# Open positions for the Marie Sklodowska-Curie fellows at the Laboratory for quantum optics

The Laboratory of Quantum Optics (LKO) focuses on the development of ultra-fast light sources in the XUV spectral range and on their use for time-resolved spectroscopic studies, which are relevant to material science. Activities rely on the use of a light source generating high-order harmonics (HHG) of an IR laser and on the availability of state-of-the-art detectors allowing to reconstruct both the angular and temporal distributions of electrons emitted by the sample under scrutiny. Our activites are also carried out at the laboratory Elettra Sincrotrone Trieste (Italy), where we promote and participate to several scientific projects, involving both the Elettra Synchrotron radiation facility and the free-electron laser FERMI.

## **Topic 1** : Investigating the magnetic properities of new materials by means of time resolved magnetic reflectivity

A new apparatus for measuring the ultrafast magnetization dynamics of selected chemical species, with a temporal resolution of few tens of femtoseconds, has just ben installed at LKO. Since the spectral range of our laser source includes the $M_{2,3}$ thresholds of transition metals, the system is an appealing source for the study of the dynamics in magnetic materials. The holder of MSC-IF will work at the improvement of the facility and on the characterization of new (exotic) magnetic materials.

### Scientific requirements:

Ph.D. in nonlinear optics or in condensed matter physics. The candidate should demonstrate the ability to operate a HHG source and have some experience with one or more spectroscopic techniques allowing to investigate the properties of condensed matter.

## **Topic 2** : Time resolved ARPES studies of strongly correlated systems

Time resolved ARPES allows the study the electronic properies of a solid at the time (femtosecond) scale at which electrons are moving. The system is brought in “out of equilibrium” conditions with a stroke of an intense infrared light pulse; electrons’ relaxation is then studied in a stroboscopic way, using HHG. This technique is quite powerful when applied to the characterization of novel quantum materials. It allows to look, in “real time”, at the evolution of the electronic band structure and to distinguish possible de-excitation channels. The holder of MSC-IF will exploit this technique to study novel materials. In particular, he/she will focus on topological insulators and/or superconductors.

### Scientific requirements:

Ph.D. in nonlinear optics or in condensed matter physics. The candidate should demonstrate the ability to operate a HHG source and have some experience with one or more spectroscopic techniques allowing to investigate the properties of condensed matter.

## Contact person

Prof. dr. Giovanni De Ninno (giovanni.de.ninno@ung.si).