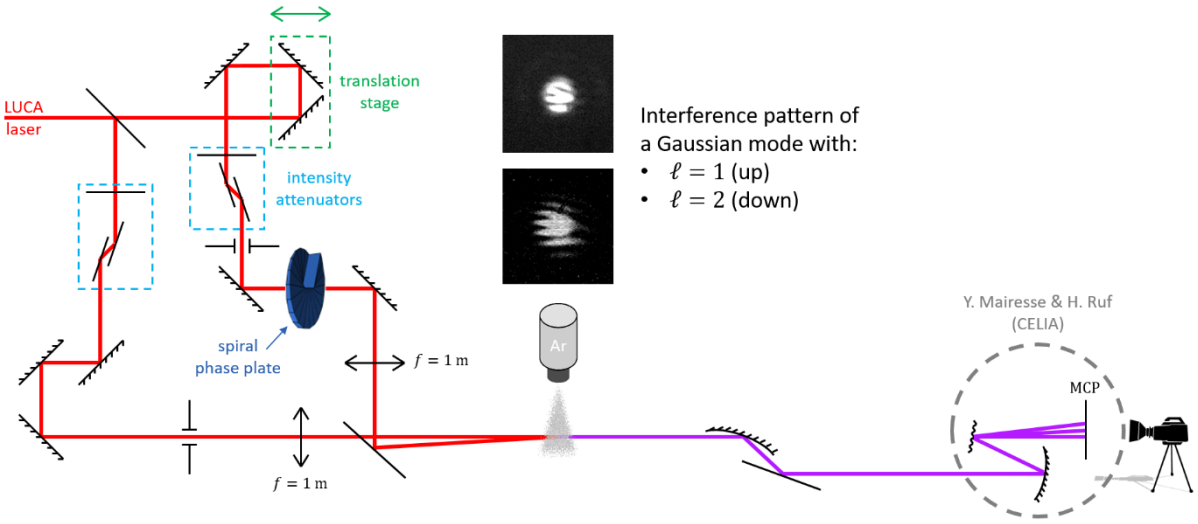
Generation of High-Order Harmonics carrying Orbital Angular Momentum

Location: CEA Saclay (LUCA)

Researcher in charge of the trainees: Céline Chappuis

Maximum number of trainees: 3

Experiment:



The Orbital Angular Momentum (OAM) of light is related to the shape of its wavefront. In particular, Laguerre-Gaussian (LG) modes carry OAM, at the rate of $\ell\hbar$ per photon ($\ell \in \mathbb{Z}$) [1].

High-Harmonic Generation (HHG) is a well-suited tool to transfer LG beams' properties from the infrared and femtosecond domains to the extreme ultraviolet and attosecond domains [2].

In order to totally control the topological charge ℓ of the high harmonics, a two-beam scheme as illustrated above is needed [3].

Schedule expected:

The trainees will generate LG high harmonics and participate in the interpretation of obtained spectra.

References:

[1] L. Allen *et al.*, Orbital angular momentum of light and the transformation of Laguerre-Gaussian laser modes, *Phys. Rev. A* **45**, 8185 (1992)

[2] R. Géneaux *et al.*, Synthesis and characterization of attosecond light vortices in the extreme ultraviolet, *Nature Communications* 7:12583 (2016)

[3] D. Gauthier *et al.*, Tunable orbital angular momentum in high-harmonic generation, *Nature Communications* (accepted)