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激光物理与激光器件

高斯-谢尔模型光束通过聚焦光学系统的偏振特性

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摘要： 为了研究高斯-谢尔模型光束的偏振特性，采用交叉谱密度矩阵的方法，研究了该光束通过聚焦光学系统的偏振特性，得到了完全偏振和完全非偏振光束保持偏振度不变的条件，并给出了通过聚焦光学系统后传输平面偏振度实现均匀分布的条件。结果表明，聚焦光学系统中偏振度在焦点位置附近有明显的起伏变化；焦点位置上的偏振度等于其在自由空间传输时的远场稳定偏振度。该研究对激光传输领域具有重要的理论和现实意义。

关键词： 激光光学 偏振特性 交叉谱密度矩阵 高斯-谢尔模型光束 聚焦光学系统

Polarization properties of Gaussian-Schell model beams passing through focal optical system

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Abstract: In order to study polarization properties of Gaussian-Schell model beams, the method of cross-spectral density matrix was adopted to study polarization properties of Gaussian-Schell model beams propagating through a focal optical system. The conditions, under which complete polarized and complete non-polarized beams kept the degree of polarization invariable in the focal optical system, were provided. The condition where the degree of polarization distributed homogeneously at propagation plane was also given. The degree of

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polarization had a sharp fluctuation at focal position in a focal optical system. The degree of polarization at focal position equaled the stable value of the degree of polarization at far field. The study had important theoretical and practical significance in the field of laser transmission.

Keywords: laser optics polarization properties cross-spectral density matrix Gaussian-Schell model beam focal optical system

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