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In-situ Spectroscopy on Erbium doped Lithium Niobate during Domain Inversion[1] CHRISTIAN SANDMANN, S. TAFON PENN, VOLKMAR DIEROLF, Lehigh University — Lithium niobate ($LiNbO_3$) has found wide application due to its favorable acousto-optical, electro-optical, and nonlinear optical properties. For many applications it is crucial to create ferroelectric domain patterns. With the most common technique, using electrodes patterned by optical lithography, periodically poled components with period lengths down to 3μm could be fabricated. Smaller structures, however, are difficult to achieve with present techniques. For the investigation of novel domain inversion techniques, which potentially offer the feasibility to create smaller structures, it is vital to probe in-situ if domain inversion is occurring with high spatial resolution. In an earlier work we have shown that the emission of the Er^{3+} ion is different for the as grown and domain inverted part of the sample this. In this work we will show that it is possible to probe the Er^{3+} defect in-situ during domain inversion offering the potential to study the spatial extension of a moving domain wall and to develop an active feedback system for electron beam or light-induced domain inversion. We found significant differences between a moving domain wall and a static domain wall in terms of their spatial extension and their Raman spectra.

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