

## Automated interferometric index profile measurement of optical fibers

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The use of an interferometric method of "whole fibre" is well known. In this method the profile of index of refraction is related to the interference strip deviation by an integral equation or in approximation by a set of difference equation. Advantages of this method are relative experimental simplicity, adequate accuracy and possibility of automation, while disadvantages are assumption of fibre symmetry, necessity of index matching, influence of strip fluctuations and inaccuracy in the strip deviation measurement.

A laboratory apparatus consists of He-Ne laser, interferometric microscope, digitizer, micro-computer, TV camera and display. Typical view of an interferometric strip is shown (notice its noisy character) and the same strip in digitized form is displayed. The result of calculation on preprogrammed computer is shown. Tested accuracy and processing speed is adequate for routine laboratory measurements.

## 光纤折射率分布的自动干涉法测量

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使用干涉法测量“整体光纤”是人所共知的。在这种测量方法中, 折射率的分布是由一个积分方程或近似的一组微分方程描述的并与干涉条纹的偏差相关的。这种方法的优点在于实验相对比较简单, 自动化精度高又较可靠。而缺点是要假定光纤对称, 要求折射率匹配和在条纹偏差测量中条纹涨落及不精确性等影响。

实验中采用 He-Ne 激光器, 干涉显微镜, 数字转换器, 微处理机, 电视摄像机和显示器组成。观测到典型的以图形和数字形式显示的干涉条纹及其噪声特性和用预先编制的程序的计算结果。试验精度和处理速度对于实验室例行测量是足够的。