

激光与光电子技术应用

弹光调制偏振Stokes参量测量及误差分析

王立福¹, 王志斌^{1,2}, 李晓^{1,2}, 陈友华¹, 张瑞¹, 张鹏飞¹

1. 中北大学 山西省光电信息与仪器工程技术研究中心, 太原 030051;
2. 中北大学 仪器科学与动态测试教育部重点实验室, 太原 030051

摘要: 为了更简便地实现Stokes矢量测量, 采用一种工作在不同频率上的双弹光调制器, 利用它的频率叠加对光进行调制, 产生载有被测量的高频调制分量, 通过锁相一次得到了适用于所有偏振态测量的4个Stokes分量, 且进行了理论分析、仿真验证以及误差分析, 即对相位延迟幅度、入射角等因素对测量结果的影响进行了分析。结果表明, 该方法实现了只需测量一次便可测出偏振态的所有分量, 为进一步工程实现提供了基本的理论支撑。

关键词: 光谱学 双弹光调制器 Stokes矢量 偏振 锁相

Measurement of the polarization Stokes parameters based on photoelastic-modulation and its error analysis

WANG Lifu¹, WANG Zhibin^{1,2}, LI Xiao^{1,2}, CHEN Youhua¹, ZHANG Rui¹, ZHANG Pengfei¹

1. Engineering and Technology Research Center of Shanxi Provincial for Optical-Electric Information and Instrument, North University of China, Taiyuan 030051, China;
2. Key Laboratory of Instrument Science & Dynamic Measurement of Ministry of Education, North University of China, Taiyuan 030051, China

Abstract: In order to measure Stokes vectors simply and conveniently, a dual-photoelastic-modulator working at different frequencies was adopted to generate high frequency modulation component loaded with the parameters to be measured after light modulation because of the frequency superposition. Four Stokes components suitable for all polarization measurements were obtained once through a phase-locked polarization measurement. After theoretical analysis, simulation verification and error analysis, the effects of phase delay and incidence angle on the measurement results were studied. The results show that all the measured polarization components can be obtained with only one measurement and the method provides theoretical support for further engineering implementation.

Keywords: spectroscopy dual-photoelastic modulator Stokes parameters polarization phase-locked

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通讯作者: 王志斌

作者简介: 王立福 (1986-), 男, 硕士研究生, 主要从事弹光干涉具仿真方面的研究。

作者Email: wangzhibin@nuc.edu.cn

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