

Experimental report

16/02/2021

Proposal: TEST-3107

Council: 4/2020

Title: Measurement of magnetic resonance in LCO+O

Research area:

This proposal is a new proposal

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Samples: La₂CuO(4+y)

Instrument	Requested days	Allocated days	From	To
IN8	2	2	01/09/2020	03/09/2020

Abstract:

Orientation determination of dynamic stripes in superconducting LCO+O by means of polarized scattering, on Thales

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The aim of the experiment is to test whether the oxygen doped compound of the cuprates family, LCO+O, shows signs of a magnetic resonance. If the dispersion turns out not to have an hourglass shape, this would support the hypothesis of a pair density wave phase separation rather than a uniform *d*-wave superconductor.

Results

Spatial constraints in the experimental zone forced us to measure the magnetic signal in the second Brillouin zone around (1, 2, 0). In the chosen instrument configuration we were able to use one single outgoing wavevector, $k_f = 4.1 \text{ \AA}^{-1}$, for all the scans performed with energy transfer between 10 and 50 meV.

Unfortunately we suspect that the genuine magnetic signal is covered by spurious scattering at these high energies. We believe that a better *Q*-resolution is needed in order to distinguish between the antiferromagnetic dispersion, the incommensurate magnetic scattering and the spurious signal. We are not confident enough to draw a definite conclusion from this data set.

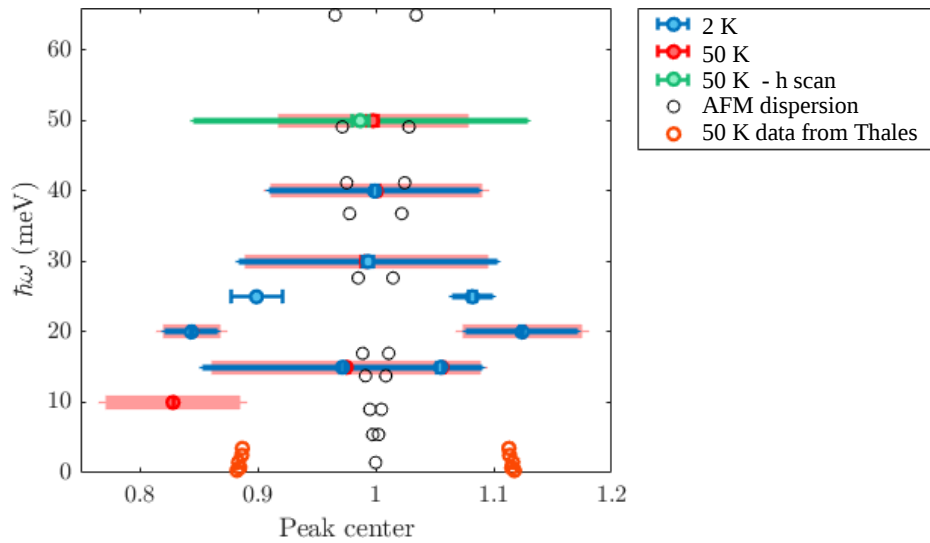


Fig. 1 The centre of the peaks observed around (1, 2, 0) plotted against energy. The data was acquired as diagonal scans around (1, 2, 0) with the exception of the green point which comes from an h-scan. The shaded red/blue/green horizontal lines indicate the fitted width of the peaks. The black circles show the antiferromagnetic dispersion of the parent compound. The low energy data ($< 10 \text{ meV}$) was collected on Thales in a previous experiment.