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Tesis: **"SUPERCONTINUUM GENERATION IN SPECIAL NONLINEAR PHOTONIC CRYSTAL FIBERS FOR NEAR INFRARED WAVELENGTHS"**

Resumen:

Supercontinuum generation is observed when a narrow light pulse traveling in a media is spread, due to a group of nonlinear effects. To have an intense and broad supercontinuum, the media where the light is propagating must enhance those nonlinear effects; otherwise the pulse will remain relatively narrow. There are two ways to improve supercontinuum generation, the first is to have a large length media and hence the light will interact with more media components. The second one is to use a high-power light source, like a laser. Both characteristics lead us to automatically think about an optical fiber and a laser.
However, conventional optical fibers normally require lasers with a very high power to generate a large supercontinuum. In the case of photonic crystal fibers (PCFs), specifically the Highly Non-linear (HNL) type, the supercontinuum can be generated with less power. This is mainly due to the HNL PCFs small core and their air hole structure, providing a large refractive index gradient.
In this work, we presented the nonlinear effects involved in our case in supercontinuum generation and we also tested seven different HNL PCFs. Then the results were analyzed to determine the best fiber and the key design factors. Five parameters were used to determine the behavior of the supercontinuum generation; an input pumping power, a fiber length, a fiber core diameter, a fiber zero dispersion wavelength and a fiber core doping.
Finally, we discuss about supercontinuum applications and also its impact in the research field.