

Abstract Submitted
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Thermal study of vortex states in mesoscopic superconducting disks¹ FLORIAN ONG, OLIVIER BOURGEOIS, CNRS-Institut Neel, SERGEY SKIPETROV, CNRS-LP2MC, JACQUES CHAUSSY, CNRS-Institut Neel — We present low temperature highly sensitive heat capacity C measurements [1,2] of aluminum disks with diameters close to $\xi(T)$, the superconducting coherence length. $C(T)$ scans under fixed perpendicular magnetic fields H reveal a quasiperiodic modulation of the height ΔC of the C jump at the superconducting to normal phase transition. This behavior is due to transitions between several arrangements of vortices in the disks. Indeed giant vortex states or multivortex states can be observed, with a vorticity (an integer equal to the number of vortices threading a single disk) depending on H , T , and on the size of the disks. Heat capacity measurements enable to study phase transitions between such states, without contacting or biasing them. Thus phase boundaries in the $H - T$ plane can be drawn in all the superconducting region.

[1] O. Bourgeois, F. Ong, S.E. Skipetrov, and J. Chaussy, *Phys. Rev. Lett.* **94**, 057007 (2005)

[2] F.R. Ong, O. Bourgeois, S.E. Skipetrov, and J. Chaussy, *Phys. Rev. B* **74**, 140503(R) (2006)

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