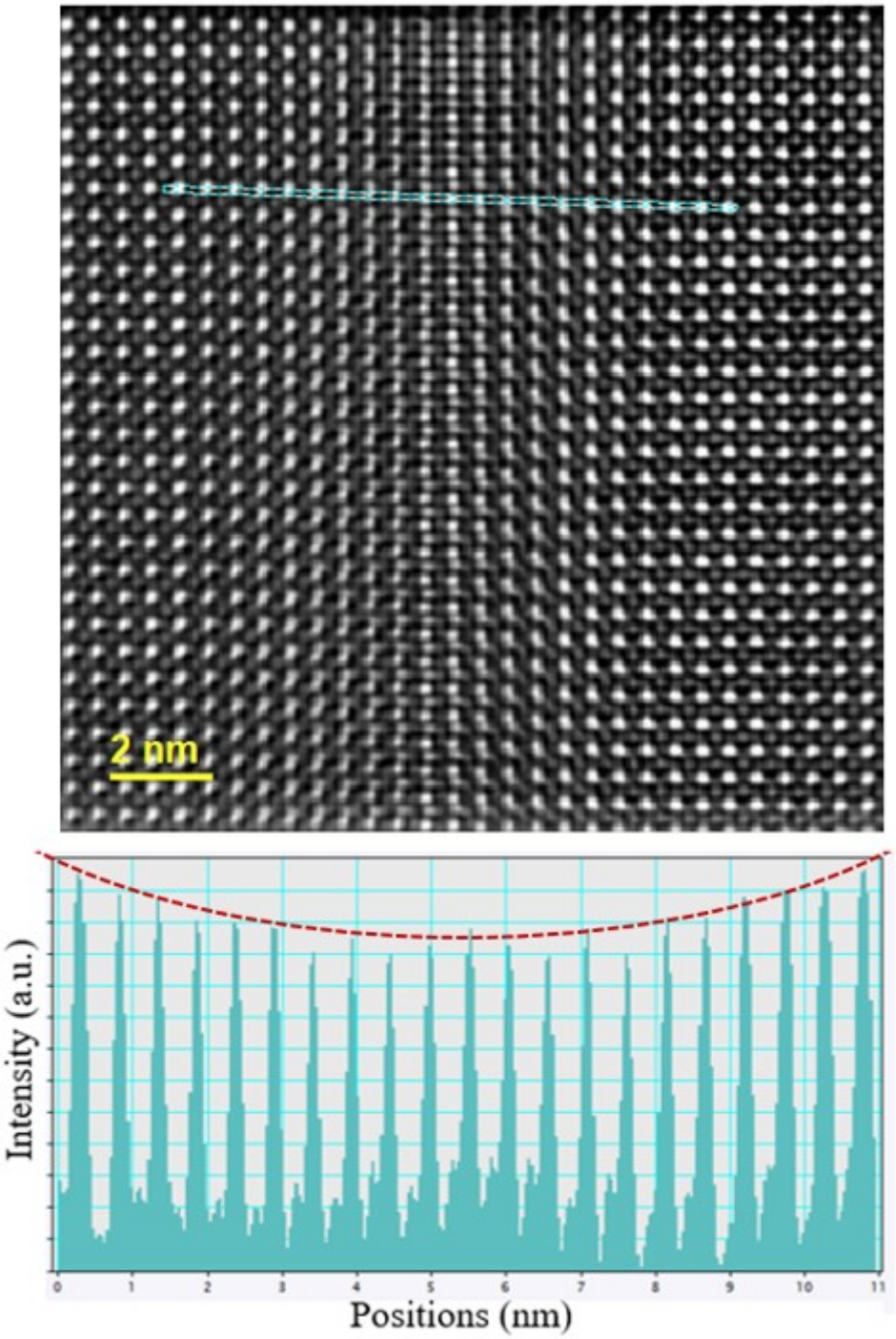

Figure S2. HAADF-STEM image and intensity line profiles across the screw dislocation core. The dashed red line shows the intensity changes across the dislocation core.

The intensity line profile across the dislocation core exbibits a parabolic curve, as highlighted with the dashed red line. This curve is caused by a combining effects of

field depth of the electron beam under STEM mode and the helical structure.