

Frequently Asked Questions

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What does ISIS stand for?

While ISIS was being built, it was known as the Spallation Neutron Source, or SNS but it was decided that it deserved a better name.

Isis was the principal goddess of ancient Egypt. She had power transcending that of all other deities and was able to bring the dead back to life. Isis has been considered by many to be the symbol of renewal of life. Most notable, perhaps, was the revitalising of her lover who needed reassembly after battle.

This was a particularly appropriate name for the new neutron source since large amounts of its equipment were recycled from previous accelerators in the United Kingdom (Nimrod and Nina). It also lies near to the river Thames, which is known as the ISIS in this part of Oxfordshire.

When was ISIS built?

Construction of ISIS began in 1978 when Nimrod, the existing accelerator on the site, was switched off and dismantled. In 1980, plans were made to begin experiments in 1984, when construction of the majority of the new facility would be completed.

ISIS was formally inaugurated and named on 1 October 1984 by the then Prime Minister, the Rt. Hon. Margaret Thatcher FRS MP. She was accompanied by the Secretary of State for Education and Science, The Rt. Hon. Sir Keith Joseph MP, Science Ministers from Italy, Luxembourg and Spain, and representatives from many other countries.



At 7:16 pm on Sunday, 16 December 1984, the culmination of 7 years of hard work by staff throughout the laboratory paid off, and the first neutrons were produced. Initially only 5000 pulses of protons were fed to the target, but this was sufficient for test experiments to confirm that ISIS would be the world's leading spallation neutron source.

What was before ISIS?

As interest gathered in nuclear physics, the experiments and equipment required became larger, more sophisticated and more expensive. Creating new nuclear particles and studying nuclear phenomena in more detail required targets to be bombarded with higher and higher energy particles. It became clear that individuals could no longer work in isolation and if further progress was to be made, co-operation between many institutes and universities would be needed.

On 14 February 1957 the United Kingdom Government announced to the House of Commons that it had created a new National Institute for Research in Nuclear Science (NIRNS) where

'The main object of the Institute will be to provide, for common use by universities and others, facilities and equipment which are beyond the scope of individual universities and institutions carrying out research in the nuclear field.'



The Rutherford High Energy Laboratory

The first laboratory of the new Institute was established at Chilton, Oxfordshire, on a site adjacent to the Atomic Energy Research Establishment at Harwell, and was called the Rutherford High Energy Laboratory (RHEL) in honour of the great achievements of Ernest Rutherford. The first proton accelerator at the laboratory, NIMROD, was built in the halls that now house ISIS.

Who was Rutherford ?

Ernest Rutherford, one of the most illustrious scientists of all time, single-handedly founded the areas of nuclear and high energy physics.

His first achievement was to explain radioactivity as the emission of alpha and beta particles when atoms spontaneously disintegrate. With Geiger, he devised a method of detecting a single alpha particle and counting the number emitted.

In 1910, his investigations into the scattering of alpha particles and the nature of the inner structure of the atom which caused such scattering led to the postulation of his concept of the 'nucleus'. This was his greatest contribution to physics.

Later, he discovered that the nuclei of certain light elements, such as nitrogen, could be 'disintegrated' by the impact of energetic alpha particles coming from some radioactive source. During this process fast protons were emitted and the nitrogen was transformed into an oxygen isotope. Rutherford was the first person to deliberately transmute one element into another.

Why is the laboratory named after Rutherford?

In 1957 the creation of a new National Institute for Research in Nuclear Science was announced by the United Kingdom Government. The first laboratory of the new Institute was named the Rutherford High Energy Laboratory (RHEL) in honour of the great achievements of Ernest Rutherford, who is acknowledged to be the founder of the areas of nuclear and high energy physics.

Who was Appleton?

Edward Victor Appleton was born in Bradford on 6 September 1892. During his time at Cambridge University he was a student of Ernest Rutherford and J.J. Thomson.

Following the First World War, he returned to Cambridge and took up research on radio waves, using them to study the atmosphere. One of his most famous experiments proved the existence of the layer in the upper atmosphere now called the ionosphere. Using the BBC Bournemouth transmitter, he sent radio waves up to the layer to see if they were reflected by it and they came back! By a slight change of wavelength it was possible to measure the time taken by the waves to travel to the upper atmosphere and back, and its height above the ground was found to be 60 miles. The ionosphere was the first 'object' detected by radio waves, and this led to the development of radio research and the invention of the radar.

He was awarded the Nobel Prize for Physics in 1947 'for his investigations of the physics of the upper atmosphere especially for the discovery of the so-called Appleton layer'.

Why is the laboratory named after Appleton?



Appleton was heavily involved in atmospheric research and was a member of the senior committee of the Radio Research Board, established in 1920 to assist the co-ordination of radio research work carried out by the fighting services and the Post Office.

At that time these areas of research required very large aerials, which had to be separated by a considerable distance from other experiments. The Admiralty provided a large area of flat, open land adjoining their Compass Observatory at Ditton Park on which isolated huts were erected to enable several experiments to be carried out simultaneously. The laboratory became known as the Radio Research Station, Slough.

From the launch of the Sputnik satellite in 1957 the Station became more involved in space programmes and the study of fundamental geophysical problems and in 1965 it was renamed the Radio and Space Research Station (RSRS).

In 1973, the RSRS became responsible for managing and supporting the whole United Kingdom space-science programme, and in recognition of the outstanding contributions of the late Sir Edward Appleton to the development of radio science, the RSRS became the Appleton Laboratory.

How was the Rutherford Appleton Laboratory formed?

The Rutherford Laboratory and the Appleton Laboratory were merged into the Rutherford Appleton Laboratory (RAL) on 1 September 1979 following the recommendations of a Government Review Panel.

Collaborations between the laboratories on a variety of projects in space science had steadily increased and there was a clear advantage in bringing the expertise of the two laboratories together on one site to enable new space science research programmes to flourish.

The recommendation was that the Appleton Laboratory at Ditton Park should be merged with the Rutherford Laboratory at Chilton, first by the formation of a joint management structure, and later by the progressive transfer of resources to Chilton from Ditton Park.

By 1981, the majority of the Appleton Laboratory had been transferred to the present Chilton site, whilst the remaining activities were transferred to the Chilbolton Observatory which also became a part of RAL, leaving the Ditton Park site to be closed after almost 61 years of continuous research.