

Supporting information for

Nematically templated vortex lattices in superconducting FeSe

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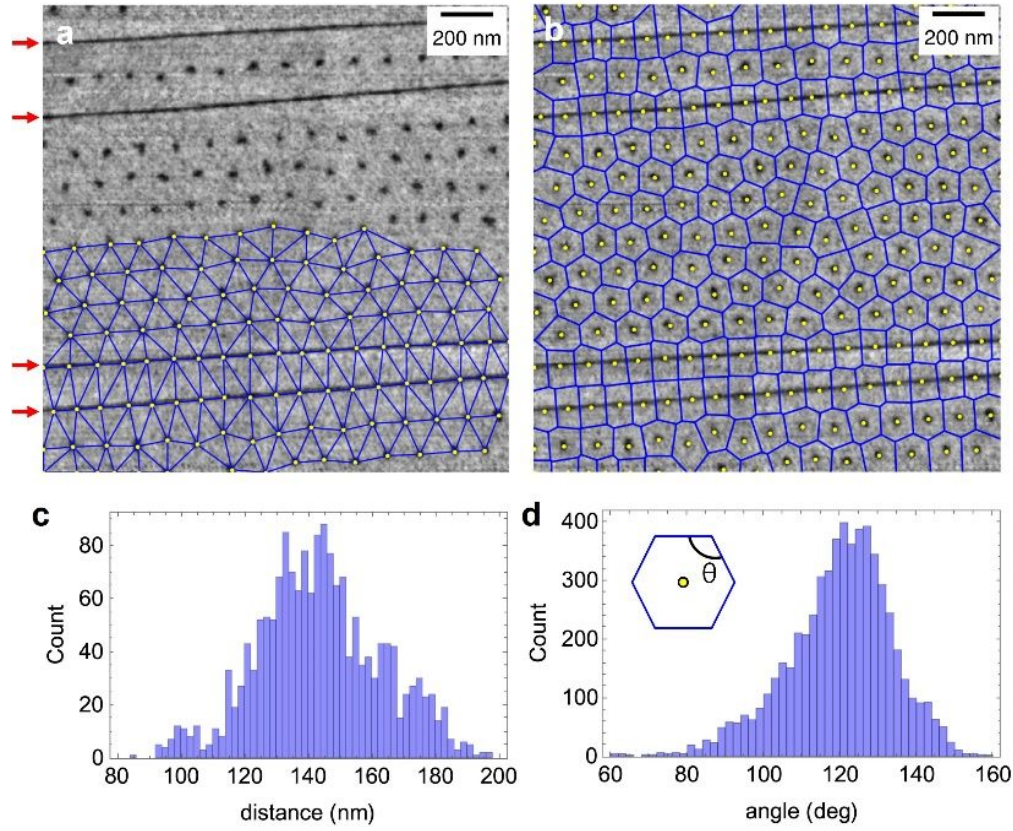


Figure S1. Vortex lattice structure in the presence of twin boundaries on FeSe at 0.13 T. (a, b) The conductance map (-2.5 mV) of a vortex lattice in the presence of twin boundaries (red arrows). Each blue mesh is constructed by Delaunay triangulation and Voronoi diagram. The Voronoi diagram divides the map into cells covering the region closest to a particular center. (c) The histogram of distances between neighboring vortices. (d) The distribution of angles obtained from the Voronoi diagram.

