
The Institute for Nuclear Physics of the Department of Physics at the Technische Universität Darmstadt invites applications for a

PhD Position in Nuclear Physics – 66%

within the framework of the Hessian Cluster Project “ELEMENTS” for a funding period until March 31st 2025. As part of the ELEMENTS early-career support a young investigator group is being established linked to the working groups of Professors T. Aumann and A. Obertelli. The group will be led by Dr. M. Duer and will include a postdoctoral researcher and the PhD position announced here.

The Cluster Project ELEMENTS is a collaborative project of Goethe University Frankfurt, TU Darmstadt, JLU Gießen, and the GSI Helmholtz Center for Heavy-Ion Research. It addresses the physics of binary neutron-star mergers from gravitational waves to the equation of state of nuclear matter. This includes investigation of nucleon-nucleon (NN) short-range correlations (SRC). SRC pairs are formed as temporary fluctuations with high density, several times the nuclear saturation density. These are densities that exist in the inner core of neutron stars. Understanding the properties of nuclear matter at high densities thus requires the description of SRC between nucleons that are governed by the properties of the interaction of nucleons (NN and 3N) at short distance.

A new experimental program has been initiated to study SRC for the first time with radioactive beams at R3B (GSI). SRC pairs will be probed using large-momentum transfer ($p,2p$) quasi-free knockout reactions of radioactive beams in inverse kinematics, and will be detected in fully exclusive kinematics. This will allow the study of SRC in exotic nuclei systematically as a function of the neutron excess along isotopic chains.

A first dedicated experiment to study SRC will take place in 2022 at R3B using ^{16}C beam. As this experiment requires optimization and modification of the R3B setup, the candidate will participate in the ongoing preparations for the experiment. He/She/They will also take an active part in the experiment itself, and will be responsible for analysis of data obtained in the experiment.

We are looking for a candidate with a university degree (Master of Physics or comparable). Experience in experimental nuclear physics and programming knowledge will be favourable assets. We expect highly motivated students who enjoy working in a diverse international team and collaboration.

Opportunity for further qualification (doctoral dissertation) is given. The fulfillment of the duties likewise enables the scientific qualifications of the candidate.

The Technische Universität Darmstadt intends to increase the number of female employees and encourages female candidates to apply. In case of equal qualifications applicants with a degree of disability of at least 50 or equal will be given preference. Wages and salaries are according to the collective agreements on salary scales, which apply to the Technische Universität Darmstadt (TV-TU Darmstadt).

By submitting your application, you agree that your data may be stored and processed for the purpose of filling the vacancy. Here you can find our [privacy policy](#).

Applications (in English) including a motivation letter, a CV, list of taken courses with achieved grades, the abstract of the Master's thesis and the contact details of the supervisor of the Master's thesis should be sent in electronic form (as a single pdf) giving the identification number to the Managing Director of the Institute for Nuclear Physics, Professor Dr. Dr. h.c. mult. Norbert Pietralla (gd@ikp.tu-darmstadt.de).

In case of further questions to this position, please contact Dr. Meytal Duer (mduer@ikp.tu-darmstadt.de) or Prof. T. Aumann (thomas.aumann@tu-darmstadt.de).

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