**2018 Helmholtz – OCPC – Program**

**for the involvement of postdocs in bilateral collaboration projects**

**DESY\_OCPC\_2018-03**

**PART A**

**Title of the project: Structure-Function relationship in chemical reactions using controlled molecules**

**Helmholtz Centre and Research Group: DESY / CFEL Controlled Molecule Imaging**

**Project leader: Prof. Dr. Jochen Küpper**

**Web-address:** https://www.controlled-molecule-imaging.org

**Description of the project:**

We are investigating the structure-function relationship of conformer-selected complex molecules. In collaboration with the Willitsch group in Basel we have performed pioneering benchmark experiment to investigate structure-dependent chemical reactivities. We have determined the conformer-specific rate constants for the reactions of *cis*- and *trans*-3-aminophenol with Ca+ ions localized in a so called Coulomb Crystal. These experiments are now being extended to investigations of conformer-separated molecule-molecule reactions.

In this project the candidate will extend our benchmark studies to the investigation of conformer specific reactivity studies of complex chemical reactions, such as cycloadditions (Diels-Alder reactions) and other textbook examples, in order disentangle the microscopic details. This involves the experimental verification of relevant molecular properties in deflection and spectroscopy experiments, and the measurement of conformer specific reactivities. Moreover, detailed analysis requires programming simulations of the deflection process and quantum-chemistry calculations.

**Description of existing or sought Chinese collaboration partner institute:**

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

* PhD in Experimental Physics, Physical Chemistry, or related field
* Strong background in molecular physics and quantum mechanics is required.
* Experience with molecular beams, high-vacuum equipment, and short-pulse lasers is envisioned; experience with a standard quantum-chemistry package would be a plus.

**PART B**

**Documents to be provided by the post-doc, necessary for an application to OCPC via a postdoc-station:**

* + Detailed description of the interest in joining the project (motivation letter)
  + Curriculum vitae, copies of degrees
  + List of publications
  + 2 letters of recommendation
  + Proof of command of English language

**PART C**

**Additional requirements to be fulfilled by the post-doc:**

* Max. age of 35 years
* PhD degree not older than 5 years
* Very good command of the English language
* Strong ability to work independently and in a team