





PhD GRANTS 2024

PhD project title: Precision infrared molecular spectroscopy for fundamental physics and atmospheric science applications

PhD Supervisor: Florin Lucian Constantin

PhD project summary (max. 20 lines):

Molecular spectroscopy in the 1.55 µm spectral domain is useful for applications in astrophysics, atmospheric science and length standards. This PhD proposal is focused on compact and robust instrumentation for molecular spectroscopy with applications in fundamental physics and atmospheric science. A spectrometer will be developed for broadband spectral measurements with improved precision and sensitivity. The spectrometer will exploit the signal at 194.4 THz delivered through the optical telecommunication fiber link provided by the REFIMEVE network with exceptional metrological performances. A laser referenced to this optical signal via a stabilized frequency comb will be amplified, shifted in frequency and exploited to probe molecular lines using an intracavity technique and a differential detection. The first results of the measurements will be exploited to estimate at which level and at which timescales time variation of the fundamental constants may be constrained using precision measurements of acetylene reference lines. A transportable version of the spectrometer driven by a telecommunication optical fiber link will be exploited for monitoring in remote sites atmospheric pollutants in the gas phase.