Perspectives with High Magnetic Fields at Neutron Sources

Wednesday 02 November 2022 - Friday 04 November 2022

ILL Chadwick Amphitheatre

Programme

Introduction

The ISABEL project which finances this workshop aims to strengthen the long-term sustainability of the [EMFL][1] through the realization of three objectives :

- enlargement of the EMFL structure and build a great community by improving several organisational aspects (such as data management, outreach and access procedures).
- bridge the gap with industry to strengthen the socio-economic impact of the EMFL.
- strengthening of the role of high magnetic field research in Europe.

This workshop will gather scientific and technical experts of high-field and neutron facilities with the aim to identify the needs of the neutron community, evaluate the technical challenges and prepare a roadmap for developing unprecedented capabilities.

[1]: https://emfl.eu

Inspiration for the use of high-B fields

Studies of magnetism, superconductivity and quantum systems with neutrons is a vibrant research area, which is underpinning a new generation of devices as well as leading to a deeper understanding of Nature at a fundamental level. During this first session, we shall discuss how invaluable is the ability to reach higher magnetic fields for exploring new states of matter and what are the most efficient ways to exploit neutron beams with high-field magnets.

Experience with pulsed fields | Science & Techniques

Up to 40 T pulsed magnetic field set-ups/devices have been developed over the past 15 years for carrying out neutron diffraction experiments. During this session, we shall get an overview of the science produced so far and the technical difficulties solved with great success. We shall also discuss the perspectives toward much higher magnetic fields and/or extended duty cycle.

Experience with static fields | Science & Techniques

Since the recent shutdown of the HZB neutron source and despite the continuous development of superconducting magnets for decades, the highest static magnetic fields currently available at neutron facilities do not exceed 15 to 17 Tesla. During this session, we shall discuss about the experience gained with the 26T HZB magnet and the desired capabilities of future extreme-field magnets: sample volume, temperature and pressure, magnet geometries, auxiliary measurements techniques, etc.

Perspectives & Projects | Specifications & Roadmap

Following the sessions presenting recent scientific and instrumental breakthroughs, we shall discuss about the state of the art and identify paths toward the collaborative development of modern high-field magnets for neutron scattering facilities.