

## ALL-FIBER ACOUSTO-OPTIC PHASE MODULATOR USING THIN-FILM DEPOSITION TECHNOLOGY

L. N. Asnis\*, V. G. Nefedov\*\*, A. A. Pokrovski\*\*\*

\*All-Russian Research Center "S.I.Vavilov State Optical Institute",  
12, Birzhevaya linya, 199034 St. Petersburg, RUSSIA

\*\*State University of Aerospace Instrumentation,  
E-mail: weconf@spb.cityline.ru

\*\*\*St. Petersburg State University,  
E-mail: Alexis.Pokrovski@pobox.spbu.ru

All-fiberization trends in modern fiber optic technology play an important role in development of optic communication components. In-fiber devices are of special interest due to their intrinsically small dimensions and negligible insertion loss. In particular, several types of all-fiber acousto-optic phase modulators were proposed in [1-3]. These devices include piezoelectric thin film wrapped around fiber cladding and sandwiched between two electrical contact layers, covering the full 360° surface of the fiber. Modulation frequencies of such devices are up to 500 MHz, with maximal modulation efficiency of 0.6 radians per millimeter of the device length.

We present the results of experimental and theoretical investigation of acousto-optic phase modulator. The device is developed on various types of fiber, where ZnO-piezotransducers are fabricated using magnetron technology of thin film deposition. Operation frequencies of the piezotransducers are between 200 and 500 MHz. The estimate of the modulation efficiency is presented.

In-fiber phase modulators of this type are prospective for fiber interferometry, fiber gyros and other systems.

## REFERENCES

1. M.H.Koch et.al. All-Fiber Phase Modulators Using Chemical Vapor Deposition Zinc Oxide Films. *J.Lightwave Technol.*, V.16, No.3, pp.472-476, 1998.
2. N.H.Ky, H.G.Limberger, R.P.Salathe, G.R.Fox. Optical performance of miniature all-fiber phase modulators with ZnO coating. *J.Lightwave Technol.*, V.14, pp.23-26, Jan.1996.
3. M.Imai, S.Satoh, T.Sakaguchi, K.Motoi, A.Odajima. 100-MHz bandwidth response of a fiber phase modulator with thin piezoelectric jacket. *IEEE Photon. Technol. Lett.*, V.6, pp.956-959, Aug.1994.