

SPECTRAL FILTRATION OF LIGHT IN A TWIN CORE FIBER

E.A.Zakhidov¹, I.I. Tajibaev¹, Sh.K.Nematov^{1,2}, X.T. Sagdiev², E.E. Eshonov²

¹Institute of Ion-Plasma and Laser Technologies AS of UzR,

²Tashkent state technical university named after Islam Karimov

Fiber interferometric devices are the key components of optical communications and fiber sensor systems that perform important functions such as light modulation, splitting, multiplexing/de-multiplexing, and filtering.

The broadband lights were generated in the visible (500–600 nm) or NIR (700–1600 nm) regions by pumping fibers No. 1 or No. 2, respectively, with picosecond ($\Delta\tau \approx 100$ ps) pulses of second (532 nm) or first (1064 nm) harmonics of Q-switched+ mode-locked Nd:YAG laser.

The medium and lower spectra in Fig. 1(a) (solid line, blue) demonstrate the light spectra measured in the output of the throughput core, at the exit of the directional coupler with twice-reduced fiber diameter and coupling lengths $L_c = 31$ mm and $L_c = 38$ mm, respectively. It is clear that pump light and different Stokes bands of SRS can be filtered out by properly choosing the coupling length.

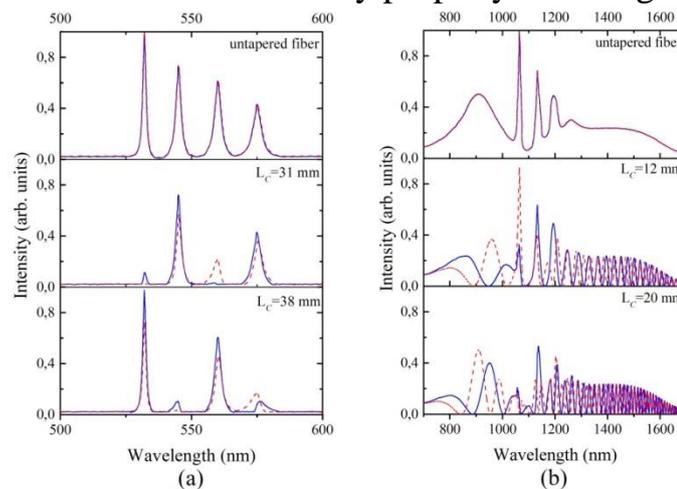


Fig.1. Experimentally measured and simulated light spectra in twin-core fibers

The medium and lower spectra in Fig. 5(b) correspond to lights measured at the output of the throughput core, at the exit of the directional coupler with coupling lengths $L_c = 12$ mm and $L_c = 20$ mm, accordingly. These spectra demonstrate the possibility of the light spectra modulation in a sinusoidal form with a specific period by means of proper changing of coupling length. In the directional coupler with $L_c = 12$ mm, this period decreases from 30 to 10 nm when wavelength increases from 1200 to 1600 nm. However, the modulation period may be as small as 0.5 nm required in the last generations of wave-length division multiplexing (WDM) systems by properly decreasing the coupler length. Unavoidable increase of optical losses in this case has to be still low in the proposed device in view of its single-fiber construction.