



Contribution ID: 76

Type: Poster

P26 - Proton beam writing of dye doped polymer microlasers

Friday, 11 July 2014 13:00 (1 hour)

Proton beam writing, a high resolution direct write lithographic technique, is becoming increasingly interesting both because of its continuous improvement in spatial resolution as well as its applicability to wide range of materials [1, 2]. It is also capable of fabricating three dimensional high aspect ratio structures and this technique is well suited for optical applications because of the straight and smooth sidewalls of the fabricated structures.

In this work, proton beam writing is applied to the fabrication of microlasers in dye doped polymer layers. Interestingly, the dye is not bleached by the irradiation process. Whispering gallery mode microlasers of different cavity designs are fabricated and their laser characteristics studied using optical pumping. Directional laser emission as well as low pumping thresholds are obtained using these laser cavities. The details of the cavity designs and their performance will be presented.

References:

- [1] J. A. van Kan, P. Malar, and Armin Baysic de Vera, The second generation Singapore high resolution proton beam writing facility, REVIEW OF SCIENTIFIC INSTRUMENTS 83, 02B902 (2012).
- [2] Yicun Yao, Ningning Dong, Feng Chen, Sudheer Kumar Vanga, and Andrew Anthony Bettiol, Proton beam writing of Nd:GGG crystals as new waveguide laser sources, OPTICS LETTERS, Vol. 36, No. 21 (2011).

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Session Classification: Poster Session with Cheese and Wine