

INVESTIGATING MAGNETISM AND SUPERCONDUCTIVITY BY NEUTRON SPECTROSCOPY

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Neutron spectroscopy has been of particular importance to appreciate the interrelation of magnetism and superconductivity by revealing the microscopic spin dynamics in momentum and energy space. Upon entering the superconducting state the energy dependence of the dynamic response changes at selected momentum space positions, reflecting the opening of the superconducting gap.

In this neutrons help answering the following essential questions:

- (i) Are magnetism and superconductivity two different phenomena or manifestation of a new ground state?
- (ii) How can neutron spectroscopy reveal the symmetry of the corresponding order parameters?
- (iii) What are the energy scales relevant for the superconducting coupling mechanism?

I will present various examples from different classes of unconventional superconductors with an emphasis on cerium- and actinide-based intermetallic superconductors. Those experiments profited from the latest neutron instrumentation at both ILL, Grenoble, France and FRM2, Munich, Germany. This paves the way to future experiments and in the second part of my presentation I will report on the progress towards the next generation neutron source ESS in Lund, Sweden.