

Abstract Submitted  
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**The robustness of high- $T_c$  superconductivity in underdoped  $\text{YBa}_2\text{Cu}_3\text{O}_{6+x}$  investigated in under strong magnetic fields<sup>1</sup>** NEIL HARRISON, Los Alamos National Labs., Y.-T. HSU, M. HARTSTEIN, Cavendish Lab., Cambridge, M. CHAN, Los Alamos National Labs., J. PORRAS, T. LOEW, M. LE TACON, Max Planck Institute for Solid State Research, Karlsruhe, G. LONZARICH, Cavendish Lab., Cambridge, B. KEIMER, Max Planck Institute for Solid State Research, Karlsruhe, V. FLUX, S. SEBASTIAN, Cavendish Lab., Cambridge — A central unresolved mystery in high- $T_c$  superconductivity is whether the pairing amplitude is small in the underdoped regime and relates to the superfluid density or whether it is large and relate to the intrinsic energy scales of the Mott insulating parent state. The magnetic field provides a sensitive probe of the pairing amplitude. However, experimental probes of the extent of the vortex state in temperature and magnetic field have thus far been indirect and hence subject to debate. Here we report measurements over a broad range of temperature and magnetic fields which we use to probe the extent of the vortex region in underdoped  $\text{YBa}_2\text{Cu}_3\text{O}_{6+x}$ . and its interplay with quantum oscillations.

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