**2018 Helmholtz – OCPC – Program**

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

**DESY\_OCPC\_2018-12**

**PART A**

**Title of the project: New physics opportunities at the LHC and future facilities**

**Helmholtz Centre and Research Group: DESY**

**Project leader: Christophe Grojean**

**Web-address:** http://grojean.web.cern.ch/grojean/

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

After the Higgs boson discovery, the Standard Model provides a consistent description of the fundamental constituents of matter and their interactions that can be extrapolated to very high energy. Nonetheless, some key questions are left unanswered: nature of dark matter, origin of the matter-antimatter asymmetry, origin of the weak scale etc. and new physics is expected to amend the standard model. The aim of this project is to study and compare the physics capabilities of possible future colliders like the International Linear Collider in Japan, the Future Circular Collider(s) at CERN, the Circular Electron-Positron Collider and the Circular Proton-Proton Collider in China. The recruited postdoc will be involved into a project devoted to a classification of all possible new physics effects in various sectors (deep-inelastic scattering, EW precision measurements, diboson and dijets data at the LHC, Higgs measurements). A special attention will be devoted to the synergy and the complementarity between these multiple measurements. In particular, for lepton collider projects, the study will be conducted to establish the importance of a run at the Z-pole. This project will be developed in the context of the platform for future facilities of the Quantum Universe excellence cluster that will hopefully be in operation at the time the recruited postdoc will join DESY.

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

Ideally, a long term collaboration could be developed in establishing the physics case of future facilities, be they ILC, CepC, SppC, FCC or HE-LHC.

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

* PhD in Theoretical Particle Physics
* Experience with Quantum Field Theory, LHC data
* Additional skills in Phenomenology, Effective field theory, Monte Carlo simulations

**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