

Summary of J-PARC Upgrade

T. Kobayashi, T. Nakaya, T. Nakadaira

Two talks

- “**J-PARC Upgrade**” by T. Koseki (KEK Accl)
- J-PARC MR will **reach 1MW** with the new power supplies after 2020 (design power of 750 kW in 2018-2019).
- “**Potential J-PARC beam power improvement and beam delivery before 2026**” by T. Kobayashi (KEK IPNS)
- Before 2026 (Hyper-K/DUNE starts operation), J-PARC MR will be able to operate with **1.3 MW**.
- The integrated POT for neutrinos (T2K and the extension) before 2026 could reach $21E21$ POT which is a factor of 3 more than the current T2K with some working assumptions.
 - The discovery potential of neutrino CP violation with $>3 \sigma$ could be possible. (later talks)

Summary

- Early realization of J-PARC MR power beyond 1 MW is a great benefit (necessity) for T2K and the neutrino community in the world. We are eager to this power.
- An experimental group is willing to write the LOI/ Proposal toward the discovery of neutrino CP violation with $>3 \sigma$ together with more physics subjects.
- The neutrino beam facility should prepare the update to accept the >1 MW beam.
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Mid-term plan of MR

FX: The high repetition rate scheme is adopted to achieve the design beam intensity, 750 kW. Rep. rate will be increased from ~ 0.4 Hz to ~1 Hz by replacing magnet PS's, RF cavities and some injection and extraction devices.

SX: Parts of stainless steel ducts are replaced with titanium ducts to reduce residual radiation dose. The beam power will be gradually increased toward 100 kW watching the residual activity.

JFY	2014	2015	2016	2017	2018	2019	2020
	Li. current upgrade		New PS buildings				
FX power [kW] (study/trial)	320	> 360	400	450	700	800	900
SX power [kW] (study/trial)	-	33 - 40	50	50-70	50-70	100	100
Cycle time of main magnet PS	2.48 s				1.3 s	1.3 s	1.2 s
New magnet PS	R&D	Large scale 1st PS		Mass production installation/test			
High gradient rf system		Manufacture, installation/test					
2nd harmonic rf system		R&D, manufacture, installation/test					
VHF cavity	R&D						
Ring collimators		Add.collimators	Add.collimators (3.5kW)				
Injection system		Kicker PS improvement, Septa manufacture /test					
FX system		Kicker PS improvement, LF septum, HF septa manufacture /test					
SX collimator / Local shields			Local shields				
Ti ducts and SX devices with Ti chamber	Beam ducts	ESS					

(could be)

→ 1.3 MW

Integrated POT projection

(working assumption)

