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# Characterization of ultrashort mid-infrared laser pulses using frequency resolved optical gating

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The past decade has witnessed the emergence of ultrashort laser systems in the mid-infrared range (2 – 10  $\mu\text{m}$ ). This has brought several new challenges to this field, beginning with the pulse determination. Indeed, to measure an event in time, a shorter one is needed to compare it with, but these ultrashort pulses are the shortest events ever created, measuring at most 100 fs. Pulse retrieval techniques in the near infrared have already been explored for a while now and diagnostic equipment is presently commercially available. This is, however, still not the case for lasers in mid-infrared, mainly due to the lack of market.

The Institute for Plasmas and Nuclear Fusion (IPFN) has recently installed a novel 3  $\mu\text{m}$  laser and it is the goal of this thesis to determine the full temporal characterization of the laser pulses of this new system using the frequency resolved optical gating technique. The work will be conducted in the Laboratory for Intense Lasers (L2I) at Instituto Superior Técnico (IST).

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