

Abstract Submitted  
for the OSF17 Meeting of  
The American Physical Society

**Fabrication of periodically poled lithium niobate for conversion experiments** MATTHEW MIRCOVICH, JAY MATHEWS, IMAD AGHA, University of Dayton — Lithium niobate (LN) is a nonlinear crystalline material in which second order nonlinear processes can occur. By applying a strong electrical field, domain reversal (reversal of the optical axis) of the crystal can be achieved, allowing for enhancement in nonlinear optical interactions. In fact, Periodically Poled Lithium Niobate (PPLN) has a high degree of effective nonlinearity due to the increased interaction length, made possible through phase-matching. Fabrication starts with a wafer of congruent lithium niobate that is diced into the appropriate size. The wafer is periodically patterned with photoresist, then placed inside a conductive electrolyte solution and held at a constant temperature. A high voltage is applied through the solution, contacting the wafer where the resist is absent. A 3-5 kV pulse is applied through the electrolyte, causing a domain reversal between the photoresist, leading to periodic poling. The fabricated PPLN will be used for frequency up conversion, down conversion, as well as basic building blocks for optical parametric oscillators.

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Date submitted: 15 Sep 2017

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