

NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY (NTNU)
Faculty of Natural Sciences and Technology
Department of Physics

PhD research fellowship position in Computational Optics

The Department of Physics, Norwegian University of Science and Technology (NTNU) announces a vacant PhD research fellowship position in the field of optics for photovoltaics with the working title ***“Polariton enhanced absorption in solar cells”***. The PhD position, that is available immediately, is part of a project entitled “Nordic Centre of Excellence in Photovoltaics” financed by the Nordic Energy Research. The project is coordinated by the Institute for energy technology at Kjeller, Norway, and the other partners in the project are Danish Technological Institute, Denmark, Ioffe Physico-Technical Institute in St. Petersburg, Russia, Tallinn University of Technology, Estonia, Helsinki University of Technology, Finland, and University of Uppsala, Sweden. The scientific activity of the CoE focuses on five cross disciplinary research topics of common interest: Search for new materials, Encapsulation and lifetime of solar panels, Modelling of solar cell structures, Contacting of solar cells, and Light collection/light trapping. These topics are of common interest for all the groups and PV technologies involved in the centre, and acts consequently as cornerstones in the project.

The position is administratively part of Department of Physics, Faculty of Natural Sciences and Technology, Norwegian University of Science and Technology (NTNU) (see <http://www.ntnu.no/fysikk> for more information). To encourage cross-disciplinary work within the project, the PhD fellow has to stay in total 6 months with one of the other partners. The position is for a 4-years period, including 25% teaching duties, usually laboratory teaching at the Department of Physics.

The goal of this subproject is to increase the absorption of solar radiation in the solar cell through field enhancement via surface plasmon excitations in metallic nanoparticles and similar metallic nanostructures in the solar cells. Plasmonics is the field of science and technology related to optics of metallic nanostructures which involves surface plasmon (SP) or surface plasmon polaritons (SPP) excitations. SPPs are electromagnetic waves that propagate along, and are bounded to, the surface of a metal. Incident light cannot excite SPPs directly on a smooth metal surface due to a momentum mismatch. However, by structuring the surface, in-coupling is allowed which opens the possibilities for the development of new devices with length scales that are much smaller than the wavelength of light. Such structures have a potential for improved performance of solar cells.

The successful applicant will apply computer simulations techniques for theoretically studies of optimal geometries and materials for achieving increased absorption in highly efficient solar cells (third generation solar cells). This work will be performed in close collaboration with existing experimental activity on solar cells (Reenaas group) at the Department of physics. The applicant is also expected to participate in the characterisation of such solar cell materials with the purpose of giving input to the theoretical studies.

The Simonsen research group has in-house developed rigorous computer simulation codes for the study of optical properties of disordered systems

(cf. <http://web.phys.ntnu.no/~ingves/Science/Research/>). The current project will be based on this code as a starting point. The Department of Physics has access to state-of-the-art high performance computing facilities via NOTUR (<http://www.notur.no>) --- the national metacenter for computational science.

We seek highly motivated individuals holding a MSc degree in physics, mathematics, electrical engineering or equivalent. Advanced courses in physics/optics and mathematics are considered important. The candidate should have a background in theoretical physics suitable for attacking electromagnetic scattering problems, often in complex geometries. Since essential parts of the work will consist of developing and running scientific simulation codes, proficiency in one of the major programming languages (especially Fortran 90/95) will be required.

For other than native speakers of English or Scandinavian, a documented proof of excellence in spoken and written English may be required. Applicant may also be asked for a more extensive proof of proficiency in one of the major scientific programming languages.

Interested candidates are encouraged to contact Professor Ingve Simonsen (ingve.simonsen@ntnu.no, +47 73 59 34 17) for further information.

The start salary for the PhD fellowship is set at Norwegian state salary code 1017, level 43, NOK 325,600 per year. Two percent of the salary will be deducted at source as an obligatory premium to the Norwegian State Pension Fund.

The successful applicant must agree to the conditions laid down for public employees. The national labour force must reflect the composition of the population to the greatest possible extent. It is therefore a major political objective to achieve a balance of age and gender and to recruit persons with an immigrant background. Immigrants are encouraged to apply for this post. NTNU wants to increase the proportion of women in its scientific posts. Women are encouraged to apply.

The application must contain information about education, examinations and previous experience. Certified copies of certificates of education and documents must be attached. Names and contact details of two referees must also be given.

Copies of (up to five) publications and any other work which the applicant wishes to be taken into account should also be enclosed. Joint works will be considered. If it is difficult to specify the input of the applicant in a joint work, a short summary should be attached outlining the applicant's input.

Please send applications electronically by using the website www.jobbnorge.no. The application should be marked with the reference number NT- 24/08.

Other publications that can not be sent electronically should be marked with the reference number and sent to Faculty of Natural Sciences and Technology, Norwegian University of Science and Technology, NO-7491 Trondheim, Norway. These documents will only be returned on request.

Application deadline: April 30th 2008.