

光电工程

扫描法测量无衍射成像微光斑的能量分布

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摘要 在无衍射光滤波法显微成像中, 实际成像光斑的能量分布对成像质量影响较大, 故需要对微弱成像光斑的能量分布进行准确测量。实验中采用扫描法测量光斑的能量分布, 通过柔性铰链机构带动微米级小孔以很小的步距对成像微光斑进行精确的二维扫描, 用光电倍增管接收扫描采样的微弱光信号,

再以低噪声的I/V转换电路和电压放大电路处理取样信号后送入计算机处理, 就可准确地复原光斑的能量分布。通过制作的测量装置对实际微弱光斑测量后, 以三维能量分布图的形式给出了测量结果。该方法实现了对能量分布不规则、尺寸较小、能量密度小的光斑能量分布的测量, 并且有很高的测量精度。

关键词 [无衍射光](#) [二维扫描](#) [光电倍增管](#)

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Measurement on energy distribution of non-diffracting spots by scanning method

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Abstract Since the energy distribution of the optical spot has great impact on the imaging quality in the micro imaging with the filtering method of non diffracting beam, the energy distribution of the weak imaging spot must be measured accurately. In the experiment, the light spots were measured by the scanning method. A pinhole attached to the flexure hinge mechanism was used to implement the 2-D scanning of the imaging spot accurately with a very small step, and the sampled light signal passing through the pinhole was received by a photomultiplier tube. Then the signal was transferred to a computer for the further processing after it was processed by the low noise current-to-voltage conversion and amplification circuits. Finally the energy distribution of the spot was reconverted and obtained through computer processing of the measurement data. The result was given in three dimension energy profile after the actual weak light spots were measured by the self made device. This method can be used to accurately measure the energy distribution of irregular small weak spots.

Key words [non-diffracting beam](#) [two-dimensional scanning](#) [multiplier phototube](#)

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