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Status of the Mu2e crystal calorimeter

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The Mu2e experiment at Fermilab will search for the charged-lepton flavor violating neutrino-less conversion of a negative muon into an electron in the field of an aluminum nucleus. The Mu2e detector is composed of a tracker, an electromagnetic calorimeter and an external active veto for cosmic rays. The calorimeter plays an important role in providing excellent particle identification capabilities, a fast online trigger filter while aiding the track reconstruction capabilities. The calorimeter requirements are to provide a large acceptance for 100 MeV electrons and reach: i) a time resolution better than 0.5 ns; ii) an energy resolution better than 10%; iii) a position resolution of 1 cm. The calorimeter consists of two disks, each one made of 674 pure CsI crystals readout by two large area 2×3 array of UV-extended SiPMs of 6×6 mm² dimensions. We report here the tests done to finalize the calorimeter design and the status of production and construction. At the moment of writing, 85% of the crystals and all the SiPMs have been produced and characterized. The calorimeter engineering drawings have been completed and the large mechanical components are under fabrication. Analog and digital electronics have been prototyped and tested with irradiation dose so that the serial production is being organized. The calorimeter assembly phase is planned for end-2020.

Summary

Fermilab report number

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