Tesis: **"EXPERIMENTAL STUDY OF THE GENERATION OF HIGH-ENERGY NOISE-LIKE PULSES AND THEIR APLLICATION TO SUPERCONTINUUM GENERATION"**

Resumen:

In this research work we obtained experimentally very wide and flattened supercontinuum (SC) spectra using noise-like pulses (NLPs) as the seed in standard single-mode fiber (SMF, non-zero dispersion at 1550 nm, low nonlinear coefficient). NLPs were produced by two different configurations of all-fiber figure-eight lasers (F8Ls). On the one hand, we demonstrated experimentally (this was confirmed by our simulations) that NLPs allow SC generation even with moderate input powers (few tens of mW) in long lengths of fiber not optimized for this purpose like the SMF, since the nonlinear processes integrate over long lengths and are still operating and widening the spectrum even after hundreds of meters; besides, adding a piece of high-nonlinearity fiber (HNLF), optical spectra covering about 1000 nm with a very good flatness and a very high dynamic range were produced. On the other hand, we obtained record pulse energies as high as 300 nJ in a scheme where the polarizing element is absent; without a strict polarization control, NLPs could avoid pulse breaking when pump power is increased, generating a SC of more than 200 nm directly at the laser output. In addition, by increasing the harmonic mode locking (HML) order and extending the length of the cavity, we were able to flatten the spectrum to less than 3 dB over 160 nm. These results show that NLPs could be useful to develop cheap SC light sources for diverse applications like optical coherence tomography (OCT) or optical device testing; such sources would compare favorably to others that require expensive laser diodes or photonic crystal fibers, increasing the cost.