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Totally Active Scintillator Calorimeter for the Muon Ionization Cooling Experiment

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The Electron-Muon Ranger (EMR) is a totally active scintillator detector to be installed in the muon beam of the Muon Ionization Cooling Experiment (MICE) - the R&D project for the future neutrino factory. It is aimed at measuring properties of low energy beam composed of muons, electrons and pions performing the identification particle by particle. The EMR is made of 48 intersecting layers. Each layer consists of 59 triangular scintillator bars. The granularity of the detector (2880 readout channels) makes it possible to identify tracks and measure particle ranges and shower shapes. The read-out is based on FPGA custom made electronics and commercially available modules. It was built at University of Geneva and installed at the Rutherford Appleton Laboratory in Oxford in September 2013. Tests with low energy beam (100 - 400MeV/c) revealed an exceptional performance of the detector.

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