



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

Title of the project:

High precision tracking for post-LHC experiments

Helmholtz Centre, division/group:

DESY, FLC

Project leader:

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Description of the project (max. 1 page):

The tracking of charged particles is a key requirement in any new particle physics experiment. Technological progress allows us to push the intrinsic precision of tracking detectors ever further. Resolutions close to single μm point resolutions are becoming possible, overall tracking systems reaching momentum resolution of well below a per-mille level are achievable.

At DESY we develop advanced tracking detectors and detector systems combining Silicon technology with other systems. For experiments at future lepton colliders we investigate the combination of a high precision silicon detector with a gaseous time projection chamber. Recently a high precision silicon strip detector has been commissioned. In the proposed project, this detector should be combined with a time projection chamber to validate the excellent momentum resolution. An experiment at the DESY test beam is planned to demonstrate the feasibility of this system, to develop alignment and calibration schemes, and to experimentally verify the anticipated system performance.

In a second phase, the time projection readout will be further optimised. Early prototype versions of a high-precision silicon based readout exist, and will be further studied. If successful an implementation of a readout module based on all-silicon technology will be pursued and – if time allows – studied and compared to the existing readout module.

The postdoc will take over a leading role in the planning, execution and analysis of the beam test



with the time projection chamber combined with the silicon detector. He/ she will commission the silicon detector, install the existing time projection chamber, and operate the setup. He/she will take a leading role in the analysis of the data. Adequate technical support exists. If interested the candidate can be involved in the supervision of graduate students participating in the project.

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

Collaborations on experiments at future lepton colliders exist with a number of Chinese institutes, in a particular with the Institute for High Energy Physics, Chinese Academy of Science, in Beijing. In China there is a significant level of activity exploring potential new experiments in particle physics, in particular, a Higgs factory. We are interested to increase the level of cooperation with these studies, as we see many similarities both in scientific goals and in tools.

We are of course open to cooperation with any other institute in China.

Required qualification of the post-doc:

- PhD in experimental particle physics
- Experience with modern experimental methods, experience in ASIC or readout electronics would be an advantage
- Experience in large scale data analysis
- Ability to collaborate in an international team
- Very good knowledge of the English language