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Field-Dependent Specific Heat Study of Chain Superconductivity in $YBa_2Cu_4O_8$ PHILIP WALMSLEY, ANTONY CARRINGTON, University of Bristol, UK — A unique property of the Y-based cuprate superconductors is the presence of conducting quasi-1-D CuO chains in addition to the CuO2 planes in which superconductivity is thought to originate. The nature of the superconducting interactions in the chains remains a matter of debate. $YBa_2Cu_3O_{7-\delta}$ (Y123) has a single b-axis CuO chain per unit cell whereas its stoichiometric relative $YBa_2Cu_4O_8$ (Y124) has two filled chains per unit. Previously, it has been observed that at low temperature there is an anomalous increase in the superfluid density along the b and c directions in Y124 which does not occur in Y123. The response along the a direction in Y124 is linear as expected for a d-wave nodal gap. This anomalous increase in Y124 is likely caused by proximity coupling to the planes. In this work we present a study of the field dependent specific heat in Y124. The field induced changes in the electronic specific heat due to the Volovik effect are used to deduce the field scale which quenches chain superconductivity.

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