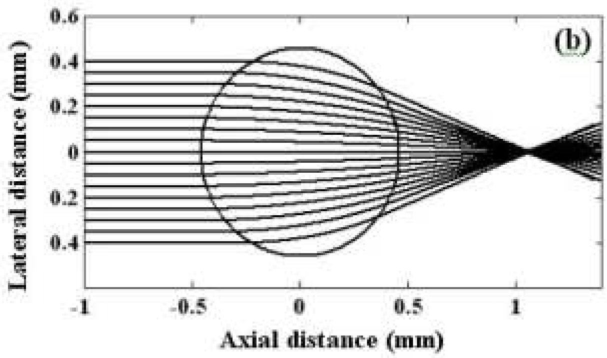

Fig.L.6.2: Ray paths for the refractive index profile shown in Fig.L.6.1

At Bio-Medical Applications and Instrumentation Division, use of Optical coherence tomography (OCT) was investigated for non-invasive measurement of gradient refractive index profile as axial scans in OCT give the optical path rather than the geometric path. The proposed method that retrieves the parameters of the polynomial form gradient refractive index profile by iterative fitting of optical path calculated by ray tracing method (Fig.L.6.1) with that experimentally measured using OCT. The approach has been employed for determining the index profile of fisheye lens in-vivo conditions (Fig.L.6.2). With suitable modification for the lens model, this method is expected to be applicable for determining the index profile of human lens also.

Contributed by :
K. Divakar Rao (kdivakar@cat.ernet.in) and Y.Verma

L.7 : Multi-wavelength Fiber Bragg Grating writing using 255 nm radiation

In Laser System Engineering Division, a laboratory was set up for writing Fiber Bragg Grating (FBG) using second harmonic UV (255 nm) of copper vapour laser beams. Highly spatially coherent UV beams of average power up to 1 W were generated and utilized for writing the C-band FBGs up to 30 dB reflectivity *[Om Prakash et al. Optics Commun. 263, 65-70 (2006)]*. This work is further extended by writing multiple wavelengths FBGs (MWFBG) on a single mode optical fiber. These gratings are useful in many applications including distributed sensing and wavelength division multiplexing.

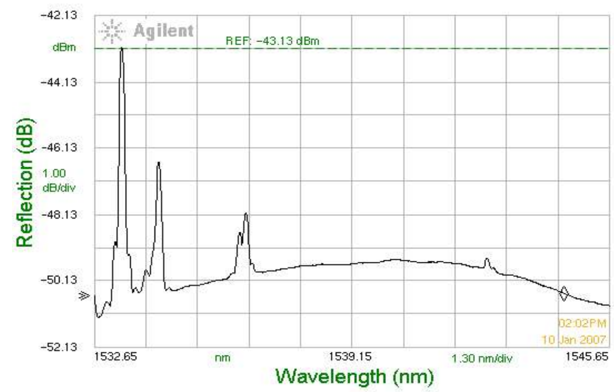

Fig.L.7.1: Multi-wavelength fiber Bragg grating written through a phase-mask

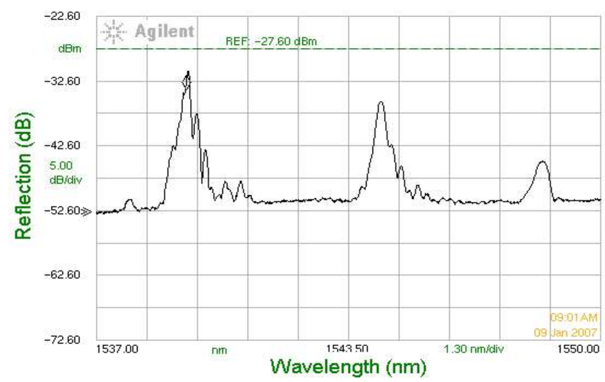

Fig.L.7.2 : Multi-wavelength fiber Bragg grating written through a bi-prism

Both, phase mask and bi-prism were used for writing these gratings. In the phase mask method, collimated UV beam is made to fall on the phase mask. MWFBGs were written by tilting the optical fiber in the grating writing plane. Each tilt produced tilted UV fringes of different spacing onto the fiber thereby leading to different Bragg wavelengths. In the bi-prism method, a geometrically diverging beam was made to fall on a 24^{o} apex angle bi-prism. By placing the fiber, at a different location beyond the bi-prism, UV fringes of different spacing and hence the different Bragg wavelengths were obtained. Fig. L.7.1 (phase mask method) and Fig.L.7.2 (bi-prism method) show MWFBGs, written on a single mode optical fiber. These patterns were recorded by an optical spectrum analyzer.

Contributed by:
S.K. Dixit (skdixit@cat.ernet.in) and J.K.Mittal