University academic wins top physics prize

Posted on Tuesday 6th July 2010

A University of Birmingham nuclear physicist has been awarded the prestigious 2010 Rutherford medal and prize for his research work on light nuclei.

Professor Martin Freer, Professor of Nuclear Structure and Reactions at the University's School of Physics and Astronomy, has picked up the prestigious prize, which is awarded every two years for "distinguished research in nuclear physics or nuclear technology".

The citation of the award, launched in 1966 by the Institute of Physics, states that Professor Freer was recognised "for establishing the existence of nuclear configurations analogous to molecules and demonstrating the existence of nucleon-clustering in key light nuclei, a long-standing issue in the field."

Professor Freer has made a significant contribution to research that has been challenging nuclear scientists for nearly a century: understanding the structure of light nuclei, which means how the constituent protons and neutrons arrange themselves inside the nucleus.

"This is important as it provides information on the nature of the force which acts inside the nucleus, but also is important as it has significant implications for how the elements are synthesised inside stars," explains Professor Freer.

Almost 100 years ago nuclear scientists suggested that rather than being homogeneously distributed, protons and neutrons are clustered into sub-nuclei which exist inside the nucleus.

Experimental studies of a series of nuclear systems have revealed that such clustering does exist and the conditions required to form clusters.

"In particular it has been demonstrated that clustering gives rise to structures where neutrons can "jump" between the clusters; just as electrons jump between atoms in atomic molecules," says Professor Freer. "These discoveries have changed the way that the field thinks about light nuclei."

© University of Birmingham 2015