Contribution ID: 60

Type: On-site planned, but remote also possible

# Detecting FIPs at a FutuDetecting FIPs at a Future Higgs Factoryre Higgs Factory

FIPs (Feebly Interacting Particles) are proposed entities that can explain dark matter and the non-observation of such states at accelerators: The reason they have not yet been seen is rather than that they are too massive (the explanation of non-observation of SUSY), they are too feebly interacting to have been observed at LHC or LEP. Future e+e- machines opens up new ways to search for such states: while still having the same low-background conditions and known initial state as at LEP, the future machines will feature 1000 times higher luminosities compared to LEP.

FIPs could manifest themselves in different ways. This project intends to study one possibility, namely that the new particle can decay into detectable standard model (SM) particles, but are so weakly coupled that these decays happens at macroscopic distances from their production point, so called Long Lived Particles, LLPs. In the project, it will be assumed that the FIP itself is not detectable.

The project requires full detector simulation of such signals, using the available tools, but modifying aspects of the signal to evaluate the performance for different FIPs decay-lengths and decay modes. These simulated events should then be analysed with the tools at hand. For the latter part, the student can profit from collaboration with the student of another project proposed by our group ("V0-Finding at a Future Higgs Factory").

### Field

B1: Particle physics analysis (software-oriented)

# **DESY Place**

Hamburg

# **DESY Division**

FH

#### **DESY Group**

FTX

# **Special Qualifications:**

Basic skills programming (C++ or python) to perform a data analysis

**Primary author:** BERGGREN, Carl Mikael (FLC (FTX Fachgruppe SLB)) **Co-author:** EINHAUS, Ulrich (FTX (SLB, TBT))