

## PhD Position

### Vectorial modeling of the space-time dynamics of ultrafast laser beams

We are seeking an exceptional candidate for a PhD position in computational photonics available for three years at the University of Ottawa in collaboration with the Université de Lyon (Laboratoire Hubert Curien in Saint-Étienne) in France. The doctorate will be shared between both laboratories, with 18 months in Canada and 18 months in France.

Working in a team that includes top theoretical and experimental researchers at both institutions, the student will develop computational models and perform simulations to understand the nonlinear processes underlying interaction of structured ultrafast laser pulses with materials, including Bessel, Airy, and vortex beams. This will be accomplished by solving the time-dependent Maxwell equations describing the electromagnetic propagation, scattering, diffraction and energy absorption processes in 3D.

This research has a wide range of applications, from industrial laser nano-machining to nano-imaging. Surface and bulk structuring by spatial pulse shaping of laser pulse are performed at the Center of Photonics and Laboratoire Hubert Curien to increase the control and efficiency of ultrafast laser processing. The PhD student will work closely with the experimentalists to interpret and guide experiments.

**Keywords:** *FDTD, Electromagnetism, Ultrafast laser, Simulation, Theory*

**Qualifications:** The candidate should hold a Master Degree in physics or closely related field no later than August 2020. Additional programming skills (for example, C, GPU, Python, Fortran, Matlab, etc.) are required.

**Start date:** not later than January 1, 2021.

**How to apply:** Interested candidate should send a CV, transcripts, and a list of references to:

Prof. Lora Ramunno (LRamunno@uottawa.ca)

Prof. Jean-Philippe Colombier (jean.philippe.colombier@univ-st-etienne.fr)

**Application deadline:** September 1<sup>st</sup>, 2020.

