

Postdoctoral position in materials physics for the project “Tuning the speed of hydrogen transport in amorphous metals: from ultra-fast to ultra-slow”

Uppsala University is an international research university focused on the development of science and education. Our most important assets are all the individuals who with their curiosity and their dedication make Uppsala University one of Sweden's most exciting work places. Uppsala University has around 40,000 students, 7,000 employees and a turnover of roughly SEK 6,5 billion.

Researchers at the Department of Physics and Astronomy, situated in the Ångström Laboratory, conduct world-class research and education. The department is the second largest at Uppsala University with more than 300 employees and 10 different divisions. For more information, visit <http://physics.uu.se/>. The project will be jointly carried out within the Division of Materials Physics and the Division of Materials Theory, where we cover a wide range of topics within condensed matter physics: see <http://www.physics.uu.se/research/materials-physics+/> and <http://www.physics.uu.se/research/materials-theory/>. Thus, the postdoctoral researcher will benefit from working in an exceptionally diverse environment and will have ample opportunities to interact and collaborate with leading theoretical and experimental groups.

Project description:

Climate change and competitiveness are key policy drivers for Sweden and Europe, with a commitment to zero net emission of greenhouse gases by 2045. The hydrogen economy will become part of the solution whereby hydrogen is extracted with renewable energy from water and subsequently stored for later use. When the energy is needed, the stored hydrogen is combined with oxygen from the atmosphere in a fuel cell, which results in a pollution free and sustainable energy mobility.

Several grand challenges remain within the fields of hydrogen production, purification, and storage throughout the vertical chain, from basic research to industrial commercialisation. The postdoctoral work will address these challenges by exploring new amorphous metallic systems to create hydrogen superhighways and robust roadblocks.

The project involves a combined experimental and theoretical screening method for finding new amorphous metals with unique properties. We will develop and use combinatorial thin film techniques to create composition gradients on a chip, and screen the whole phase diagram of amorphous metal hydrides for potential candidate materials using optical techniques.

Two research fields are highlighted: (i) creation of new amorphous metals and exploring their properties with neutron and optical scattering, and (ii) numerical simulations to predict, understand, and screen new candidates.

This project will help to improve our understanding of amorphous solids and will establish a bridge to connect their properties to those of crystals. Additional novel, unexpected phenomena should emerge due to the new interplay between structural order and physical properties.

The ultimate goal of the studies is not only to open and study a new research field but also to explore the frontiers of the possible applications of the new materials.

Requirements: The applicant should have a PhD degree in Physics or equivalent. Experience in one or more of the following areas are considered a merit: modern optics, Raman or Brillouin scattering, neutron or x-ray scattering, thin film synthesis, computational physics, density functional theory, and lattice dynamics. Personal qualities such as dedication, motivation, initiative and independence are valuable. Very good skills in spoken and written English are required.

How to apply: The application should include a letter of intent that explains general research interests, specific interests in the announced project, and what unique skill set the applicant can contribute with to the success of the project, especially past experiences regarding the topics listed above as being of great importance for this position. The application should include a CV, a copy of the PhD thesis and any other relevant documents. Furthermore, contact details for at least two letters of references should be provided.

Uppsala University aims for gender balance and diversity in all activities in order to achieve a higher quality at every level of the organization. We therefore especially encourage underrepresented minorities to apply.

Pay: Fixed tax-free scholarship for 1 year with possible prolongation for a second year.

Starting: 2020-04-01 or as otherwise agreed.

Type of employment: Full time, Time-limited position

Working hours: 100%

For further information about the position please contact:

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