Development of an Experimental Set-up for Fiber Bragg Gratings Production

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This work presents a versatile experimental set-up developed to produce Bragg gratings in optical fibers. The set-up allows Bragg gratings to be written by two different techniques of fiber irradiation using as light source an ultraviolet Nd:YAG laser operating at 266 nm. Gratings are obtained in hydrogen loaded single mode fibers both by a direct illumination of a phase-mask and by the use of a phase-mask interferometer. The system operation is computer aided and the interchange between the two techniques of irradiation is easily accomplished. The writing process of fiber Bragg gratings is monitored in real-time with the help of an optical spectrum analyzer set to a resolution of 0.07 nm. The reflection spectra are obtained after launching light in the fiber using as optical source a superluminescent LED operating between 1445 nm and 1645 nm, and depending on the spectral range of interest, other light probes may be used. Changes in the resonant Bragg wavelength are obtained with increments of 0.11 nm. The set-up performance was tested and results concerning to the recorded fiber Bragg gratings are presented. Bragg gratings with lengths up to 15 mm have been produced, with bandwidth as low as 0.115 nm and reflectivity as high as 26 dB.