

DOH P4 FAR-FIELD AND NEAR-FIELD METHODS FOR OPTIC FIBER CHARACTERIZATION

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Optical fibers play an important role in modern technologies. They are largely used both in industrial and civil applications: telecommunications, defense and aerospace, test and measurement, automotive, chemical, and specifically in medical applications [1-4].

We describe here two methods for optical fiber characterization - the far field method and the near field method. The far-field method gives information about the modal distribution of propagation light an optical fiber, and provides a technique for determining the numerical aperture of optical fiber, and allows identification of the conditions in which a stationary mode distribution has been formed.

The near-field technique is a method for determination of the refractive index profile in an optical fiber. Both far-field and near-field methods are used for characterization of optical fibers [4], which is needed in development of various applications, specifically in development of biochemical and medical fiber optic sensors.

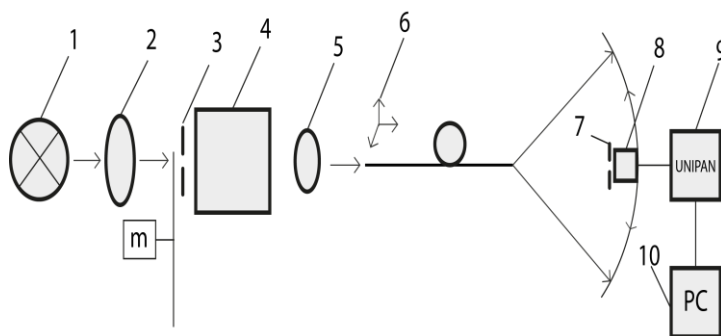


Fig. 1. Experimental set-up for characterization of far-field distribution in an optical fiber.

We show that, besides standard applications, the far-field technique can be applied for development of fiber sensors for registration of physical and biochemical parameters.

- [1] J.P.Dakin, Optical fibre sensors – principles and applications, Fibre Optics'83, SPIE Vol. 374, p. 172
- [2] D. Marcuse, *Light Transmission Optics*, (New York, Van Nostrand Reinhold, 1972).
- [3] Ho C.K., Robinson A., Miller D.R. and Davis M.J., Overview of sensors and needs for environmental monitoring, *Sensors*, 2005, 5, 4-37
- [4] Culeac I., Optical devices based on fibre samples, In: "Contributions to Non-Crystalline Semicond.: Physics and Optoelectronics. Ed. A. Buzdugan and M. Iovu, Chisinau, 2003, p. 227
- [5] NATIONAL BUREAU OF STANDARDS TECHNICAL NOTE 1032, Nat. Bur. Stand. (U.S.), Tech. Note 1032, 48 pages (Feb. 1981)