Conceptual design of beam dividing system for J-PARC Transmutation Experimental Facility

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The Japan Proton Accelerator Research Complex (J-PARC) consists of three accelerators and three experimental facilities. In addition, new experimental facility for the Accelerator-driven system (ADS), the Transmutation Experimental Facility (TEF), is planned [1, 2]. The TEF is composed of two experimental facilities, Transmutation Physics Experimental Facility (TEF-P) and ADS Target Test Facility (TEF-T), and both facilities use the 400MeV proton beam from the LINAC [3, 4]. The LINAC is now operating in repetition of 25Hz for the 3GeV rapid-cycling synchrotron (RCS) and downstream facilities. Therefore in order to keep beam power for existing experimental facilities and furthermore to deliver the beam to the TEF, the LINAC should be operating in 50Hz and new beam dividing system will be installed at the upstream of the L3BT (LINAC to 3GeV RCS Beam Transport) straight section. The L3BT straight section of a doublet structure is adopted as the fundamental lattice, keeping the continuity of the transverse focusing scheme [5, 6]. The pulsed bending magnet, which is a main component of the beam dividing system, repeats between the unexcited and excited state in 25Hz, and divides the beam into the RCS and the TEF respectively. However, as a result of our early feasibility study, it is difficult to obtain the enough beam orbit separation at the doublet with the only pulsed bending magnet. Thus, the beam for the TEF is extracted with both the pulsed bending magnet and a static septum magnet. In this scheme, the doublet quadrupole magnets should be improved. In this presentation, we will report a conceptual design of the beam dividing system for the TEF.

References

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