全固态紫外激光器的研究

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摘要：紫外激光广泛应用于半导体加工、大气探测、光化学、光生物学及医疗等领域。半导体泵浦固态激光三倍频是产生紫外激光的有效技术之一。本文从理论和实验方面研究产生固体紫外激光的相关技术，对激光谐振腔与非线性频率转换进行了理论分析，实验测量了激光腔型对紫外激光输出的影响。特别是对非线性光学晶体偏振态的匹配进行了实验研究。

关键词：紫外激光；非线性光学频率变换；半导体激光泵浦；激光谐振腔

Studies on All-Solid-State UV Lasers

Abstract: UV laser has found a lot of applications, such as semiconductor processing, atmospheric detection, optical chemistry, optical biology and medicine, etc. DPSSL THG is one of the most effective techniques for generating the UV laser. In this paper, the technologies of solid-state UV laser were investigated both in theory and experiment. Laser resonator and nonlinear optical frequency conversion are theoretically analyzed. The dependences of the UV laser output on the laser resonator were measured。 Especially, the polarization matching of the nonlinear optical crystal has been studied experimentally.

Key Words: ultra-violet laser; nonlinear optical frequency conversion; diode-pumped; laser resonator

教师点评：全固态紫外激光器是目前固体激光器领域的热点，它采用非线性光学频率变换技术获得。在国内这方面的关键技术还有待突破。本项目研究三倍频产生 355nm 紫外激光。特别是在非线性光学晶体偏振态的匹配问题方面做了有益的探讨，获得了较好的结果。在这方面国内还少有人研究，有一定的创新性。