Proceedings of SPIE, San Francisco, California, United States, 1 February 2014

Digital control of laser modes with an intra-cavity spatial light modulator

Sandile Ngcobo[a,b], Igor Litvin[b], Liesl Burger[b] & Andrew Forbes[a,b]

[a]Council for Scientific and Industrial Research, P.O. Box 395, Pretoria 0001, South Africa;

[b]School of Physics, University of KwaZulu–Natal, Private Bag X54001, Durban 4000, South Africa.

ABSTRACT

In this paper we outline a simple laser cavity which produces customised on-demand digitally controlled laser modes by replacing the end-mirror of the cavity with an electrically addressed reflective phase-only spatial light modulator as a digital addressed holographic end-mirror. We show that on-demand digitally controlled laser modes are possible by changing the phase and amplitude of the computer generated hologram in a form of a grey-scale image on the holographic mirror. We demonstrate that customised digitally controlled laser modes can be generated on-demand by switching to several different spatial modes in real-time with the first the ‘digital laser’.