UNIVERSITETET I OSLO

Jobbnorge ID: 239372
Deadline: 2/28/2023
Website: http://www.uio.no/
Scope: Fulltime
Duration: Fixed Term

PhD Research Fellow in Instrumentation for high energy physics

Job description

Position as PhD Research Fellow in Instrumentation for high energy physics is available at the Department of Physics.

No one can be appointed for more than one PhD Research Fellowship period at the University of Oslo. Starting date no later than October 1, 2023.

The fellowship period is 3 years. A fourth year may be considered with a workload of 25 % that normally consists of teaching. This is dependent upon the qualification of the applicant and the current needs of the department.

Knowledge development in a changing world - Science and technology towards 2030

Faculty of Mathematics and Natural Sciences

Video: https://www.youtube.com/watch?v=t4wvWQEhDEs

More about the position

The position is associated with the Norwegian ALICE project at CERN, funded by the Norwegian Research Council as part of the Norwegian Centre for CERN research (NorCC). The electronics and high energy physics sections at the Department of Physics, University of Oslo, participate in the ALICE experiment, which in 2022 entered the third round of data taking at the Large Hadron Collider (LHC Run-3). In addition to physics analysis and related software development, the local ALICE group is involved in instrumentation activities associated with the ALICE Inner Tracking System (ITS) and Forward Calorimeter (FoCal), in collaboration with the heavy-ion groups at the University of Bergen and at University of South-Eastern Norway.

The Inner Tracking System (ITS) is the innermost detector of the ALICE experiment, closest to the interaction point of the LHC beams. During the recent long shutdown period at CERN, it has undergone a major upgrade, called ITS2, to improve its capabilities as a vertex and tracking detector. With more than 24000 monolithic active pixel sensors (MAPS), each with half a million pixels of 30 x 30 micrometers, distributed in 7 cylindrical layers surrounding the LHC beam line, the new ITS2 detector is today a 12.5 gigapixel camera capable of taking 50000 pictures every second. Covering an area of 10 square meters, it is at present the largest scale application of monolithic active pixel sensors in a high energy physics experiment, and the first LHC detector to use the MAPS technology.

Exploring new sensor designs requires extensive research and development effort. The successful candidate is expected to contribute to the Norwegian activities in the ITS3 and other future detector projects in ALICE. The Norwegian groups will take active part in the development and testing of the new chip and updates of the readout electronics. Depending on the candidate's background, this may include the development and characterization of MAPS test structures and detector concepts, beam tests and simulation studies, data analysis, and development of instrumentation and electronics.

The candidate will be based in Oslo but will be expected to spend some time participating in data taking and other ALICE activities at CERN or other collaborating institutions. The position will also include mandatory service work for the ALICE collaboration.

After a successful installation and commissioning of ITS2, the ALICE Collaboration now prepares for the next ITS upgrade, the ITS3 upgrade project. To achieve even better tracking precision and vertexing performance, the project is exploiting the rapid progress made for MAPS technology in the field of imaging for consumer applications. One of the features offered recently by CMOS imaging sensors technology is called stitching. This lithography technique overcomes the chip mask or reticle size limitations by using multiple exposures of a fixed repeating pattern. A tiny overlap at the edges makes it possible to connect the exposure to achieve a significantly larger sensor, only limited by the wafer size. Furthermore, if silicon is thinned below 50 micrometers, it can be bent like paper without breaking. This will open the door to wafer scaled ultra-thin curved sensors, making it possible to realize low-mass and truly cylindrical silicon-only sensor layers. This will facilitate unprecedented tracking and vertexing precision close to the interaction point, providing access to numerous new physics observables. ALICE therefore plans to upgrade the three innermost layers using this technology.

Qualification requirements

The Faculty of Mathematics and Natural Sciences has a strategic ambition to be among Europe's leading communities for research, education and innovation. Candidates for these fellowships will be selected in accordance with this, and expected to be in the upper segment of their class with respect to academic credentials.

Required:

- Master’s degree or equivalent in electronics, microelectronics, instrumentation, or a related field.
- Foreign completed degree (M.Sc.-level) corresponding to a minimum of four years in the Norwegian educational system
- Knowledge of silicon detectors and good programming skills relevant for high energy physics applications
- Experience in data analysis and/or simulations

Desired:

- Experience from beam tests and other relevant experiments (strong advantage)
- Knowledge of detector readout electronics and radiation effects in electronics

Candidates without a Master’s degree have until 30 June, 2023 to complete the final exam.

