**Pulsed laser deposition of garnets at a growth rate of 20-microns per hour**

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**Abstract:** To date, pulsed laser deposition (PLD) has been used for depositing many different materials under the classes of metals, semiconductors, and dielectrics. For the latter, PLD is advantageous for fabrication of crystalline layers that are suitable for high quality planar waveguides. In previous work, we showed PLD can be exploited for fabricating garnet-crystal layers, specifically Yb:YAG, with optical quality close to Czochralski grown material [1]. Typical growth rates are slow at < 1 microns per hour but some progress has been made increasing depositions using a pulsed laser operating at a repetition rate of 20 Hz [2].

Here, we report a ~ 5 x increase in growth rate from previous work, demonstrating that YGG and YAG can be grown with excellent crystal quality at deposition rates approaching 20-microns per hour by using an excimer laser operating at a repetition rate of 100 Hz. This surprising result demonstrates the unique capability of PLD at 100 Hz, for upscaling deposition speeds to a rate that is industrially relevant for thick films.

1. Stephen J. Beecher et al. Proc. SPIE 9726, Solid State Lasers XXV: Technology and Devices, 97261Z (March 16, 2016)
2. J. A. Grant-Jacob et al. Opt. Mater. Express 6, 91-96 (2016)