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**Competition between superconductivity and charge order in YBCO via X-ray diffraction**

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Recently, charge order has been probed by NMR [1], x-ray diffraction [2-5] and ultra sound [6] experiments in the cuprate system YBCO. In this talk, the most recent hard x-ray experiments [2-3] in high magnetic fields will be discussed. Consequences of competition between superconductivity and charge density wave order will be demonstrated. It will for example be shown how direct measurements of the upper critical field,  $H_{c2}$ , reveal a 20-fold drop of the superconducting condensation energy as a result of this competition [7]. Connections to the Fermi-surface reconstruction detected by quantum oscillations will also be discussed.

- [1] T. Wu *et al.*, Nature 477, 191 (2011).
- [2] E. Blackburn *et al.*, Physical Review Letters **110**, 137004 (2013).
- [3] J. Chang *et al.*, Nature Physics **8**, 871 (2012).
- [4] S. Blanco-Canosa *et al.*, Physical Review Letters **110**, 187001 (2013).
- [5] G. Ghiringhelli *et al.*, Science **337**, 821 (2012).
- [6] D. LeBoeuf *et al.*, Nature Physics **9**, 79 (2013).
- [7] G. Grissonnanche *et al.*, arXiv:1303.3856