Contribution ID: **14** Type: **not specified**

A new electromagnetic calorimeter for BabyIAXO to search for axions from solar fusion and supernova explosions

BabyIAXO is a future experiment located at DESY to search for the dark luminosity of our Sun: hypothetical very lightweight and extremely feebly interacting new particles like the axion. Such bosons are perfect candidates to also explain the dark matter in our Universe. This project is embedded in a study to further expand the science case of BabyIAXO. By adding a new electromagnetic calorimeter, BabyIAXO might become also sensitive to 5.5 MeV axions produced by the solar fusion processes and $\mathcal{O}(100\,\mathrm{MeV})$ axions from nearby supernova explosions.

The successful applicant will contribute to the designs of possible calorimeter solutions focusing on:

- The optimization of the acceptance for gamma rays resulting from the interaction of the axions with BabyIAXO's magnetic field taking into account geometric constrains (e.g., space constraints, detector positioning).
- Exploring potential detector types and materials.

The student will become familiar with Monte Carlo tools to simulate the transport of radiation in matter such as Geant4 and OpenGATE, which are standard tools in particle physics. The study might include also very new concepts like chromatic calorimetry.

To gain some experience in laboratory work, it could be possible in addition to contribute to the commissioning, calibration and background measurements of X-ray detectors for BabyIAXO (depending on the schedule of the test-bench installation).

Group

FH-ALPS

Project Category

B1. Physics data analysis and performance (software-oriented)

Special Qualifications

- Good knowledge of Python programming. C++ knowledge or experience with ROOT is a plus.
- Good command of the English language.
- Ability to summarize and present the outcome of your work in a structured manner.

DESY Site

Hamburg

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