Grade and language requirements:

The norm is as follows:

- The average grade point for courses included in the Bachelor’s degree must be C or better in the Norwegian educational system.
- The average grade point for courses included in the Master’s degree must be B or better in the Norwegian educational system.
- The Master’s thesis must have the grade B or better in the Norwegian educational system
- Fluent oral and written communication skills in English
- For candidates who would like to apply for a fourth year including teaching, good knowledge of Norwegian or another Scandinavian language is strongly preferred.
- English requirements for applicants from outside of EU/ EEA countries and exemptions from the requirements:

https://www.mn.uio.no/english/research/phd/regulations/regulations.html#toc8

Personal skills:

- Applicants must be able to work independently and in a structured manner and have the ability to cooperate with others.
- Applicants must demonstrate an ability to communicate and work in a group environment, and to demonstrate suitable social and interpersonal skills.
- Applicants must be willing to travel internationally to research facilities as required.
- Applicants must have an enthusiasm for science.
- Applicants must contribute to a sustainable social environment.

The purpose of the fellowship is research training leading to the successful completion of a PhD degree.

The fellowship requires admission to the PhD programme at the Faculty of Mathematics and Natural Sciences. The application to the PhD programme must be submitted to the department no later than two months after taking up the position. For more information see:

http://www.uio.no/english/research/phd/

http://www.mn.uio.no/english/research/phd/

The position's subject area may require licensing under the Norwegian Export Control Act. In order to be considered for the position, it is a prerequisite that UiO must be able to be granted such licence; https://www.uio.no/english/studies/admission/master/export-control.html

We offer

- Salary NOK 501 200 - 544 400 per annum depending on qualifications and seniority as PhD Research Fellow (position code 1017)
- Attractive welfare benefits and a generous pension agreement
- Vibrant international academic environment
- Career development programmes
- Oslo’s family-friendly surroundings with their rich opportunities for culture and outdoor activities

How to apply

The application must include:

- Cover letter - statement of motivation and research interests
- CV (summarizing education, previous positions and academic work)
- Copies of the original Bachelor and Master’s degree diploma, transcripts of records and letters of recommendation
- Documentation of English proficiency
- List of any publications and academic work that the applicant wishes to be considered by the evaluation committee
- Names and contact details of 2-3 references (name, relation to candidate, e-mail and telephone number)
- Applicants who are interested in teaching need to add to this application a description of their motivation for and (if any) experience with teaching.

The application with attachments must be delivered in our electronic recruiting system (please follow the link “Apply for this job”). Foreign applicants are advised to attach an explanation of their University's grading system. Please note that all documents should be in English or a Scandinavian language.

Interviews will be part of the hiring process.

Formal regulations

Please see the guidelines and regulations for appointments to Research Fellowships at the University of Oslo.

According to the Norwegian Freedom of Information Act (Offentleglova) information about the applicant may be included in the public applicant list, also in cases where the applicant has requested non-disclosure.

The University of Oslo has an agreement for all employees, aiming to secure rights to research results etc.

Inclusion and diversity are a strength. The University of Oslo has a personnel policy objective of achieving a balanced gender composition. Furthermore, we want employees with diverse professional expertise, life experience and perspectives.

If there are qualified applicants with disabilities, employment gaps or immigrant background, we will invite at least one applicant from each of these categories to an interview.

Contact information

For further information please contact:

Professor Ketil Røed, e-mail: ketil.roed@fys.uio.no

Professor Trine S. Tveter, e-mail: t.s.tveter@fys.uio.no

Dr. Ionut C. Arsene, e-mail: i.c.arsene@fys.uio.no

For questions regarding Jobbnorge, please contact HR Adviser Elin Thoresen, e-mail: elin.thoresen@mn.uio.no

About the University of Oslo

The University of Oslo is Norway's oldest and highest rated institution of research and education with 28 000 students and 7000 employees. Its broad range of academic disciplines and internationally esteemed research communities make UiO an important contributor to society.

The research at the **Department of Physics** covers a broad range of subfields within physics and technology: From space research to medical physics. A good proportion of the research is interdisciplinary, and conducted in close cooperation with collaborators in Norway and abroad.

Education and teaching are other essential activities. We offer a broad range of courses, and the Department is involved in several study programmes at bachelor's and master's level. Some of the best lecturers in Norway are amongst our employees, and we are proud of our prizewinning teaching and learning environment. The Department has 200 employees, of which 50 are permanent scientific positions. On a yearly basis 20 students complete their Ph.D. and 50 finish their M.Sc. degree.

Additional information

Place of service:

Problemveien 7 0313 Oslo (Oslo Municipality)