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TECHNISCHE
UNIVERSITÄT
DARMSTADT

PhD Thesis in Nuclear Physics

Hypernuclei spectroscopy at GSI/FAIR: Development of a time projection chamber at GSI/R³B

A PhD thesis is open in the group of Prof. Alexandre Obertelli at the Institut für Kernphysik (IKP) of TU Darmstadt. The position is expected to start from January 1st, 2020.

Studies of hypernuclei which carry a new strangeness quantum number, shed a new light on the world of traditional nuclei by revealing new symmetries and new phenomena. So far only about 40 hypernuclei have been synthesized and studied using pion, kaon or electron beams by the missing mass spectroscopy. As first pioneered by the HypHI collaboration at GSI, heavy-ion beams induced reactions offer new opportunity to produce and study exotic (proton-rich or neutron-rich) hypernuclei by the invariant mass spectroscopy. We are starting a hypernuclei program at GSI/R³B via high-intensity heavy-ion beam bombarding a thick hydrogen target. The detection system consists of two time projection chambers (TPC) to be inserted into the GSI/R³B GLAD magnet: the k TPC and the π TPC for the detection of the kaon mesons and pion mesons, respectively. The proposed thesis will focus on the development of TPC version0 with high-resolution tracking capabilities. Together with the engineer and postdoctoral researchers, the candidate will take an active part to build the prototype TPC, including the field cage, the gas system, the pad plane and the readout electronics. He/She will lead the in-beam test of TPC version0 at GSI and will analyze the first experimental data on the production of hypernuclei from hydrogen in inverse kinematics.

His/Her tasks will focus on

- 1) Participation to the design of the TPC field cage, structure and gas system.
- 2) Construction and lab tests of the TPC version0.
- 3) Active participation of the experimental program at R³B, GSI/FAIR.
- 4) Data analysis of first experiment, including synthesis of new hypernuclei at the drip line.

Candidate profile:

Only candidates holding a Master degree in physics or engineering will be considered. The ideal candidate speaks English fluently and has experience in experimental nuclear physics.

Salary:

The salary will be according to the tariff contract of the TU Darmstadt (TV-TUD), following a 2/3 E13 position. TU Darmstadt is an equal opportunity employer and we especially encourage applications from women. Disabled people with a degree of disability of at least 50% will be preferred if equally qualified.

Contact:

Interested candidates should directly contact Prof. Alexandre Obertelli via e-mail (aobertelli@ikp.tu-darmstadt.de).