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**Tesis:** **“DESIGN, FABRICATION AND INVESTIGATION OF SPECIAL MICROSTRUCTURED FIBERS”**

**Resumen:**

In this thesis we reported the design, fabrication and investigation of Large Mode Area Photonic Crystal Fibers (LMA PCFs) and High Nonlinearity (HNL) PCFs. In the first part of the thesis it was reported an optimization of LMA PCFs, obtaining a very regular air-hole structure with very low losses in these fibers. In the second part, it was performed the dispersion simulation with a special software based on a most used empirical method, and the optimization of HNL dispersion properties was made to obtain the HNL PCFs with a flattened dispersion, that means with the dispersion near to zero in a wide range of wavelengths. After the simulation, the HNL PCF were designed and fabricated with three rings of air-holes in the cladding. There were reported four fibers fabricated at different drawing velocities, three fibers fabricated at different pressures and two fibers fabricated at different temperatures. Moreover, a six ring HNL PCFs also were designed, fabricated, and investigated. As application of these fabricated fibers, a scientific article on supercontinuum generation in investigated fibers was reported. Also, a research of LMA and HNL PCF polarization properties was published.