



## Laser-Based Angle-Resolved Photoemission: from Ultrahigh Resolution to Ultrafast Dynamics

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### 报告摘要:

By monitoring the quasiparticle relaxation rates following a pulse of light, we have established a new window into the intrinsic rates of recombination that occur as Cooper pairs become re-established. We have demonstrated the ability to directly perturb and monitor the superconducting gap in cuprates, using near-infrared pump pulses to suppress superconductivity in the low-fluence regime and to fully induce a metastable pseudogap state in the moderate- to high-fluence regime. These results serve both as a vivid demonstration of an ultrafast phase transition involving a topological change in the nature of the Fermi surface of a material, and as a novel probe into the factors that influence the superconducting order parameter. These new results prelude planned trARPES studies of charge-density wave dynamics. Ultrafast time-resolved ARPES studies of high  $T_c$  superconductor reveal a softening of the electron-boson interaction in concomitance with a softening/closure of the superconducting gap. The effect is negligible in the normal state and for a metallic compound, suggesting that the electron-boson interaction might be a booster for pairing in cuprates.

### 参考文献:

1. Wentao Zhang *et al.*, Nat. Comm. **5**, 4959 (2014).
2. Wentao Zhang *et al.*, Phys. Rev. B **88**, 245132 (2013).
3. C. Smallwood, Wentao Zhang *et al.*, PRB **89**, 115126 (2014).
4. C. Smallwood, Wentao Zhang *et al.*, Science **336**, 1137 (2012).
5. C. L. Smallwood, Wentao Zhang, *et al.*, Rev. Sci. Ins. **83**, 123904 (2012).

### 报告人简介:

张文涛, 2005 毕业于中国科学技术大学、2010 年在中国科学院物理研究所获凝聚态物理理学博士。2010-2013 年在美国劳伦斯伯克利国家实验室 (Lawrence Berkeley National Lab) 博士后, 2013-现在在加州大学伯克利分校任助理研究员。博士期间主要从事高温超导体 Bi2212 的电子结构的角分辨光电子能谱研究以及先进的真空紫外激光光电子能谱仪的设计和搭建工作。毕业后主要从事高温超导体及其它非常规超导体电子结构的时间分辨角分辨光电子能谱研究。至今已经在 Science、Nature、Nature Communication、PRL 等一系列杂志发表论文 30 余篇, 被引用近 700 次。

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