

光学计量与测试

电光调制晶体半波电压倍频测量方法的讨论

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摘要:

在电光调制晶体的半波电压倍频法测量中,基于晶体电光效应分析了不同偏压下输出信号与调制信号之间的线性与倍频关系,并利用计算机模拟分析了调制信号的调制幅度对倍频信号的影响,分析结果表明倍频信号受高阶谐波分量的干扰产生波形畸变,不利于晶体半波电压的倍频法测量。提出利用李萨如图形的对称性来确定电光调制的倍频位置,克服了调制幅度波形畸变问题的干扰。通过对半波电压不同测量方法的实验测量和对比分析,说明该方法可操作性好,测量精确度也比直接观察倍频信号输出波形要高。

关键词: 电光调制 半波电压 倍频法

Frequency doubling method for half-wave voltage measurement based on electro-optical modulation

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Abstract:

To study half-wave voltage measurement in the electro-optic modulation experiment, the main relationships including double-frequency characteristics and linear characteristics between output signal and modulation signal are analyzed based on the principle of crystal electro-optic modulation. The influence of the amplitude of modulating signal on the frequency doubling signal is investigated by computer simulation. The analysis shows that the frequency doubling signal waveform is distorted under the impact of high order harmonic wave, which is not in favor of crystal half-wave voltage measurement. Symmetry of Lissajou figure is used to determine the position of the frequency doubling signal and overcome the disturbance of modulating amplitude waveform aberration. Compared to other methods, this method is easy to use and can measure half-wave voltage accurately.

Keywords: electro-optical modulation half-wave voltage frequency doubling method

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