### Observation of clean conventional Caroli-de Gennes-Matricon states in the vortex core of single-layer FeSe/SrTiO<sub>3</sub>

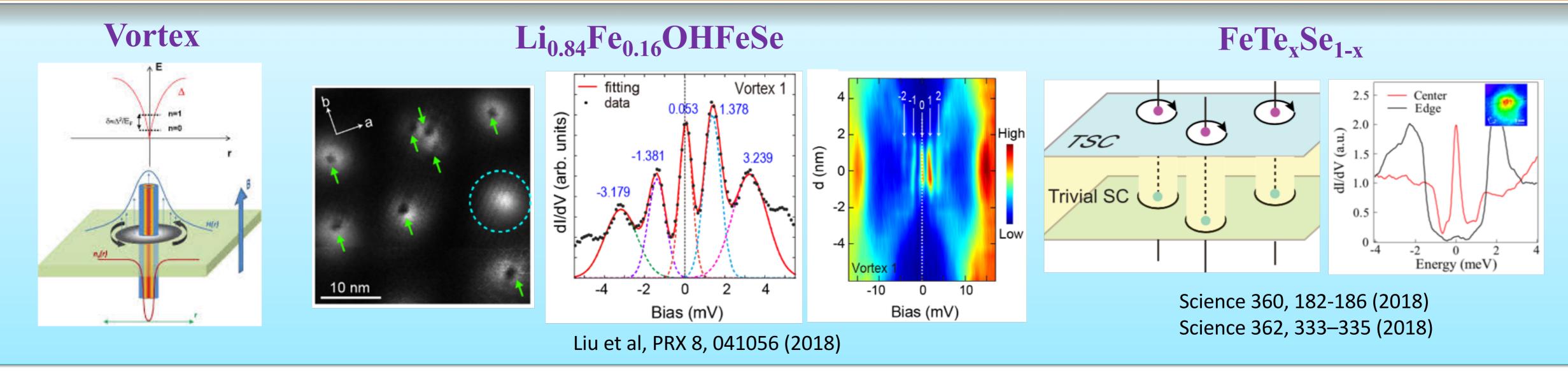
Chen Chen<sup>1,4†</sup>, Qin Liu<sup>1,2,4†</sup>, Wei-Cheng Bao<sup>3,6†</sup>, Ya-Jun Yan<sup>1,4</sup>, Qiang-Hua Wang<sup>3,4\*</sup>, Tong Zhang<sup>1,4\*</sup>, Dong-Lai Feng<sup>1,4,5\*</sup>

<sup>1</sup> State Key Laboratory of Surface Physics, Department of Physics, and Advanced Materials Laboratory, Fudan University, Shanghai 200438, China

- <sup>2</sup> Science and Technology on Surface Physics and Chemistry Laboratory, Mianyang, Sichuan 621908, China
- <sup>3</sup> National Laboratory of Solid State Microstructures & School of Physics, Nanjing University, Nanjing, 210093, China
- <sup>4</sup> Collaborative Innovation Center of Advanced Microstructures, Nanjing 210093, China

