Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

PPLN Device Characterization and Novel Entanglement Schemes

SEAN KRUPA, ERIC STINAFF, Department of Physics & Astronomy, Ohio University, Athens, OH, DAVID NIPPA, LEE OESTERLING, Battelle Memorial Insitute, Columbus, OH — Bright sources of entangled photons are of great interest in the quantum information community, and the non-linear optical process of Spontaneous Parametric Downconversion (SPDC) is a well-known means to create entangled photons. Additionally, periodic polling has emerged as a viable choice for quasi-phase matching the downconverted photons rendering them useful for experimentation. Periodically Poled Lithium Niobate (PPLN) is among the best choices for these materials as it optically robust, temperature tunable, and commercially available. The addition of waveguide structures in PPLN devices not only increase its viability as a source of entangled photons but can also become an integral part of the entanglement schemes as well. Thorough characterization of PPLN devices is essential for the optimization of SPDC and their use to create entangled states. We will report characterization results for wave-guided PPLN devices including: waveguide geometry, fiber coupling efficiency, polling period details, and downconversion efficiency. Of particular interest is our device's ability to be used for novel entanglement states involving one or more waveguides.

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Date submitted: 17 Nov 2012 Electronic form version 1.4