

State of the art and perspectives of LNCMI pulsed magnets at neutron sources

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The Laboratoire National des Champs Magnétiques Intenses (LNCMI) is a French host facility for experiments in high magnetic fields. LNCMI is a member of the European Magnetic Field Laboratory (EMFL) with the Hochfeld-Magnetlabor in Dresden (HLD) and the High Field Magnet Laboratory in Nijmegen (HFML). The Toulouse facility is dedicated to the generation of pulsed magnetic fields. The LNCMI-Toulouse has been engaged for two decades in the development of pulsed magnets suitable for experiments combining high magnetic fields and other condensed matter probes such as X-rays and neutrons.

We present here the existing cryomagnet developed in collaboration with the ILL and the CEA for single crystal neutron diffraction [1], focusing on the 40 Tesla long duration and high duty cycle pulsed magnet. This magnet combines state-of-the-art developments such as optimized reinforcement density and rapid cooling channels. Improvements are still possible based on this original design in terms of magnetic field, pulse duration and repetition rate. We present a preliminary design study of an improved magnet and also discuss some technical issues and the possibilities to solve them.

[1] F. Duc et al. Review of Scientific Instruments 89, 053905 (2018); <https://doi.org/10.1063/1.5028487>

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