Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

**Current studies and improvements on a single frequency blue source generated by second harmonic from IR**[1] ALI KHADEMIAN, SAI LAKSHMAN JAMPANI, MATTHEW TRUSCOTT, ANOOJA JAYARAJ, DAVID SHINER, University of North Texas — We have reported 81.5% efficiency in generating ˜500 mW of blue at 486 nm by second harmonic generation (SHG) from the IR, using a periodically poled Lithium Tantalate (PPSLT) crystal. Initially a total cavity loss of 0.65% was observed. We developed techniques for careful measurement of individual losses such as scattering and absorption in the crystal and mirrors, polarization misalignment caused by the crystal and back reflection from the periodically poled boundaries of crystal. We have replaced the crystal with a tilted periodically poled crystal. This eliminated the reflection loss, but scattering in the crystal, we speculate from the MgO doping, is still causing enough feedback to destabilize the IR source. We are also replacing cavity mirrors with ultra-low loss sputtered mirrors to minimize their contribution to loss. Crystal lifetime at different blue power levels is being investigated. In our setup a mixed signal processer (MSP) is used for cavity locking and temperature stabilizing. Once MSP is programed by a computer interface, it can be installed inside the cavity housing, making the laser source standalone and self-sufficient. We have been able to stabilize and lock the laser cavity length, the temperature of the IR laser source, the temperature of fiber Bragg grating (FBG), and the temperature of the nonlinear crystal using the MSP, matching the performance of high end commercial temperature controllers and lock-in amplifiers. Our recent progress and improvements will be presented.

[1]This work is supported by NSF award # 1404498.

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Date submitted: 11 Apr 2017 Electronic form version 1.4