

Project of a mobile muon hodoscope for muonography of various objects

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At present, the method of muonography (by analogy with X-ray radiography) of the internal structure of various objects of natural or artificial origin using the natural flux of cosmic ray muons has become widespread. To implement this method, a mobile muon hodoscope (MMH) is being developed at the NEVOD Scientific and Educational Center (MEPhI). The design of the MMH is a multichannel detecting system consisting of six single-projection planes with an active area of about 1 m². Each single-projection plane is an assembly of two layers of 96 scintillation strips in each layer with geometric dimensions of 10 × 7 × 1000 mm³ with light collection using wavelength-shifting optical fibers to silicon photomultipliers (SiPM). The layers are shifted by half of the width of the strip relative to each other and fixed between two aluminium sheets. 32 SiPM signals are transmitted to an electronic reading system based on a 32-channel ASIC PETIROC 2A. Two adjacent single-projection planes are rotated relative to each other by 90 degrees.

In this report the features of the construction and registration system of MMH are discussed. The results of tests of a sample of a silicon photomultiplier, as well as a prototype of a single-projection plane consisting of 32 scintillation strips are presented.

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