

## Recent results and reflections on the cuprate phase diagram

Sudi Chen\*

Departments of Physics and Applied Physics, Stanford University, USA  
Stanford Institute for Materials and Energy Sciences, SLAC National Accelerator Laboratory, USA  
Department of Physics, University of California, Berkeley

A recent finding of a sharp and almost “vertical boundary” of the strange metal state adds to the riches of the cuprate electronic phase diagram [1]. In this talk, I will present recent angle-resolved photoemission data to reveal this effect, and to reflect on a few peculiarities around it: i) the smooth sailing of pairing temperature across this boundary[1], contrasting to the rapid change of pairing energy gap near this boundary [2,3]; ii) the ubiquitous and strong phase fluctuation[4,5]; iii) evidence of competition between superconducting pairing and likely another ordering tendency[6].

- [1] S.D. Chen et al., Science, 366, 6469 (2019)
- [2] Yu He et al., Science, 362, 62 (Oct. 2018)
- [3] I.M. Vishik et al., PNAS 109/45, 18332 (2012)
- [4] S.D. Chen et al., Nature 601, 562-567 (2022)
- [5] Yu He et al. Phys. Rev. X 11, 031068 (2021)
- [6] M. Hashimoto et al., Nature Physics 10, 483 (2014)