Experimental Report

Proposal: **7-01-356** **Council:** 4/2012

Title: Phonon dispersion and electron phonon coupling in La5/3Sr1/3CoO4

This proposal is a new proposal

Researh Area: Physics

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Samples: La5/3Sr1/3CoO4 , La2CoO4 , La1Sr1CoO4

Instrument	Req. Days	All. Days	From	To
IN8	5	6	09/11/2012	15/11/2012
IN3	0	2	04/09/2012	06/09/2012

Abstract:

The discovery of charge stripe ordering in nickelate and cuprate systems has triggered a lot of research activity due to the possible relevance of charge stripes for the pairing mechanism in the HTSC cuprates. Also in the isostructural cobaltate La5/3Sr1/3CoO4 stripe ordering has been observed and very recently even a hour-glass magnetic spectrum resembling on the famous observations in the cuprates has been found. Signatures of the periodic charge density modulation should not be only observable in the magnetic excitation spectrum but also in the phonon dispersion, i.e. the plane polarized metal-oxygen bond-stretching phonon modes. Indeed, for the cuprates with vertical stripes the topmost Delta_1 branch exhibits distinct anomalies at a wave-vector corresponding to the propagation vector of the charge stripes. Here, we propose to study the effect of electron phonon coupling in the isostructural La5/3Sr1/3CoO4 system with diagonal stripes. Hence, the Sigma_1 mode should couple to these stripes. In order to (1) analyse the difference to the undoped parent compound and (2) in order to disentangle the effects of pure Sr-doping, we also need to study La2CoO4 and LaSrCoO4 very briefly.

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