

激光与光电子技术应用

高能阿秒脉冲聚焦及光谱分析复合系统设计

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摘要: 为了减小阿秒脉冲聚焦反射过程的能量损失、降低阿秒脉冲测量过程中由聚焦像差引起的测量误差以及提高阿秒光脉冲光谱分析监测的可操作性, 采用各环节性能分别优化的方法, 设计了一种高能阿秒光脉冲聚焦及光谱分析复合系统, 聚焦及光谱分析元件分别采用镀金掠入射型超环面镜和掠入射型凹面聚焦光栅, 并给出了其具体结构和特性参量。结果表明, 此系统适用于以短脉宽、高能量阿秒脉冲为新型探针的阿秒光谱学研究。

关键词: 光谱学 阿秒脉冲 平场光谱仪 超环面镜 像散

Design of a combined system for focusing and spectrum-analyzing of high energy attosecond pulse

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Abstract: For reducing attosecond pulses energy loss in the focusing reflection process and measurement error caused by attosecond pulse focusing aberration measurement, as well as improving the operability of attosecond pulse spectroscopy monitoring, a combined focusing and spectrum-analysis system for attosecond pulse was designed through step-by-step performance optimization. The structure and characteristic parameters were given in detail. The focusing and spectrum-analyzing components are gold-coated grazing incidence toroidal mirror and grazing incidence concave focusing grating, respectively. The proposed system can find application in research platform of attosecond spectroscopy using high energy short attosecond pulse as basic probe tool.

Keywords: spectroscopy attosecond pulse flat-field spectrometer toroidal mirror aberration

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