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CAMPUS TECNOLÓGICO E NUCLEAR

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Palestrante/Speaker:	António M. dos Santos	Quantum Condensed Matter Division, Neutron Sciences Directorate, Oak Ridge National Laboratory, Oak Ridge Tennessee, USA
Título/Title:	***Frontiers of Neutron Research at SNAP: Research on Solid State Physics, Chemistry and Geophysics***	

The intrinsic properties of neutrons and the way these interact with matter, make neutron scattering a unique tool allow studies on problems mostly inaccessible through other techniques, such as structural studies of compounds containing light elements, the magnetic structure of materials, the non-destructive testing of engineering parts and phonon dynamics. However, unlike other sources of radiation, such as visible light or X-rays, neutrons can only be produced, in useful amounts for scientific research, in dedicated large scale facilities, such as nuclear reactors or spallation sources. The Oak Ridge National Laboratory is one of the only user facilities in the world to house these two types of neutron sources, the Spallation Neutron Source (SNS) and the High Flux Isotope Reactor (HFIR), making it arguably the leading laboratory in the world for neutron scattering research. The Spallation Neutrons and Pressure (or SNAP) is a diffractometer dedicated to the study of materials under high pressure that is part of the SNS's suit of instruments. Since it began operating, a broad range of materials systems have been investigated, in the form of powders, glasses and single crystals. Here we will present some recent scientific results of research performed at SNAP, namely examples of compression mechanisms of amorphous solids, magnetic phase diagrams in lanthanides, phase competition in manganites and structural studies of clathrate hydrates. These examples will highlight how the use of the SNAP capabilities is already resulting in an exciting science. Finally, ongoing improvements and additions to the SNAP capabilities will be discussed; in particular the recent development through the Instrument Development Team of a new generation of diamond anvil pressure cells that allows data collected up to 90 GPa, a new record in the context of neutron scattering.