

Three examples of research possibilities at ESS

Upgrade cancer diagnosis

Each year, 80 million MRI examinations are carried out in order to help doctors and healthcare professionals around the world diagnose a variety of diseases, including a range of cancers. However, the level of detail in today's scanners is still limiting. In order to develop a more detailed MRI scanner, new, better superconducting materials are needed that can create stronger magnets and thereby larger magnetic fields.

The research with neutrons that will be conducted at ESS will enable analysis of the magnetic structure of superconducting materials that was previously impossible, which in turn creates a more favourable environment for further development of MRI scanners.

Improve the transport sector

Fast, safe and efficient transport is based on strong, light and heat resistant materials. In order to create new materials that meet tomorrow's challenges within the transport sector, researchers are working on influencing material properties. By changing material properties to withstand higher temperatures, for example, the materials can maintain combustion better, which in turn leads to more efficient processes.

At ESS, researchers will gain a better understanding of how atoms react to the heat, stresses and loads that occur during both the manufacturing process and the operational lifecycle. The instruments at the facility will enable the examination of process and operating conditions of the materials in real time.

Refine renewable energy sources

Although there are already many solar energy systems around the world, the industry continues to face major challenges in using solar energy as a primary source of energy. Researchers are working to find better ways to exploit the potential of sunlight, with a particular focus on improving the efficiency of organic solar cells, as they can provide a more versatile, attractive, and cheaper solar energy solution.

ESS enables researchers to investigate the electrical properties of heated organic solar cells on a nanoscale - something that was not previously possible. Understanding structural changes as solar cells heat up will be crucial in being able to use more efficient and sustainable solar cell technology for daily use.

ESS will be the world's most sensitive neutron source, which will help us understand more about the molecular and atomic structures, and energy, of different materials. Understanding this can contribute to new discoveries in research areas such as quantum physics, pharmaceuticals and biology.