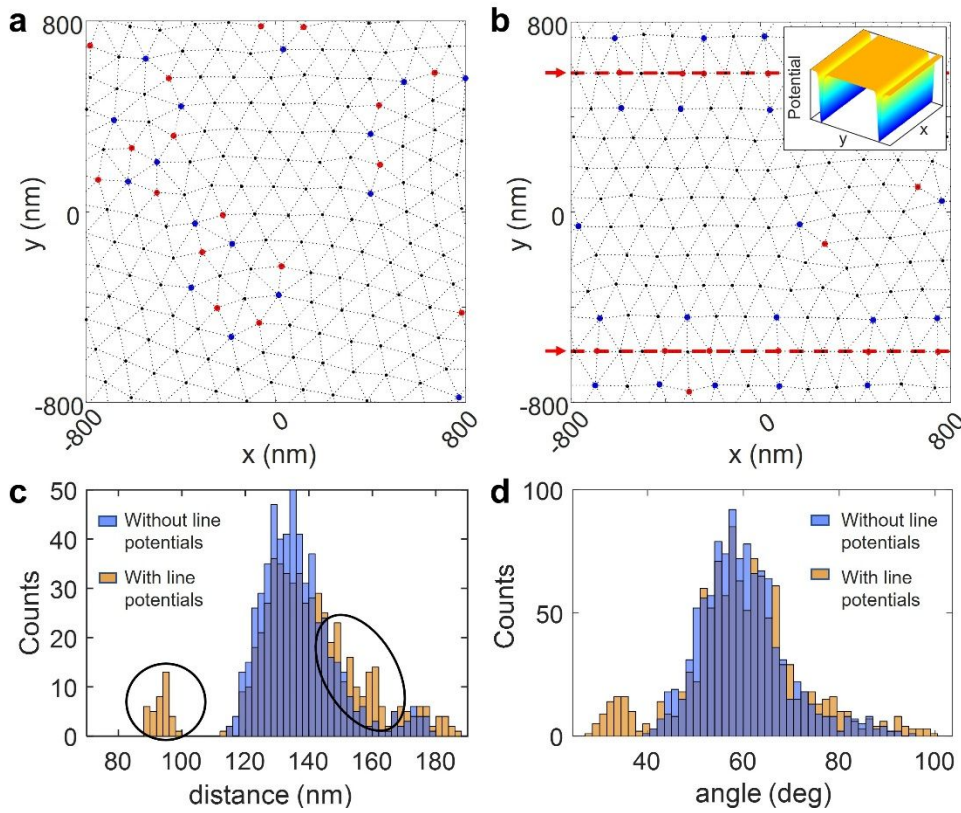


Figure S2. Simulation results of vortex configurations with and without line potentials. (a) A simulation result of vortex glass by implementing 5000 randomly distributed point-like potentials. The red and blue dots indicate vortices with five and seven neighbors, respectively. (b) The vortex glass in the presence of two parallel line potentials which represent twin boundaries. Line potentials align the vortex glass in between them. The inset shows the shape of the two line potentials. Note that these line potentials are in addition to the point-like potentials that give rise

to the vortex glass itself. (c) The histogram of distance between neighboring vortices of the entire domain for simulations with (orange) and without (purple) line potentials. (d) The histogram of angle between neighboring vortices of the entire domain for simulations with (orange) and without (purple) line potentials.

