



## 2020 HGF – OCPC – Programme for the involvement of postdocs in bilateral collaboration projects

**Title of the project:**

Detector performance optimization for LUXE experiment at DESY

**Helmholtz Centre, division/group:**

Deutsches Elektronen-Synchrotron DESY

**Project leader:**

Prof. Beate Heinemann

**Contact Information of Project Supervisor: (Email, telephone):**

[Beate.Heinemann@desy.de](mailto:Beate.Heinemann@desy.de) Tel. +49 40 8998-1446

**Web-address:**

[www.desy.de](http://www.desy.de), [luxede.desy.de](http://luxede.desy.de)

**Department/Group: (at the Helmholtz centre or Institute):**

FLC LUXE group

**Programme Coordinator (Email, telephone and telefax)**

Dr. Frank Lehner  
DESY Head of Directorates Office  
Phone: +49 40 8998 3612  
Email: [frank.lehner@desy.de](mailto:frank.lehner@desy.de)

**Description of the project (max. 1 page):**

DESY is one of the world's leading research centers in high energy physics and in photon science. European XFEL currently operated at DESY is a unique linear electron accelerator primarily designed as an X-ray light source for wide areas of scientific studies including applied materials research and fundamental physics. At the same time its 17.5 GeV electron beam provides an excellent possibility to probe the properties of QED vacuum and in particular its instability in a strong electric field approaching and exceeding  $1.3 \times 10^{18}$  V/m known as Schwinger limit. The phenomenon has been predicted long ago and has been widely studied theoretically. Nevertheless its profound experimental investigation was prevented by the technical limitations in reaching high fields in laboratories. Recent decades developments in laser technology made it possible to plan an experiment where QED in strong field regime can be studied. Such experiment, called LUXE is currently under development at DESY and aims on studying strong field QED in collisions of high power laser and XFEL electron beam.

At present stage the international team is working on the design of the experimental setup which includes design of the beam delivery components and detector systems optimization. Appropriate detector technologies have to be identified in simulation followed by their performance study in beam tests using DESY dedicated facilities.



**Job description:**

- Design test beams to study the performance of different detectors and test their suitability for LUXE;
- Analyze test beam data of detector prototypes;
- Study detector performance in Monte Carlo simulation;

**Description of existing or sought Chinese collaboration partner institute (max. half page):**

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**Required qualification of the post-doc:**

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- PhD in physics (experimental physics)
- Awareness of detector technologies in particle physics
- Awareness of data acquisition techniques
- Experience in programming
- Fluent English and good communication skills