Superimposed Fiber Bragg Gratings (SIFBGs) are multiple passband filters written at the same location of an optical fiber. They are often used in Wavelength Division Multiplexing (WDM) optical communications systems and in optical sensor devices. For both applications, it has become of high importance to study the grating polarization properties such as Differential Group Delay (DGD) and Polarization Dependent Loss (PDL) since they affect the data transmissions but they can be advantageously used for sensing applications. We investigate a writing technique to reduce DGD and PDL induced by the inscription of SIFBGs.

**Superimposed FBGs (SIFBGs)**

Superimposed Fiber Bragg Grating (SI-FBG): Several FBGs with different modulation period fabricated in the same location of the fiber.

**Experimental Results: Rotated SIFBG**

We have studied the case with no rotation and the case with 120 degrees rotation angle (three gratings) after each illumination. Measurements of DGD and PDL were performed after each inscription for the standard case and for the rotated case in order to observe the evolution of the polarization properties. The DGD and PDL dependency with wavelength was obtained using the Jones matrices method with the aid of a tunable laser. We demonstrate that a reduction of the polarization effects is observed after each inscription in the rotated case, contrary to the non rotated case.