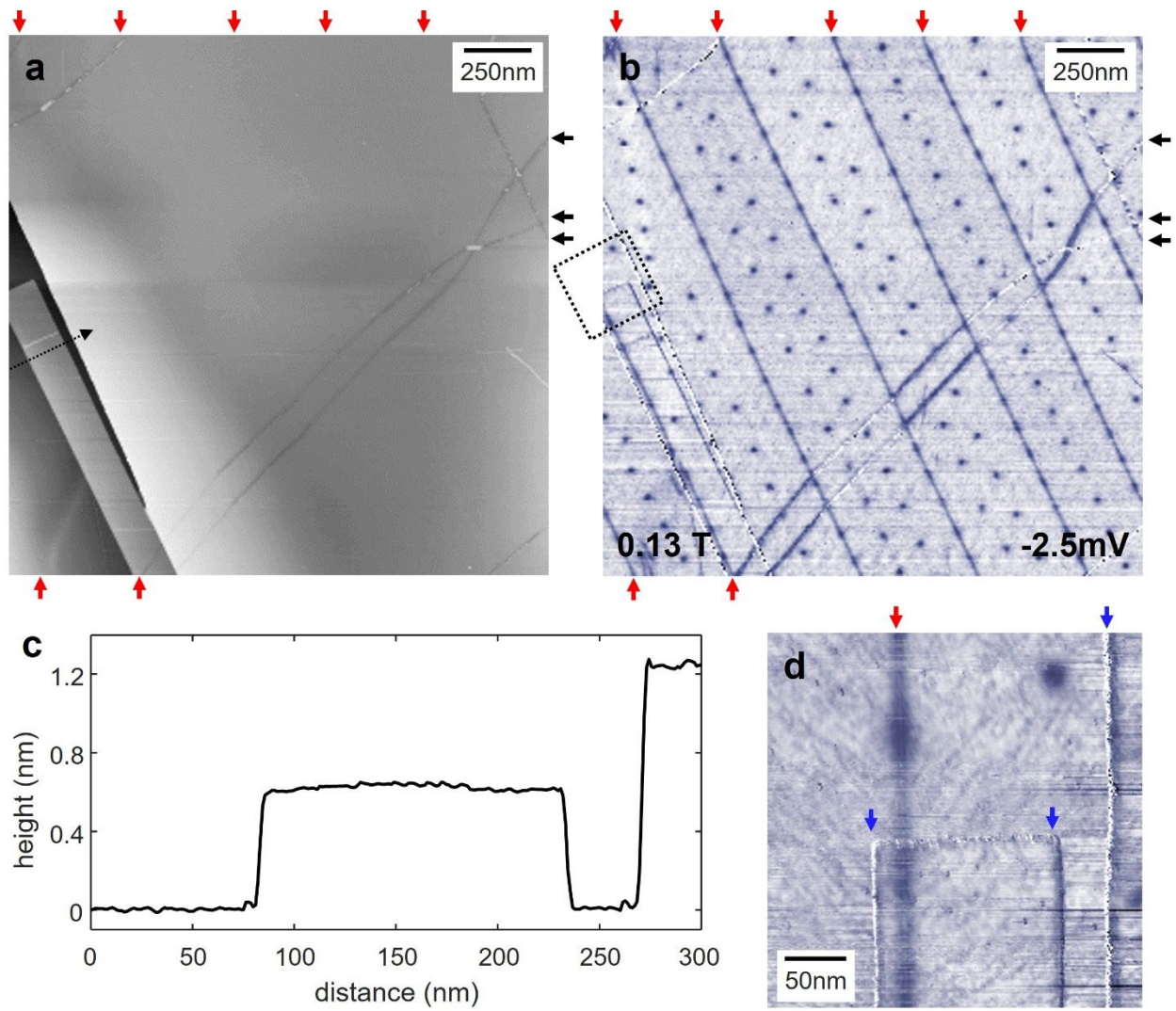


Figure S3. (a) The constant current mode STM image of FeSe surface in the presence of twin boundaries (red arrows), wrinkles (black arrows), and steps ($I=100\text{pA}$, $V_{\text{bias}}=2.5\text{mV}$). (b) The differential conductance map (-2.5mV) of area (a). Geometrical confinements between narrow parallel twin boundaries give rise to various vortex configurations such as zigzag quasi one-dimensional and linear quasi one-dimensional vortex lattices. (c) The line profile along the black dotted arrow in (a). Each height of steps corresponds to one unit cell and two-unit cells, respectively. (d) Zoomed-in image of differential conductance map near the steps (the black dotted box in (b)). Vortices are pinned along the twin boundary (red arrow) rather than step edges (blue arrows).

