

论文

神光-III诊断包瞄准指示器光学系统的设计和研究

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摘要:

介绍采用瞄准指示器提高诊断包瞄准精度的方法。基于高斯光束薄透镜变换原理分析由单模光纤耦合输出的激光经过瞄准指示器的光学系统后的传输特性, 提出近轴放大率是影响瞄准指示器像方光斑大小的主要因素。设计一个以光纤耦合输出激光为光源, 工作波长为635nm,总长小于100mm,瞄准距离(600~1500)mm,在靶心处相应光斑大小为(46.2~71.9)μm的神光-III诊断包瞄准指示器光学系统。该激光光学系统采用3片普通光学玻璃,其中固定组由正负分离的2片玻璃组成,变焦组为单片负透镜。最后利用点扩散函数和波像差进行质量评价,结果表明该光学系统设计指标达到技术要求。

关键词: 瞄准指示器 光纤耦合 变焦距 神光-III 光学设计

Optical system design of alignment pointer for SG-III diagnostics

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Abstract:

The method of improving the accuracy of the diagnostics with alignment pointer is introduced. The transmission characteristics of the laser coupled by the single-mode fiber and passing through the optical system of the alignment pointer were analyzed based on the transformation principle of Gaussian beam thin lens. The paraxial magnification is the major factor to affect the spot size in image space of the alignment pointer. The optical system of the alignment pointer for SG-III diagnostic package was designed, whose illumination source was a fiber laser, working wavelength was 635nm, total length was less than 100mm, target distance varied from 600mm to 1500mm, and spot was located at the center of the target and its size was 46.2μm~71.9μm. The optical system includes three normal glasses, in which the fixed group is composed of two separate positive-negative glasses, and the zoom group is a negative lens. The quality of the optical system was evaluated by the point spread function and wavefront aberration. The results show that the optical system meets the design specification.

Keywords: alignment pointer fiber coupling variofocus SG-III optical design

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