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| | **Experiment title:**<br>Atomic Dilatations and Intermixing at Manganite/Titanate Interfaces | **Experiment number**:<br>SI-1806 |
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## Report:

Three samples of ultrathin (001) LSMO films (10 unit cells thick) grown with different Sr profiles along the growth direction have been measured by X-ray diffraction. The films are grown in our Oxide MBE laboratory at TASC (Trieste), and the Sr profile was selected to maximize the Curie temperature and minimize the low-temperature resistivity.
The contribution of the substrate (STO) and of the grown film have been selected by changing the incident angle. Crystal truncation rods have been measured for STO Bragg reflections and fractional reflection of the film.

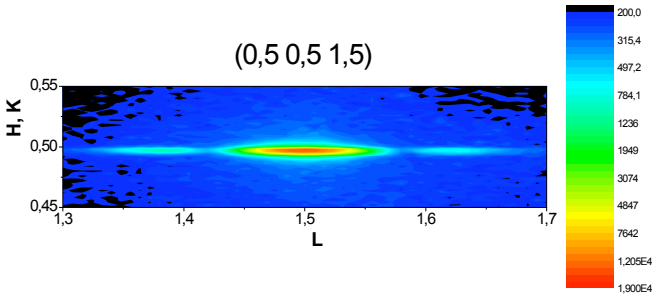


**Fig. 1 Reciprocal space H,K-L Map of the (0.5, 0.5, 1.5) reflection of 10 unc LSMO film**

The state of the art quality of our growth technique is confirmed by the XRD data.
We measured H-K and H(K)-L maps of the scans of fractional relfection. The coherence length of the LMSO films typically of 2000 Ang (the best film 2500 Ang, the worst 1800 Ang). The periods of the oscillations in X-ray reflectivity confirm the expected thickness of the films.Figure 1 shows a reciprocal space K-L map of the (0.5, 0.5 1.5) reflection. Figure 2 show the X-ray reflectivity of the same sample

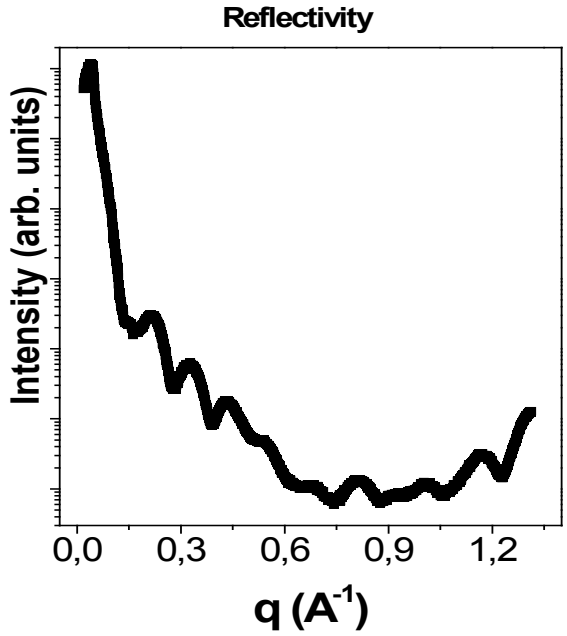


Figure 2 X-ray reflectivity of the same sample of fig. 1

The data danalysis of the CTR should provide: the detrmination of the gradient of the atomic concentrations of the speciments along the surface, the roughness of the films, the local atomic relaxations as well as the structure of the different intefaces and the stacking sequence of the films.

We aim to continue our study, extending our analysis to different Sr profile, (for example gaussian etc) and to even thinner samples (2-4 MnO2 planes) in conjuction with our magnetotransport and spectrospic characterization performed in house.