



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

Title of the project:

Reaching beyond the Standard Model with Higgs precision measurement

Helmholtz Centre, division/group:

DESY, FLC

Project leader:

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Description of the project (max. 1 page):

Currently, several proposals for future e+e- colliders operating at energies from the Z pole to a few TeV are being discussed, including both Linear and Circular Colliders. Prime objective of this next generation of colliders is the search for physics beyond the Standard Model of particle physics via the precise characterisation of the recently discovered Higgs particle. The FLC group at DESY is one of the world-wide leading groups in the evaluation of the physics potential of such future e+e- Higgs factories.

Most of the projections for Higgs precision measurements have been performed for the case of the 125-GeV Higgs boson having the properties predicted by the SM. This includes both the detector-level analyses of simulated data sets as well as their interpretation, for instance in global fits based on SMEFT.

In this project, the successful applicant will inject specific BSM benchmark models into the existing analyses and their interpretations. The work plan comprises a) the choice of interesting benchmark models with and without light new particles, b) the adaptation and possibly the addition of specific analysis channels and c) the interpretation both in EFT and the specific BSM model, with the goal to quantify the ability to distinguish different models from the SM and from each other, and to determine the underlying model characteristics.

For each aspect of the project, significant expertise is available at DESY, and the candidate will collaborate closely with experimentalists and theorists.



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

Collaboration exists with IHEP, recently strengthened by a previous round of the DESY-ONAPCR program. The project is open to any partner institute which is interested in the physics program of a future e+e- Higgs factory, be it in China or elsewhere in the world

Required qualification of the post-doc:

- PhD in experimental particle physics or particle phenomenology
- Experience in Higgs physics and extensions of the SM,
- as well as in in large scale data analysis
- Ability to collaborate in an international team
- Very good knowledge of the English language