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## Realization and commissioning of WAVE Neutrons a Wide Aperture Vector Magnet for Neutron scattering experiments delivered Turn Key

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WAVE is a one tesla superconducting vector magnet for neutron scattering experiments. It will expand the range of experimental scattering possibilities by being able to applying a 3D magnetic field in any orientation, completely independently from orienting the sample in diffraction condition. WAVE will be used as a sample environment on neutron scattering instruments relevant for magnetism studies and thus available to a large community of users. This equipment is based on an innovative design (patent FR12 62 070, US extension 14/105,711), the magnet is made of 16 coils, all with a vertical axis, the homogeneity of the field is better than 1000 ppm. The design concept of WAVE, consists of NbTi wire wound solenoids imbedded in an aluminum box, indirectly cooled by a thermosiphon loop of liquid helium which is liquefied by a 2-stage cryocooler. An additional 1-stage cryocooler cools down the thermal screen and the current leads. This equipment has a very wide aperture which is crucial for neutron diffraction ( $220^\circ$  horizontal,  $\pm 10^\circ$  vertical with a warm sample bore of 100 mm). The WAVE neutrons magnet system fabrication contract has been awarded to SIGMAPHI group. In this context, we present in this paper all the realization work performed by our company to deliver a complete turn-key magnet system comprising the magnet with its cryostat, its cooling system, its dedicated power supplies and quench detection system. We also report in this paper the results of the factory acceptance tests as well as the preliminary site acceptance tests performed at CEA during the last few months.

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