ESRF

ESRF	**Experiment title:** Lattice parameter determination of structured $Zn:LiNbO_3$ thin films epitaxially grown on $LiNbO_3$ substrates	**Experiment number**: SI-1518
Beamline: BM 20	**Date of experiment**: from: 21/07/2007 to: 24/07/2007	**Date of report**: 19/03/2009
Shifts: 9	**Local contact(s)**: Dr. Carsten Baehtz	*Received at ESRF:* 19/03/2009

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Report:

Because of beam loss at the synchrotron the planned experiment SI-1518 could not to be accomplished in the time from 21 until 24 July 2007. As replacement for it, us from 08 December 2007 until 11 December 2007 an additional jet time was granted. → A new report will be written.

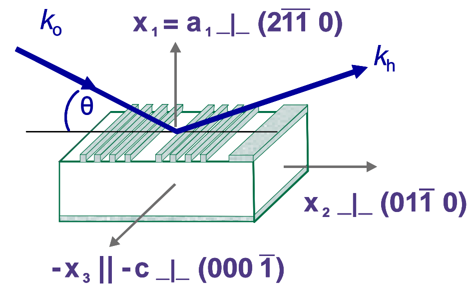
The aim of the planned experiment was to characterize epitaxially grown $Zn:LiNbO_3$ thin films which were subsequently laterally structured (Fig. 1) in view to the generation of optical wave guide strips.

SEM picture

5µm

Fig. 1: Zn:LiNbO3 rib waveguide, produced by ICP-RIE etching technique

Using high-resolution x-ray diffraction measurements (HRXRD) with symmetric reflections thin film lattice parameters perpendicular to the sample surface can be won, in reference to the x-cut LiNbO3 substrate with a relative accuracy of $(\Delta d/d)_\perp < 10^{-5}$.



In plane lattice parameters of the epitaxially grown Zn:$LiNbO_3$ thin films in respect to the substrate can be won from **r**eciprocal **s**pace **m**aps (**rsm**) recorded with asymmetric reflections In this case one obtains a precision of $(\Delta d/d)_{||} < 10^{-4}$.