

Acousto-optic interactions in optical fibers and their applications

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Abstract Based on the analysis of the acoustic waves along optical fiber, new novel aspects of acousto-optic effects were studied for photonic device applications. Firstly, the mode coupling and polarization properties via the interaction between flexural acoustic waves and guided optical waves in hollow optical fiber(HOF) were studied for ultrafast polarization manipulation. Secondly, Brillouin frequency shifts in SBS resulted from the interaction between longitudinal acoustic waves and optical waves in optical fibers with triple-layered structure were theoretically analyzed.

, (longitudinal wave), (flexural wave), (torsional wave)

[1]. 가 (piezo-electric transducer; PZT)

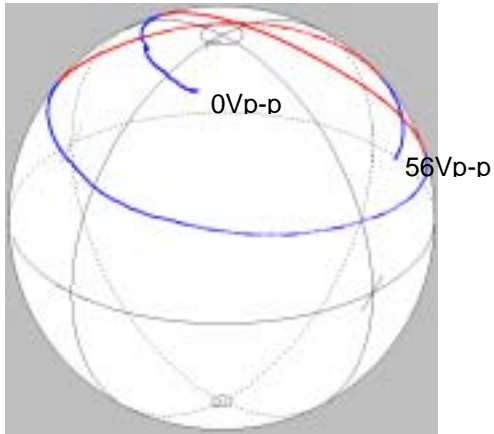
, [1] . RF 73~86kHz, 0~56V Poincare 95% 가 (differential group delay; DGD) . DGD fs 8ps

(stimulated Brillouin scattering; SBS)

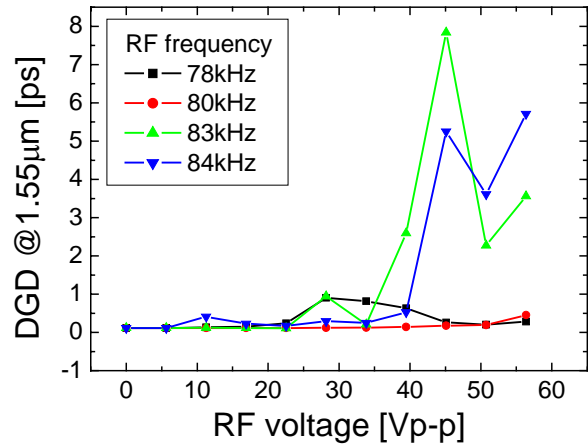
. 3 (, ,) [2].

. 3

가



[1] RF



[2] RF DGD

[3]

가

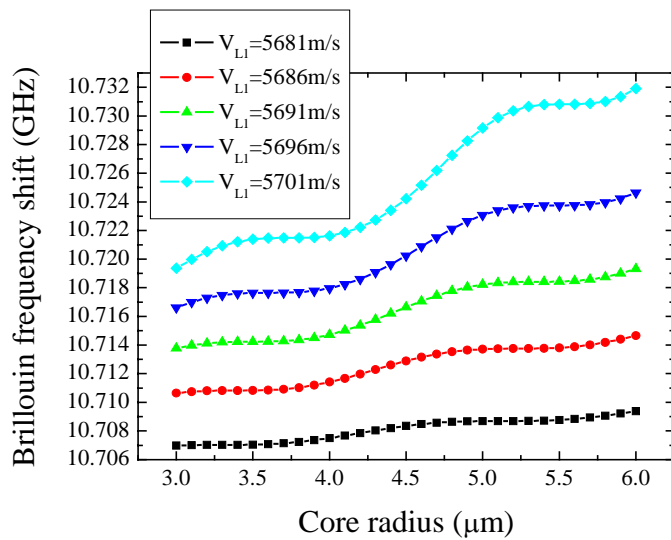
(Brillouin optical time-domain analyzer; BOTDA)

. BOTDA

, 1.5s

4.81km

3m



[3]

REFERENCE

1. D. Ostling, and H. E. Engan, "Polarization-selective mode coupling in two-mode hi-bi fibers," *Journal of Lightwave Technology*, vol. 15, pp. 312 ~ 320, Feb., 1997.
2. A. Safaai-Jazi, and R.O. Claus, "Acoustic modes in optical fiberlike waveguides," *IEEE Trans. Ultrason., Ferroelec., Freq. Contr.*, vol. 35, pp. 619 ~ 627, 1988.