

5 PhD-positions in soft matter science

Application deadline: March 15, 2007. Reference number 2007/40.

At the Department of Applied Physics, Division of Condensed Matter Physics, we now announce 5 PhD-positions in Soft Matter science. Soft Matter science is a rapidly expanding research field in the interface between physics, chemistry and biology. Materials ranging from glasses, polymers and gels to biological macromolecules (e.g. proteins and DNA) and colloids are at focus in this area.

The PhD-projects are directed towards both fundamental studies of *structure and dynamics of disordered systems* and *soft matter for energy applications*. The nature of the research projects is experimental and based mainly on advanced spectroscopic techniques available in our own laboratories as well as at international large-scale facilities. All projects have interdisciplinary elements and close connections to other research groups both nationally and internationally. There is a particularly high potential for collaboration within the newly established Soft Matter Centre at Chalmers.

We are searching for creative candidates with excellent analytical and language skills and a strong interest in interdisciplinary research. The successful candidate should have a Master's degree in physics or chemistry or equivalent. Along the lines of the department's strive for equal opportunities, we encourage female applicants.

The employment

As a Ph.D. student, you will work on research related tasks and participate in Ph.D. courses, leading to licentiate and Ph.D. degrees. In addition, you will be required to teach and conduct other departmental duties corresponding to at the most 20%. The employment is limited to a maximum of 5 years.

The application

Welcome with your application letter, CV, transcripts of high school and university degrees and grades, a copy of your master thesis and contact information for at least two references. You should also state which project(s) you are mostly interested in and give a short motivation why you apply for this position and why you are the best candidate. Send your application before March 15 marked with reference number e 2007/40 electronically as a pdf-file to registrator@adm.chalmers.se.

You are also welcome to contact Professor Lars Börjesson, +46 31 7723307 , borje@fy.chalmers.se Senior Lecturer Aleksandar Matic +46 31 7725176, matic@fy.chalmers.se or Professor Per Jacobsson , head of department + 46 317723427, pjacob@fy.chalmers.se.

Project descriptions

Structure and dynamics of disordered systems (2 positions)

Soft matter constitute a large part of our everyday life. These materials present a vast number of fundamental, as well as technological, challenges since they are often disordered, fragile and show a low contrast between phases. It is thus difficult to apply the standard tools, theoretical as well as experimental, of traditional solid-state physics. The scientific challenges are many and concern phenomena related to the structural organization, to the dynamic behaviour, the existence and character of phase transitions and the connection between microscopic detail and macroscopic properties. Applications are closely coupled to the fundamental research, e.g. in "smart" drug carriers, biosensors, electrolytes, nano-structured materials and medical implants. Our research in this field is directed towards fundamental structure and dynamics of glasses, polymers, gels, complex liquids and colloidal systems. The PhD-projects will particularly involve studies of hydrogen bonded systems, of the dynamical behaviour of glasses and glass-forming liquids under pressure and the influence of disorder on vibrational excitations.

Soft Matter for energy applications (3 positions)

The development of new and more efficient fuel cells and batteries for mobile as well as stationary applications is dependent on a fundamental understanding of materials' function and on the development of new tailor made materials. A central part in this work is the search for new electrolytes both for lithium batteries and low temperature fuel cells. Soft matter based systems, such as ion conducting glasses, polymer electrolytes and ionic liquids, are of high interest as they have the potential to combine high ionic conductivity with good mechanical , chemical and thermal properties.. Our research in this field is directed towards reaching an understanding of the microscopic structure and dynamics of new electrolyte materials and their relation to the ionic transport, mechanical, thermal and chemical properties. The PhD-projects span from fundamental studies of ion-conducting glasses, polymers and ionic liquids to ion-situ spectroscopy of membranes in a working fuel cell.