



Contribution ID: 1078

Type: Poster Presentation of 1h45m

Magnet System for the BabyMIND Neutrino Detector at J-PARC

Monday, August 28, 2017 1:15 PM (1h 45m)

The BabyMIND Experiment, supported by the CERN Neutrino Platform program, is a downstream muon spectrometer on the T2K beamline for the WAGASCI experiment at J-PARC in Japan. The BabyMIND detector aims to improve the measurements of the ratio of neutrino interaction cross-section on water and carbon, and to establish charge identification for muons with momenta below 1 GeV/c, where multiple scattering degrades muon momentum measurements. The detector's magnet system comprises a horizontal stack of 30 mm thick individually magnetized iron plates of size 2.0 m by 3.5 m. The overall mass of the block shaped magnet system is about 65 t including 2.3 t of insulated aluminum strip-shaped conductor. An innovative method of plate magnetization was developed. The magnetization scheme developed is optimized flux return for minimum stray field and operating current, while maximizing the useful tracking area with one-directional homogeneous magnetic field of 1.5 T. The magnet is operated at 140 A for generating the nominal field in the iron plates requiring only 12 kW power consumption with no need of any active cooling system. The magnet system for BabyMIND was constructed in 2016 and tested at CERN early 2017. In this paper the development and optimization of a new type of magnetization layout and its advantages are discussed. The coil module and overall system design, coil winding method, construction of the magnet modules, system assembly on site, as well as the results of the module and system testing are presented.

Submitters Country

Switzerland

Primary authors: DUDAREV, Alexey (CERN); ROLANDO, Gabriella (CERN); PAIS DA SILVA, Helder Filipe (CERN); NOAH MESSOMO, Etam (Geneva university); BLONDEL, Alain (Universite de Geneve (CH)); TEN KATE, Herman (CERN)

Presenter: DUDAREV, Alexey (CERN)

Session Classification: Mon-Af-Po1.02

Track Classification: A5 - Particle Detector Magnets