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Shubnikov-de Haas oscillations in $YBa_2Cu_4O_8$ A. F. BANGURA, J. D. FLETCHER, A. CARRINGTON, P. J. HEARD, N.E. HUSSEY, (Bristol), J. LEVALLOIS, M. NARDONNE, B. VIGNOLLE, C. PROUST, (LNCMP, Toulouse), N. DOIRON-LEYRAUD, D. LEBOEUF, L. TAILLEFER, (Sherbrooke), S. ADACHI, (ISTEC, Tokyo) — The recent report of quantum oscillations in the single-chain underdoped cuprate $YBa_2Cu_3O_{6.5}$ - ortho II (hole doping p$\sim$0.10) points to the possibility that the underlying electronic structure in the underdoped region of the cuprate phase diagram contains Fermi surface pocket(s), at odds with results from ARPES experiments. In this talk I will describe our observation of quantum oscillations in the Hall resistivity ρ_{xy} of the stoichiometric double-chain cuprate $YBa_2Cu_4O_8$ (hole doping p$\sim$0.14), in pulsed magnetic fields up to 62T. Our results show that both the area of the quasiparticle orbit and the cyclotron effective mass of $YBa_2Cu_4O_8$ are larger than those measured for $YBa_2Cu_3O_{6.5}$ - ortho II. The observed negative Hall coefficient and the failure of LDA bandstructure calculations to account for the oscillations suggests a non-trival origin. However, clear evidence of quantum oscillations in materials with such different levels of doping and the details of the transport properties of the two compounds, allows us to conclude that small Fermi surface pocket(s) are a generic feature of the underdoped side of the Yttrium-based cuprate phase diagram and are associated with the CuO_2 planes.

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