OPTICAL PARAMETRIC OSCILLATION IN BETA BARIUM BORATE

by

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ABSTRACT

This thesis describes the demonstration of tunable optical parametric oscillations in Beta Barium Borate (BBO) . The BBO parametric oscillators are pumped by the second harmonic and fourth harmonic radiation of a Nd:YAG laser.

The 532nm second harmonic pump source was obtained using D-CDA and KD*P crystals. The output beam generated was compared and the beam quality was considered for usage in optical parametric oscillator (OPO) system. Tunable radiation from 680nm to 895nm, in the visible and infrared was acheived with the 532nm pumped OPO. Different cavity configurations were experimented, including a pumping scheme that employs an intracavity pump steering mirror. Their efficiencies and oscillation threshold were studied. KD*P was used in the generation of ultraviolet radiation at 266nm which pumped a BBO parametric oscillator .

ABSTRAK

Tesis ini memperihalkan hasil penyelidikan mengenai ayunan parametrik optik dalam Beta Barium Borate (BBO). Penghayun parametrik BBO telah dipam oleh radiasi harmonik kedua dan harmonik keempat laser Nd:YAG.

Sumber harmonik kedua pada jarakgelombang 532nm telah diperolehi menggunakan hablur D-CDA dan KD*P. Cahaya output yang dijanakan telah dibandingkan dan kualiti cahaya dipertimbangkan untuk digunakan dalam sistem penghayun parametrik optik (OPO). Sumber bolehtala dari 680nm hingga 895nm, dalam julat bolehnampak dan infra merah, telah dihasilkan dengan OPO yang dipam pada 532nm. Beberapa konfigurasi rongga telah dieksperimen , termasuk skema mengepam yang melibatkan satu cermin mengemudi cahaya pam dalam rongga. Kecekapan serta ayunan ambang telah dikaji. KD*P telah digunakan untuk menjana cahaya ultra lembayung pada jarakgelombang 266nm yang seterusnya mengepam sebuah penghayun parametrik optik BBO.

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