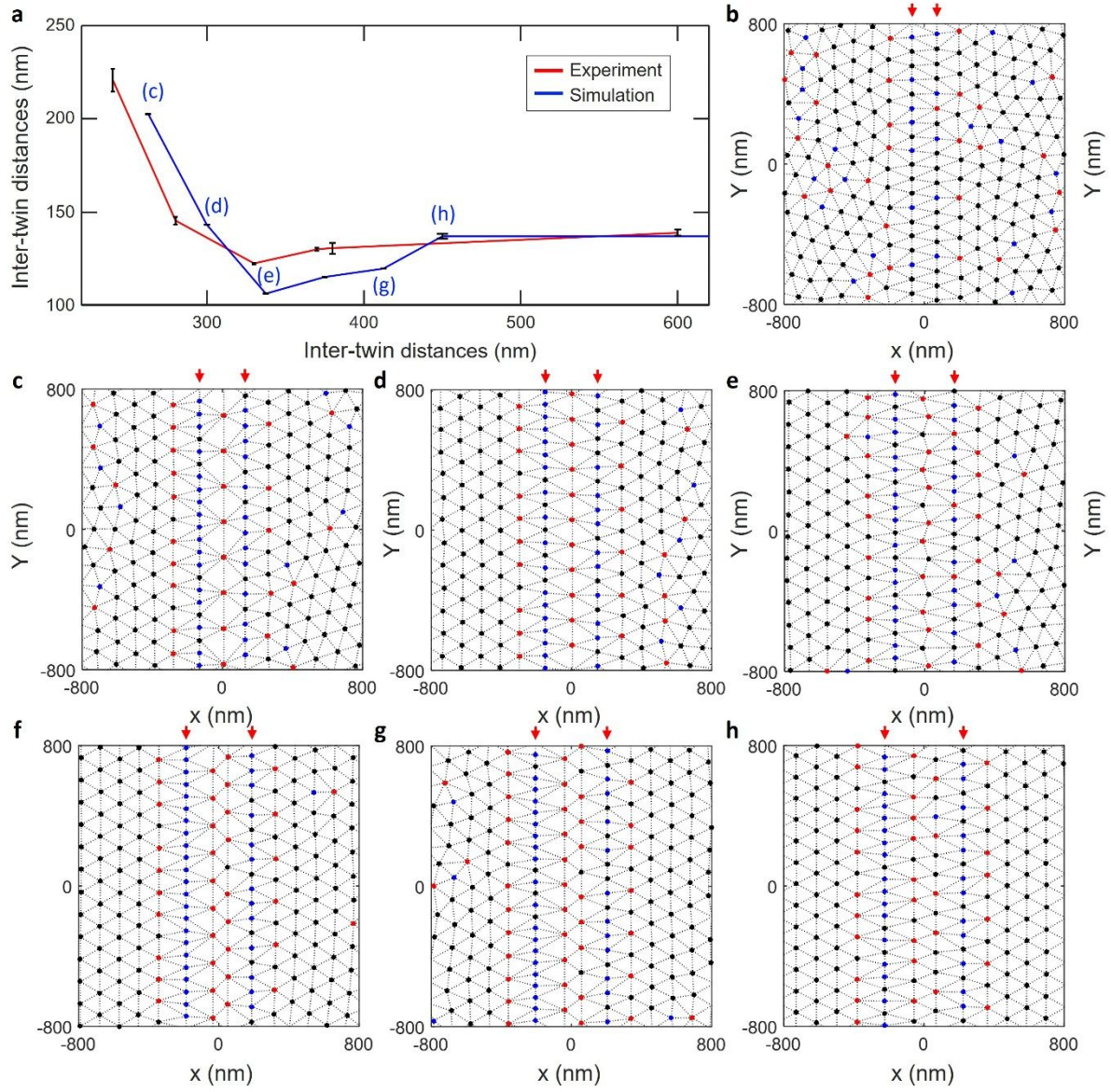


Figure S4 (a) Simulation and observation results of inter-vortex distances as a function of inter-twin distances. (b-h) The simulation results of vortex configurations between parallel twin boundaries with inter distances of (b) 160 nm, (c) 263 nm, (d) 300 nm, (e) 338 nm, (f) 375 nm, (g) 413 nm, and (h) 450 nm ($\sigma_{line} = 0.2$, and $A_{min} = -2$).