

## Generation of polarized supercontinuum in air-clad dual tapered fiber

S.M.Kobtsev, S.V.Kukarin, N.V.Fateev

Novosibirsk State University, Laser Systems Laboratory, Pirogova 2, Novosibirsk, 630090, Russia

Tel./fax: +7 (3832) 39-72-24, e-mail: kobtsev@lab.nsu.ru

Generation of unpolarized supercontinuum has recently been demonstrated in air-clad core tapered fibers with the strand diameter of about a few microns [1, 2].

This paper presents for the first time the generation of polarized supercontinuum using a silica/air-clad dual tapered fiber. The novel fiber was fabricated by stacking of two SMF-28 fibers that touch each other along the axis. Draw technology is described in [2]. During the draw process a cross-section shape of the fiber changed from 8-shape to nearly elliptic. Fig. 1 shows a cross-sectional microphotograph of the fabricated fiber when the other ends were illuminated. The microphotograph had been taken before the final stacking, then the strand sizes were decreased by a factor of 4. Final strand radii along the minor and major axes are  $2.5\ \mu\text{m}$  and  $4.3\ \mu\text{m}$ , the length of dual uniform waist is 7 cm.

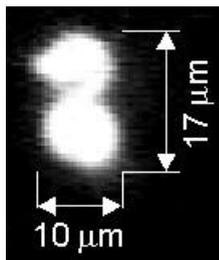


Fig.1. Cross-sectional microphotograph of the fiber dual waist

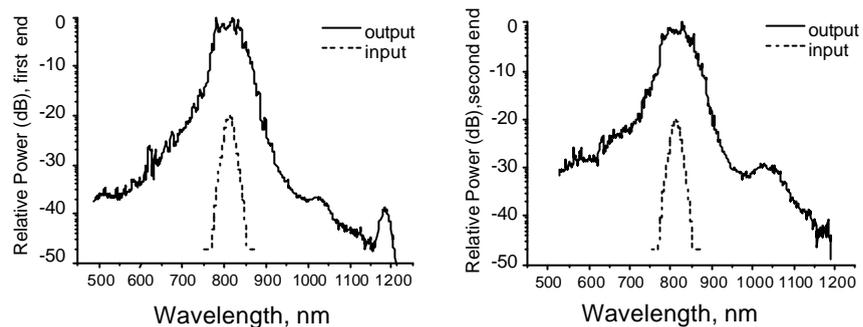


Fig. 2. Octave-spanning spectra produced by the dual tapered fiber

Pumping of dual tapered fiber is carried out through one of two input ends by radiation of Ti:Sapphire laser with the pulse duration 80 fs and average power 250 mW (wavelength 810 nm, repetition rate 82 MHz). Fig. 2 shows the spectrum for two output ends of the fiber. Output spectra cover over an octave in frequency at the -40-dB level, total registered range is 500-1200 nm at the -50-dB level. Power of supercontinuum is distributed in nearly equal parts between output ends and it amounts to 40 mW for each output. Supercontinuum light from both fiber ends (~15 cm long) was generated in the Gaussian mode and was polarized along the major axes of elliptic waist.

1. T.A.Birks, W.J.Wadsworth, P.St.J.Russell. *Opt. Lett.*, **25**, p. 1415 (2000).
2. S.M.Kobtsev, S.V.Kukarin, N.V.Fateev. *Quantum Electronics*, **32**, N1, p. 11 (2002).