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Electronically driven nematicity in multilayer FeSe Film on SrTiO3 WEI LI, YAN ZHANG, J.J. LEE, Stanford University, HAO DING, Tsinghua University, MING YI, Stanford University, ZHI LI, Tsinghua University, SUNG-KWAN MO, Lawrence Berkeley National Lab, MAKOTO HASHIMOTO, DONGHUI LU, R.G. MOORE, SLAC National Accelerator Laboratory , XI CHEN, QI-KUN XUE, Tsinghua University, ZHI-XUN SHEN, Stanford University; SLAC National Accelerator Laboratory — Nematicity in iron-based superconductors is an intensely investigated contemporary subject. Although it is closely connected to the structural transition, it is unclear whether the lattice degree of freedom is responsible for the nematicity. Here we combine molecular beam epitaxy, angle-resolved photoemission spectroscopy and scanning tunneling microscopy together to study the nematicity in multilayer FeSe films on SrTiO3. Our results demonstrate direct connection between electronic anisotropy in momentum space and standing waves in real space. The lifting of orbital degeneracy of dxz/dyz bands causes the unidirectional interference fringes, observed in real space as standing waves produced by scattering electrons off C2 domain walls and Se-defects. On the other hand, the formation of C2 nematic domain walls unexpectedly shows no correlation with lattice strain pattern. Our results establish a clean case that the nematicity is driven by electronic rather than lattice degrees of freedom in FeSe films.

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