EARLY STAGE RESEARCHER

Michele Natile

PROJECT: *"High-energy CEP-stable pulses for nonlinear XUV spectroscopy"*

Host institution: **Amplitude Technologies**

Supervisors: **Dr. X.Chen , Dr. C. Kalpouzos, Prof. M. Vrakking**

Start date: 2 **May, 2016**

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 641789

My career

POLITECNICO MILANO 1863

Bachelor Degree->

Engineering Physics

Master of Science->

Nano-optics and Photonics

MEDEA

ecular Electron Dynamics Investigated by Intense Fields and Attosecond Pulses

Amplitude TECHNOLOGIES

Nothing but ultrafast.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 641789

Outline

- Project description
- Achieved goals
- Scientific activities in progress
- Outreach activities and training
- Career Development Plan

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 641789

The Project

Project :

Design and characterization

High power laser

Grating based compressor

For

CEP noise reduction

Application :

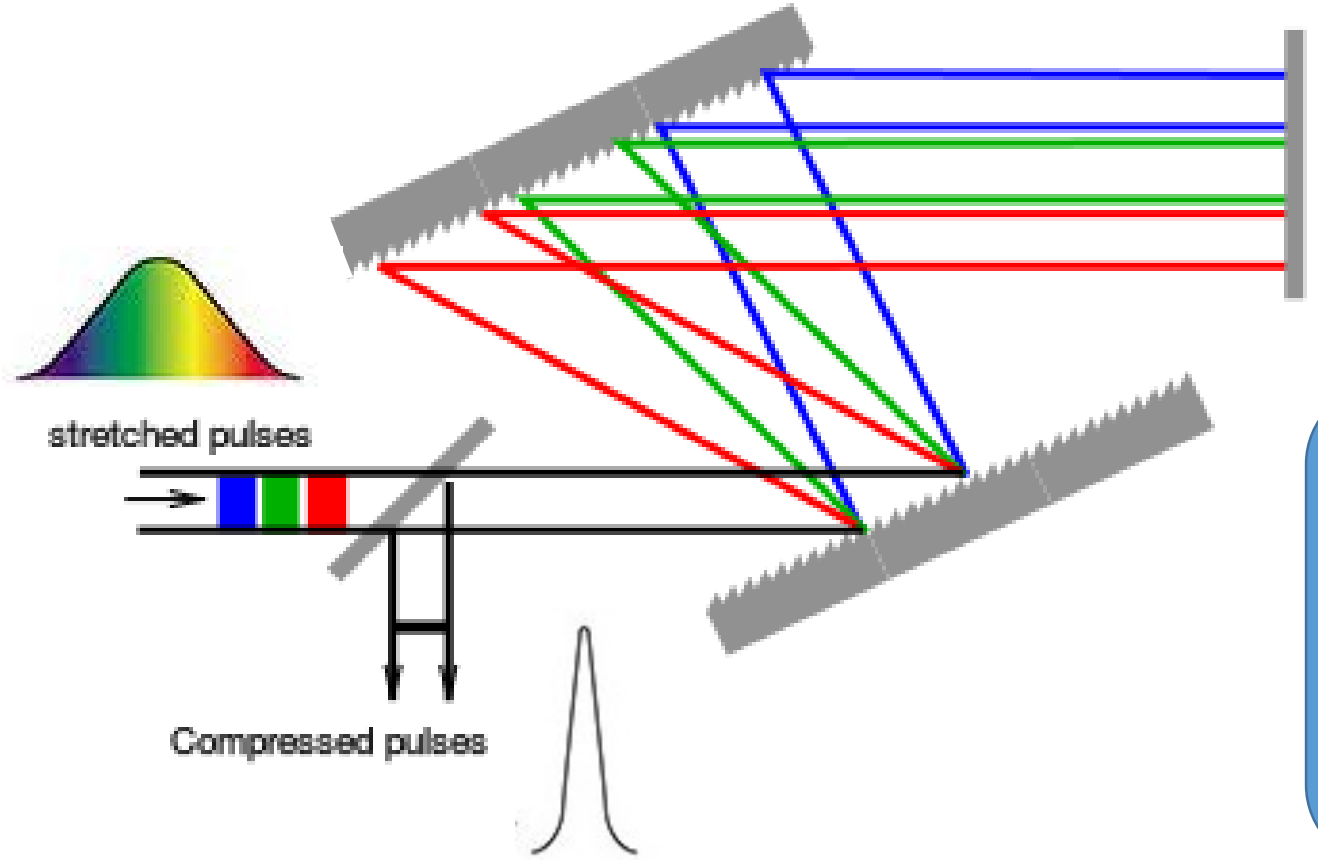
Non-linear XUV spectroscopy

WP 2.2 Goals:

- Test of mechanical stability of new developed optical mounts for grating based compressor
- Design of high power laser amplifier

