

*SEMINAR*

**Prof. Robert A. Robinson**

*University of Wollongong, Australia*

**September 29<sup>th</sup>, 2022 - 15:00, Seminar Room “U.M. Grassano”**

**NEUTRONS FOR ENERGY AND FOOD**

Neutron scattering is a powerful research technique for the study of materials in all manner of applications. Originating from nuclear physics and starting out in condensed-matter physics, its use spread to chemistry in the 1970s and to biology, engineering, cultural heritage and palaeontology since then. In this talk, I will outline its application to current issues in energy materials and food science. The neutron is ideal for studies of hydrogen and other light elements, so it is very useful in studies of all aspects of the “hydrogen economy” as well as important components (like lithium and carbon) in lithium-ion batteries. In addition, many important electronic materials are oxides, and neutrons are useful to determine both structures and diffusion in these materials. The main techniques are neutron diffraction (for the structures of materials), neutron spectroscopy (to determine how the atoms and ions move) small-angle neutron scattering and neutron reflectometry to study structure on the nano-scale, and finally neutron imaging (to visualize and quantify how macroscopic structures are formed, and how fluids move, in real devices. The same techniques are growing in importance in food materials science, as there is important structure at all length scales from the atomic right up to that of a loaf of bread.



Prof. Robinson has almost 40 years of experience in neutron scattering and condensed-matter physics. A graduate from the Cavendish Laboratory at the University of Cambridge, he then went to Los Alamos National Laboratory, initially as a postdoctoral fellow, and stayed there for 17 years. In 1999, he moved to Sydney, Australia, to lead the neutron scattering effort, and build-up of both instruments and staff, at the new OPAL research reactor. He retired from ANSTO in July 2016, and currently has an adjunct professorial position with the University of Wollongong. He is a Fellow of the American Physical Society and was President of the Australian Institute of Physics between 2013 and 2015.

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