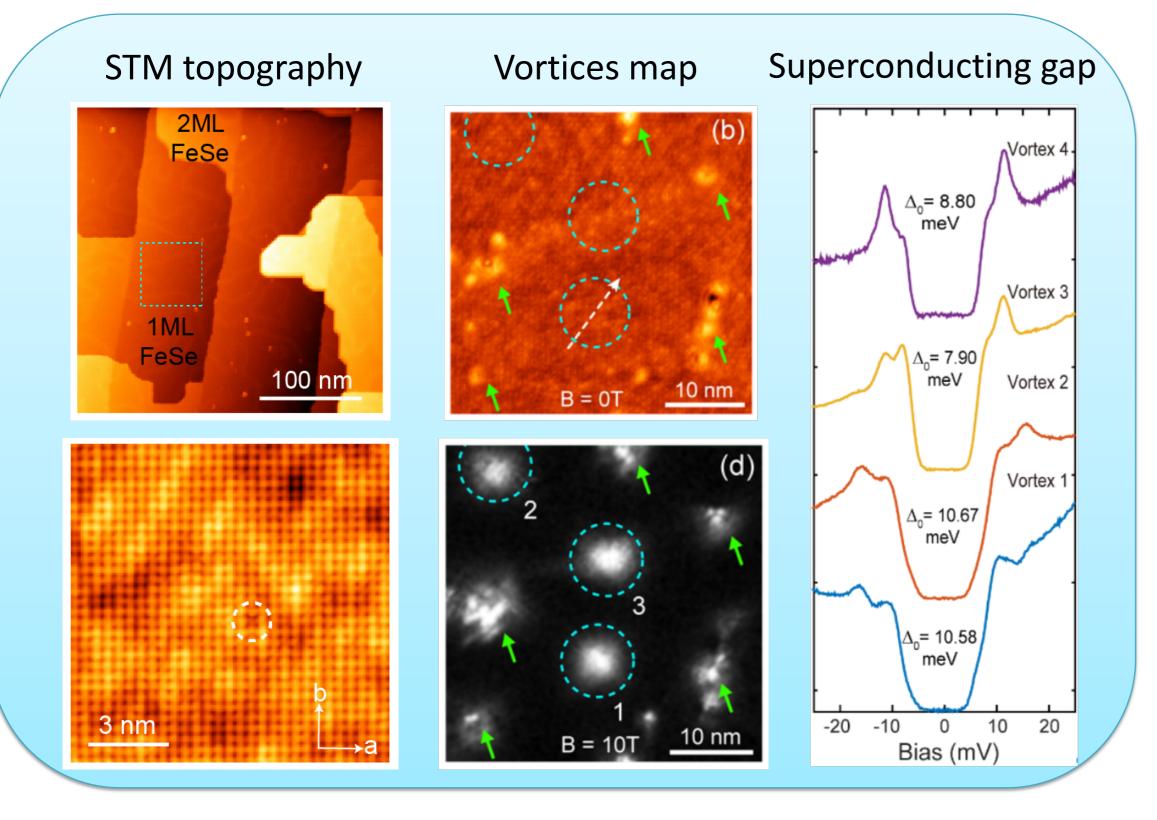
<sup>5</sup> Hefei National Laboratory for Physical Science at Microscale and Department of Physics, University of Science and Technology of China, Hefei, Anhui 230026, China 6 Zhejiang University of Water Resources and Electric Power, Hangzhou 310018, China