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 641789

Scientific Goals achieved: test of mechanical stability of new designed optical mounts for a grating compressor



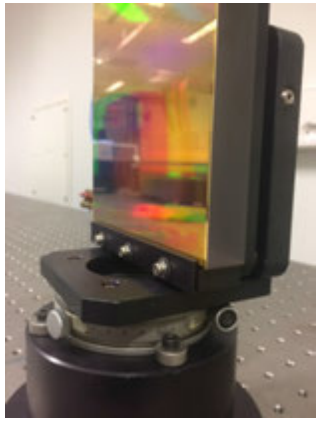
CEP fluctuations criticalities

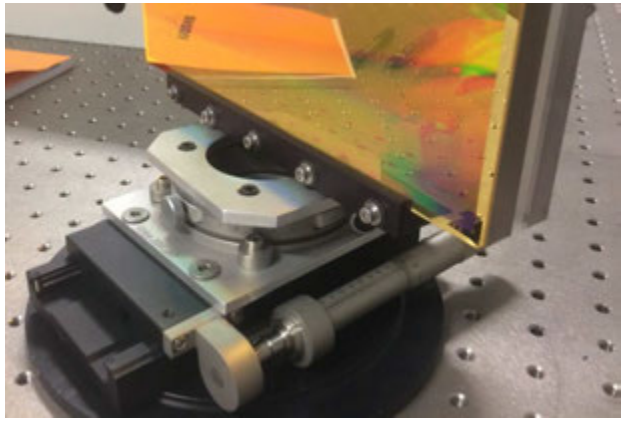
Mechanical stability of gratings and mirror mounts

Optical distance between the gratings

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 641789

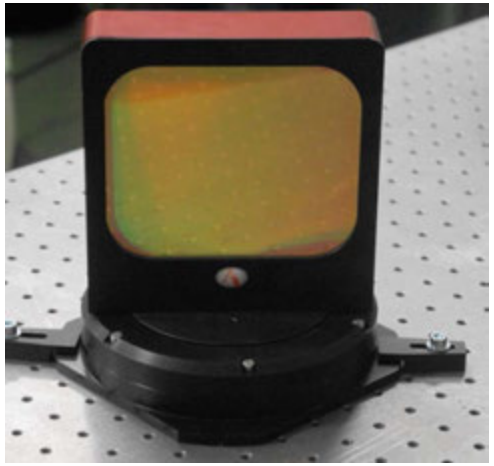
Scientific Goals achieved: test of mechanical stability of new designed optical mounts for a grating compressor

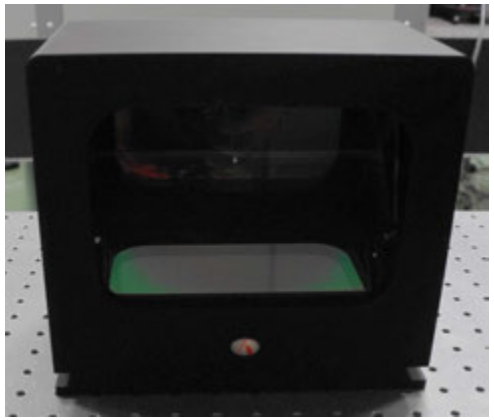




Old type mounts with spring rotation stage and translation stage

- **<u>No successful CEP measurement</u>**
  CEP Fluctuation too strong to be stabilized





New developped opto-mechanical mounts

- **Massive**
- **No spring based adjustment mechanics**
- **<u>Lower beam height</u>**
- **<u>Measured CEP noise < 300mrad</u>**

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 641789

Scientific Activities and goals in progress

WP 2.2 Milestones:

- **Test of mechanical stability of new developed optical mounts** → **OK**

- **Design of a high power laser amplifier** → **Work in progress:**

  Design and realization of a new CEP stabilized front-end

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 641789

Outreach activities and training

Training

Scientific

- MEDEA summer school
  Ultrafast dynamics
  Crete 2016
- MEDEA Webinars and JJCs

Transversal

- Laser and electrical safety

Outreach activities

- *Lycée Kleber (Scientific)*

Strasbourg – France
7/8 November 2016

Number of students reached:
44

- *Liceo G.B. Vico (Scientific)*

Laterza(TA) - Italy
21/22 December 2016

Number of students reached:
200

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 641789

Career Development Plan and future activities

Scientifc next goals
Design and realization of a new CEP passive stabilized front-end for the High power Laser system

Outreach activities
Next year agreement for making activities in the same schools both in France and Italy

Planned Secondment (after May 2017)
FORTH- Dr. C. Kalpouzos
Non-linear XUV autocorrelator for attosecond pulse measurements.

Planned training scheduled
MEDEA summer school 2017
Webinars and JJCs

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 641789

THANK YOU FOR YOUR ATTENTION !

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 641789