

Name of the Partnering Organization:	European X-ray Free-Electron Laser Facility GmbH	
Location (town, country):	Hamburg, Germany	
Web site address:	http://www.xfel.eu	
Brief description of the organization		
<p>The European X-Ray Free-Electron Laser Facility GmbH (European XFEL GmbH) is a limited liability company under German law that was officially founded in Hamburg, Germany, on 28 September 2009. At present, 12 countries are participating in the European XFEL project: Denmark, France, Germany, Greece, Hungary, Italy, Poland, Russia, Slovakia, Spain, Sweden, and Switzerland.</p> <p>The company is in charge of the construction and operation of what will be the world's brightest source of ultrashort X-ray pulses: the European XFEL, a 3.4 km long X-ray free-electron laser facility. Civil construction started in early 2009; the beginning of X-ray operation is planned for 2015. With its repetition rate of 27 000 pulses per second and a peak brilliance a billion times higher than that of the best synchrotron X-ray radiation sources, the European XFEL will open up new research opportunities for scientists and industrial users. Thanks to its ultrashort X-ray flashes, the facility will enable scientists to map the atomic details of viruses, decipher the molecular composition of cells, take three-dimensional images of the nanoworld, film chemical reactions, and study processes such as those occurring deep inside planets. Preparatory scientific work in the targeted areas of application is required in order to allow the scientific user community to start the experimental program with the best possible preparation. Interaction of user communities with the scientific staff at European XFEL allows exchanging knowledge and know-how. This exchange will benefit both sides through better preparation for future experiments and scientific applications and by better definition of the scientific endstations.</p>		
Description of the research group		
<p>Within this project, the European XFEL staff will contribute to scientific cooperation, workshops and schools for young scientists, in order to improve the exchange between the scientific staff of our facility and the potential new users' community interested in exploring the unprecedented research opportunities of this future lightsource. Two research groups of the European XFEL will be involved:</p> <ul style="list-style-type: none">- The Femtosecond X-ray Experiments (FXE) group (contact person: Wojciech Gawelda) has been carrying out an extensive research program focused on studying dynamical properties of condensed matter systems, in particular chemical reaction dynamics in liquids, using ultrafast x-ray spectroscopy (XANES and EXAFS) and various x-ray scattering techniques (diffuse and inelastic scattering). The unprecedented characteristics of the European XFEL x-ray beam require the development and implementation of novel spectroscopic methodologies at the FXE scientific instruments starting operation in 2015.- The X-ray Optics and Beam Transport group (contact person: Jerome Gaudin) is engaged in a research program devoted to the understanding of the interaction of intense femtosecond x-ray pulses with solids of interest for x-ray optics. This program includes the development and characterization of new materials as well as experiments at the already existing FEL facilities. New optics materials which will allow proper steering of the X-ray FEL beam and preservation of its unique properties are a mandatory achievement towards the anticipated experimental program to be established at the European XFEL.		
Selected list of relevant publications		
<p>1. M. Messerschmidt et al., Ultrafast potential energy surface softening of one-dimensional organic conductors revealed by picosecond time-resolved Laue crystallography, J. Phys. Chem. A 114, 7677-7681 (2010).</p> <p>2. B. Nagler et al., Turning solid aluminium transparent by intense soft X-ray photoionization, Nature Phys 5, 693-696 (2009).</p> <p>3. S. Düsterer et al., Femtosecond x-ray pulse length characterization at the Linac Coherent Light Source free electron laser, New J. Phys. 13, 093024 (2011)</p>		
Key researcher's CV		
<p>Scientific Director Thomas Tschentscher –Coordinator x-ray optics, hard x-ray scientific instruments and optical lasers at European XFEL (member of the management board).</p> <p>In addition to the project responsibility his scientific activities focus on research of ultrafast phenomena in the area of solid-state photo-chemistry [1] and in the regime of condensed matter under extreme conditions [2]. Another important activity is the development of new instrumentation [3].</p>		