Introduction of an 8-GeV Booster Synchrotron between RCS and MR: One Possible Option toward a Multi-MW Output Beam Power from J-PARC MR

H. Hotchi[1#], H. Harada[1], M. Yamamoto[1], S. Igarashi[2], T. Koseki[2] and Y. Sato[2]

[1]*J-PARC Center, JAEA, Tokai, Ibaraki 319-1195, Japan*
[2]*J-PARC Center, KEK, Tokai, Ibaraki 319-1195, Japan*

 # a corresponding author: E-mail hideaki.hotchi@j-parc.jp

Since the startup of beam commissioning in November 2006, the output beam power from the J-PARC accelerators (linac, 3-GeV RCS and 50-GeV MR) has been steadily increasing following progressions in beam tuning and hardware improvements. So far, RCS has successfully achieved high-intensity beam trials of up to 560 kW at a low-level intensity loss, and the output beam power for the MLF user program has been increased to 300 kW. MR also has achieved 240-kW output beam power at 30 GeV for the NU user program.

Thus now the J-PARC accelerators are in transition from the initial beam commissioning phase to the final stage aiming for the design output beam power of 1 MW from RCS and 0.75 MW from MR; RCS is to start 1-MW beam tuning from October 2014 after completing the linac upgrade, and MR aims at 0.75 MW within the next 3 years by introducing new main magnet power supplies with the faster cycling time.

In view of such current situation, we have started discussions for the future J-PARC accelerator concept toward a Multi-MW output beam power. In this paper, we discuss the feasibility for the introduction of a new 8-GeV booster synchrotron between RCS and MR as one possible option toward a Multi-MW output beam power from MR, in combination with the RCS beam power upgrade from 1 MW to 2 MW.