doi: 10.1038/nature05872

Figure S1: a

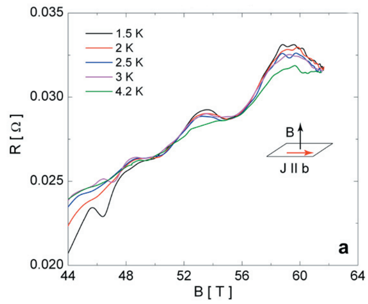

Figure S1: b

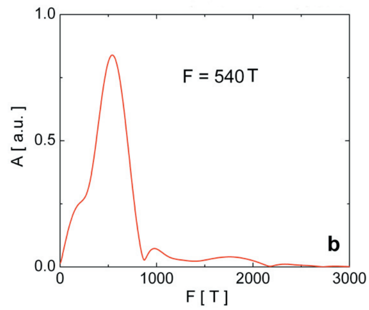

Figure S1: a) Electrical resistance of ortho-II ordered $YBa_2Cu_3O_{6.5}$ (sample B) as a function of magnetic field, at different temperatures T between 1.5 and 4.2 K. The field is applied normal to the CuO_2 planes ($B \parallel c$) and the current along the b-axis of the ortho-rhombic crystal structure ($J \parallel b$).
Figure S1: b) Power spectrum (Fourier transform) of the oscillatory part for the $T = 2$ K isotherm, revealing a single frequency at $F = (540 \pm 20)$ T.

Figure S1: c

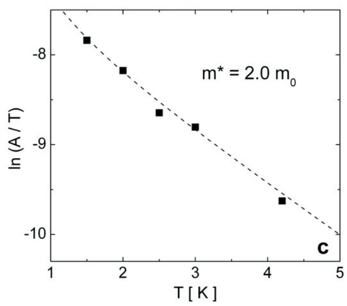

Figure S2

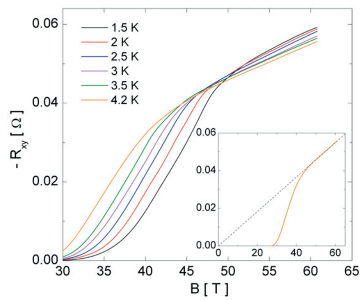

Figure S1: c) Temperature dependence of the oscillation amplitude A, plotted as $\ln(A / T)$ vs T. The fit to the Lifshitz-Kosevich formula yields a cyclotron mass $m^* = (2.0 \pm 0.1)\, m_0$, where m_0 is the free electron mass.
Figure S2: Monotonic part of the Hall resistance of sample A as a function of magnetic field, at different temperatures T between 1.5 and 4.2 K, fitted to the raw data shown in Fig. 2. The oscillatory part displayed in Fig. 3a was obtained by subtracting the monotonic part from the raw data. **Inset:** Zoom on the data at $T = 2$ K, showing the extrapolation of the monotonic part going to zero as the magnetic field vanishes (dashed line).

Figure S3: a

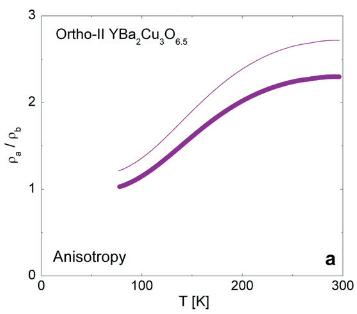

Figure S3: b

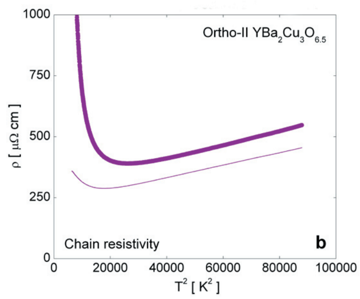

Figure S3: a) Ratio of the electrical resistivity measured along the a (sample A) and b (sample B) axes as a function of temperature.
Figure S3: b) Resistivity of the chains as a function of temperature. In both panels, the thin line denotes the extremal value allowed by the combined uncertainties on the geometric factor of both samples.

Figure S4

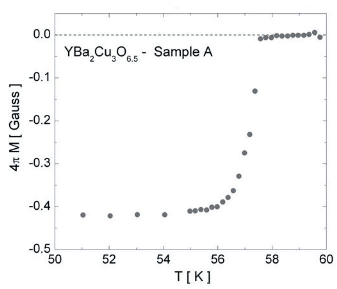

Figure S5

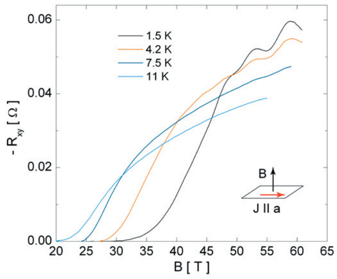

Figure S4: Magnetization of sample A as a function of temperature, showing that the superconducting transition starts sharply at $Tc = 57.5$ K. This is also precisely where the resistive transition goes to zero.
Figure S5: *Rxy* as a function of magnetic field B, for sample A, at different temperatures between 1.5 and 11 K. The field is applied normal to the CuO_2 planes ($B \parallel c$) and the current along the a-axis of the orthorhombic crystal structure ($J \parallel a$). While very weak oscillations are still perceptible at 7.5 K, they are completely absent from the data recorded at 11 K, as expected from thermally damped quantum oscillations.