

## Keynote Lecture

KN-09

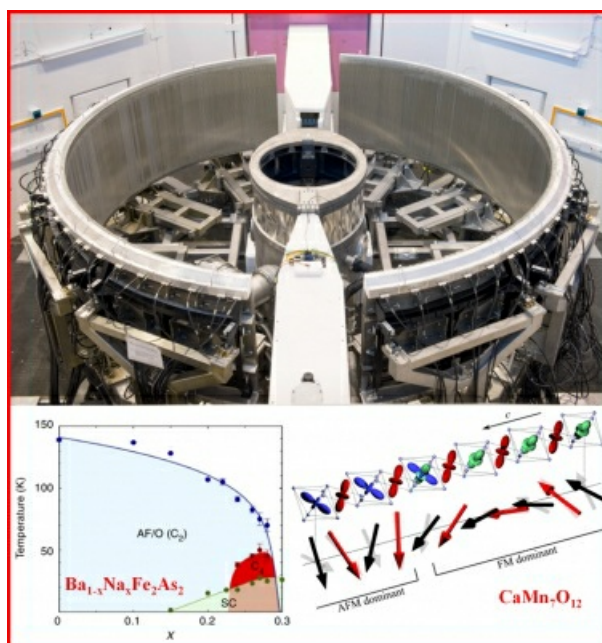
### *Magnetic degrees of freedom in emerging materials*

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Magnetic materials embrace a wide variety of alloys and compounds, which are used in a diverse range of applications. In addition, magnetism is a tremendously interesting subject, offering challenges in many aspects of fundamental science. Recent advances in magnetic semiconductors, multiferroics, interaction between superconductivity and magnetism and topological effects have generated an extensive research front. As a result, magnetism continues to inspire excitement and attracts researchers from many different areas of science. One of the key experimental tools, playing a leading role in exploration of magnetic degree of freedom in solids, is neutron diffraction. Large scale facilities spread across the world provide access to neutron scattering for a vast user community and substantially contribute to fundamental understanding of magnetic phenomena. In the lecture, I will overview the most exciting science on the WISH beamline - a cutting edge high-resolution cold-neutron diffractometer located at the second target station of the ISIS facility. The beamline was primarily designed to study magnetic materials and large unit cell systems. For several years of operation, WISH data have made breakthroughs in many classes of emerging materials, such as multiferroics, iron-based superconductors, geometrically frustrated systems, heavy fermion metals and Kondo semiconductors. Based on several representative examples, I will discuss how magnetism interplays with other degrees of freedom in these exciting materials.



**Keywords:** [Neutron diffraction](#), [multiferroics](#), [iron-based superconductors](#)