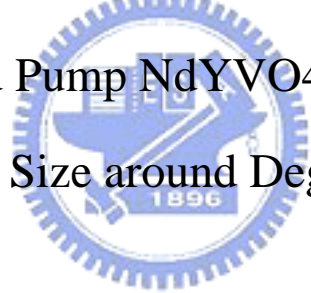


國立交通大學  
光電工程研究所  
碩士論文

大光束端泵浦摻釹釩酸釷雷射在簡併共振腔  
下的動力學研究

Dynamics of End Pump NdYVO<sub>4</sub> Laser with Large  
Pumping Spot Size around Degenerate Cavity



研究生：李國昶

指導教授：謝文峰博士

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# 大光束端泵浦摻釹釩酸釷雷射在簡併共振腔 下的動力學研究

學生：李國昶 指導教授：謝文峰 教授

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我們分別從實驗與模擬去試圖了解當我們用大光束端泵浦摻釹釩酸釷雷射時，在簡併共振腔下的雷射行為。我們發現橫模間的交互作用會使得雷射輸出出現不穩定。而從實驗與模擬，我們都發現從穩定到不穩定間的第二閥值對腔長作圖是一個V形的曲線。而該V形曲線的特性與輸入功率跟端泵光束大小有關。同時我們也發現在該雷射系統中存在數種動態行為，包括渾沌、脈衝等，我們也利用模擬畫出各種動態行為所存在的區域。

# Dynamic of End Pump NdYVO<sub>4</sub> Laser with Large Pumping Spot Size around Degenerate Cavity

Student : Guo-Chang Li      Advisor : Dr. Wen-Feng Hsieh

**INSTITUTE OF ELECTRO-OPTICAL ENGINEERING  
NATIONAL CHIAO TUNG UNIVERSITY**



## Abstract

The behavior of the axially pumped Nd:YVO<sub>4</sub> laser with large pumping spot size is experimentally and numerically studied. We show that the instability of this laser system is due to transverse mode beating. We found that there is a V-shaped second threshold of quasi-periodic which agrees with our simulation result. The character of the V-shaped depends on both the pumping power and pumping spot size. In addition, we also observed several kinds of laser dynamics and the instability regions they exit, such as chaos, modulated pulsation, and quasi-period.

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English abstract

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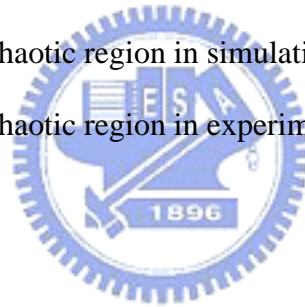
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