



Contribution ID: 23

Type: Oral

Scintillating Fiber Detector for the Beam Loss Proton Measurements at J-PARC Linac

Wednesday 4 June 2014 12:20 (20 minutes)

In the J-PARC linac, due to its high intensity H⁻ beam, significant beam loss has been observed at the downstream straight beam line section called ACS (Annular-Coupled Structure linac). The loss is mainly due to a proton which is produced due to double electron stripping of the H⁻ beam by the residual gas inside the beam pipe, and the titanium beam pipe.

We have developed a detector system consisting of 8 planes of scintillating fiber hodoscopes in order to measure proton tracks emitted from the beam pipe of the J-PARC linac. The system measures positions of the charged particle tracks in a small solid angle, and also measures the time-of-flight of each particle.

We show angular and energy distributions of the proton tracks measured in 2012-2013. We also show comparison of the results with simulation.

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Session Classification: I.e Novel Technologies

Track Classification: Sensors: 1e) Novel technologies