

**A) Position ESR FREIB-1**

*Title: Nonlinear XUV interactions and coherent control experiments at Free Electron Lasers*

Duration: 24 months

Supervisor: Prof. Dr. Giuseppe Sansone

The Early Stage Researcher (ESR) will be actively involved in experiments at the Free Electron Laser FERMI at Elettra in Trieste. He/she will be involved in the preparation of an experimental beamtime planned in the period January-August 2017. He/she will play a leading role in the data acquisition and data analysis using numerical codes, which are partly already available. He/she will be also in charge of the development of a numerical simulation code, which will be used to guide the experiment.

During the stay in the network, the ESR will also spend a few months at the premises of the laser company Amplitude Technologies in Evry, France, under the supervision of Dr. X. Chen.

The ESR will be co-supervised by Prof. Dr. F. Stienkemeier of the University of Freiburg and Dr. Carlo Callegari, responsible for the beamline Low Density Matter at FERMI.

<b>ESR FREIB-1</b>		<b>Nonlinear XUV and coherent control experiments at FELs</b>	
<b>1<sup>st</sup> Supervisor: Prof. Giuseppe Sansone/Prof. F. Stienkemeier</b>		<b>Duration: 24 Months; PhD enrolment: Yes</b>	
<b>Planned secondment</b>	<b>Start*</b>	<b>Dur.</b>	<b>Content of the training</b>
<b>AMPL</b> <b>2<sup>nd</sup> Supervisor: Dr. X. Chen</b>	<b>32</b>	<b>1</b>	<b>Development of CEP-stable amplifiers of high energy</b>
<b>ELETTRA</b> <b>3<sup>rd</sup> Supervisor: Dr. C. Callegari</b>	<b>26</b>	<b>3</b>	<b>Experimental campaign on attosecond pulse shaping and coherent control in the XUV</b>
<b>POLIMI: Prof. S. Stagira</b>	<b>22</b>	<b>3</b>	<b>Characterization of attosecond pulses: numerical codes.</b>

\* Months after the starting date of the network (01-01-2016)

One/Two additional year(s) for the position (in order to reach a total employment of 36/48 months) will be secured using additional funds. In this way, the ESR will have the possibility to be employed for a total of 36/48 months corresponding to the typical time required to complete a PhD program and attain a PhD title.

**B) Position ESR FREIB-2**

*Title: Coincidence spectroscopy on small molecules*

Duration: 24 months.

Supervisor: Prof. Dr. Giuseppe Sansone

The main scientific training activity of this position will be the optimization and the preparation of experiment on simple molecules (hydrogen) using coincidence photoelectron and photoion spectroscopy based on a Reaction Microscope. These experiments will be conducted in close collaboration with Max Planck Institute for Nuclear Physics in Heidelberg (MPIK), which has originally developed the techniques implemented for the measurement in coincidence of charged particles.

The PhD program of this ESR will be completed by two secondments focused on the design, operation and application of high-repetition rates OPCPA laser system (at TRUMPF and MPQ), well suited for experiments (like those involving the Reaction Microscope) which require high-repetition rates attosecond sources. In this way, the ESR will spend an extended secondment in the private sector (TRUMPF, partner organization), thus securing the possibility to experience a different working environment and to receive an intersectoral training.

ESR FREIB-2		Coincidence spectroscopy in small molecules	
1 <sup>st</sup> Supervisor: Prof. Giuseppe Sansone		Duration: 24 Months; PhD enrolment: Yes	
Planned secondment	Start*	Dur.	Content of the training
TRUMPF 2 <sup>nd</sup> Supervisor: Dr. T. Metzger	26	3	Design of a high-repetition rate OPCPA Laser system
MPIK 3 <sup>rd</sup> Supervisor: Prof. R. Moshhammer	32	2	Data analysis using a Reaction Microscope
MPQ: Prof. R. Kienberger	40	1	Data acquisition at high-repetition rates using an OPCPA system

\* Months after the starting date of the network (01-01-2016)

One/Two additional year(s) for the position (in order to reach a total employment of 36/48 months) will be secured using additional funds. In this way, the ESR will have the possibility to be employed for a total of 36/48 months corresponding to the typical time required to complete a PhD program and attain a PhD title.

## **Common Arrangements for the ESR FREIB-1 and ESR FREIB-2 positions**

The ESRs will be fully integrated and take active part to the training activities of the network including:

1) **Webinars and Joint Journal Clubs**

The ESRs will take part to the webinars and Joint Journal Clubs organized on a monthly basis by the network.

<http://www.medeia-horizon2020.eu/training/>

2) **Secondments and participation to training schools.**

The ESRs will take part to the schools planned by the network (Summer school on “Ultrafast dynamics with intense radiation sources” planned on the 18-21 October 2016 in Crete and the Technology and Innovation Management planned for 2018 in Paris).

<http://www.medeia-horizon2020.eu/training/schools/>

3) **Outreach activities based on the Photonics Explorer Kit.**

The ESRs will be actively involved in outreach activities based on the Photonics Explorer Kit (<http://www.eyest.eu/STEM-Programs/Photonics-Explorer> ). The activities will consist in small experiments of optical physics for secondary school students. An initial training on the use of the kit will be delivered by EYEST at the beginning of 2017.

<http://www.medeia-horizon2020.eu/outreach-and-dissemination/photonic-kit/>