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# MASTER IN PHOTONICS – PHOTONICS BCN EUROPHOTONICS-POESII MASTER COURSE

## PROPOSAL FOR A MASTER THESIS

**Dates: April - September 2019**

**Laboratory : Attoscience and Ultrafast Optics**  
**Institution: ICFO – The Institute of Photonic Sciences**  
**City, Country : Castelldefels (Barcelona), Spain**

**Title of the master thesis: Field-resolved electronic dynamics in solids**

**Name of the master thesis supervisor: Dr. Luke Maidment, Dr. Jens Biegert**  
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### **Summary of the subject:**

The mid-infrared region between 3 and 10 micron contains absorption edges of most important materials and substances. Measuring a mid-IR laser pulse before and after transmission through such substance will permit direct extraction of the material's response to electron magnetic radiation, i.e. absorption or its instantaneous response. It is the aim of this Master's thesis to employ electro optical sampling (EOS) with our unique few-cycle mid-IR sources to conduct such first experiments.

Your task will be to familiarize yourself with our research. (We will explain it to you)

- Plan, implement and use an EOS setup.
- Planning of experiment and sample preparation.
- Participate in the measurement campaign and analyze your data

Reading material:

- [https://www.rp-photonics.com/electro\\_optic\\_sampling.html](https://www.rp-photonics.com/electro_optic_sampling.html)
- I. Pupeza et al. "High-power sub-two-cycle mid-infrared pulses at 100 MHz repetition rate" Nature Photonics, 9, 721 (2015).

**Keywords : Electro optical sampling, mid-IR**

**Additional information:**

\* Required skills: Diligence, programming