## I. Vortex bound states in iron-based superconductor



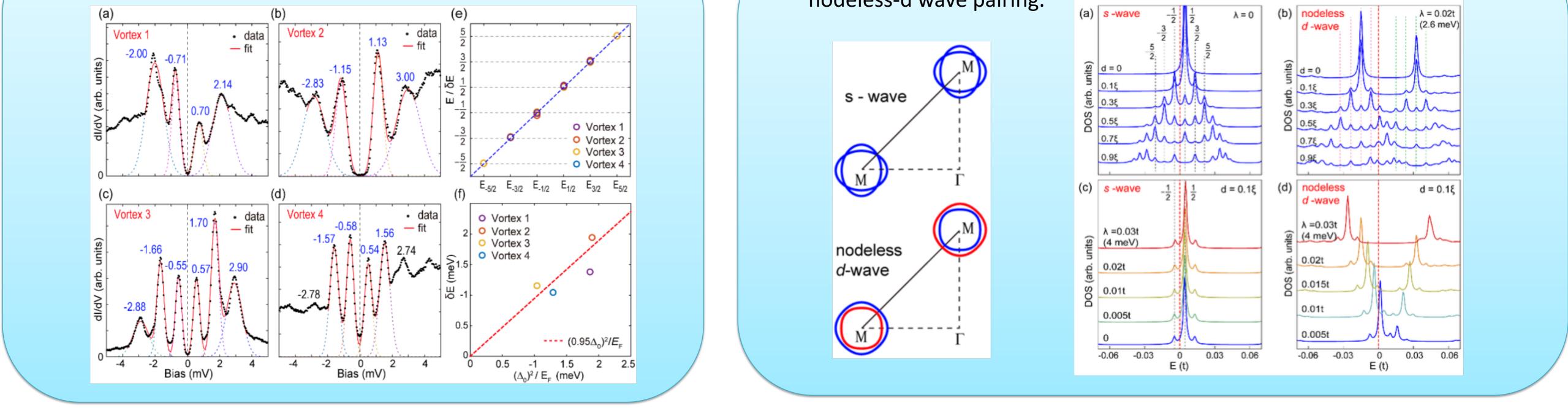
**II.** Experiments

### **1ML FeSe film grown on SrTiO<sub>3</sub> Discrete vortex bound states**



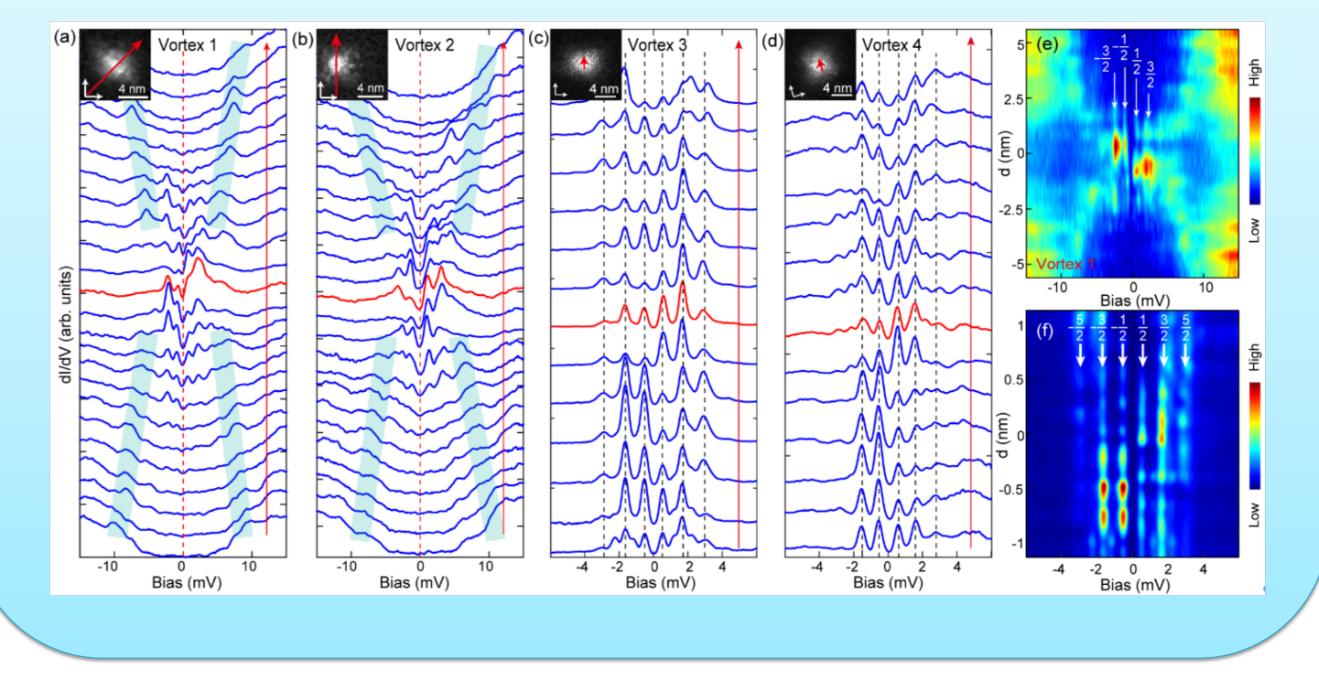
### **Discrete vortex bound states**

These CdGM states are symmetrically distributed with respect to  $E_F$ . The energies are consistent with  $E = \mu \Delta^2 / EF$ 

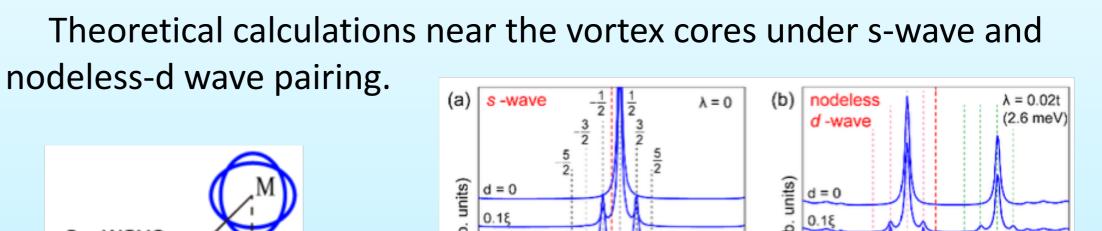


Discrete Caroli-de Gennes-Matricon (CdGM) states without a ZBCP can be clearly observed in the free vortex core at T=0.4 K.

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### **Theoretical calculation of vortex states**



# **III.** Conclusions

• We clearly observed multiple discrete Caroli-de Gennes-Matricon (CdGM) states in the vortex core of single-layer FeSe film on SrTiO<sub>3</sub>, and quantitative analysis shows their energies well follow the formula:E =  $\mu\Delta^2$ /EF. Accompanied with theoretical calculations, our results indicate a s-wave pairing without sign-change in this high-Tc system. C.Chen Phys. Rev. Lett. 124, 097001 (2020)

