# UK-Netherlands collaboration will build state-of-the-art neutron super-microscope

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Digital impression of the final construction of Lamour

A new neutron super-microscope that will help pave the way for new high-tech materials is under construction at ISIS, the Science and Technology Facilities Council's (STFC) world-leading neutron and muon source in Oxfordshire.

The new microscope, called Larmor, will be at the forefront of materials science for engineering, food, health and the natural environment. For example, knowledge gained could play an important role in the development of new high-tech materials for electronic equipment, or in speeding up charging speeds of lithium-ion batteries in electronic vehicles.

"You can also use the instrument in the study of new molecules that can

transport medication to the exact location of a tumour, or for improving the composition of food, such as margarine," said Professor Katia Pappas, Research Co-ordinator, Delft University of Technology (TU Delft).

Larmor will use beams of neutrons to see the exact positions and movements of atoms inside materials with unprecedented accuracy and resolution.

Additional funding to build the innovative neutron super-microscope at ISIS has been announced from the Netherlands Organization for Scientific Research (NWO) and a consortium of Netherlands universities led by TU Delft.

The Netherlands funding complements previously secured UK funding for the Larmor instrument announced in March 2011 by David Willetts, the Minister for Universities and Science. Larmor is one of four instruments being built as a result of this funding for the Phase 2 instrument suite at the second target station at ISIS.

A number of industry supporters have already expressed a strong interest in using this new instrument, including, Tata Steel, SKF Group, NIZO Food Research, M2i (the Dutch materials innovation institute), Unilever, TI Food Nutrition and the Dutch Polymer Institute.

Over the next five years, ISIS will collaborate with the three Netherlands universities to develop this new and unique super-microscope. The £4.5 million UK contribution to Larmor will provide a high-intensity small-angle scattering instrument, whilst the Netherlands contribution will provide components that give state-of-the-art control of neutron beam polarisation. It is this additional apparatus that will significantly improve accuracy and resolution to levels previously unattained.

"By working closely together we have demonstrated that we are able to build the world's most advanced neutron instruments and use them to develop a unique understanding of modern materials science," said Dr. Uschi Steigenberger, ISIS director.

"Recent collaborations between ISIS, TU Delft and NWO have already resulted in the construction of the Offspec reflectometer on the second target station at ISIS. The new Larmor instrument that we will build together will significantly extend the concepts used on Offspec to deliver new experimental capabilities to the scientific and industrial user communities."

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