

Overview ~cont'd

Muon linac design

US μ → RFQ → IH-DTL → DAW CCL → Disk-loaded (DL)

5.6 keV $\beta=0.01$ 0.3 MeV $\beta=0.08$ 4.5 MeV $\beta=0.3$ 40 MeV $\beta=0.7$ 212 MeV $\beta=0.9$

3.2 m 324 MHz 1.4 m 16 m 1296 MHz 15 m

~40m in total

- Basic design for all structures was finished.
 - M. Otani et al., Phys. Rev. AB, 19, 040101, 2016.
 - Y. Kondo et al., J. Phys.: Conf. Ser. 874 012054 (2017) [link]
- Next goal is demonstration of muon acceleration.

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Thus far

2014 2015 2016 2017 acceleration(2017/10)

Assembly@J-PARC (~2015/5)
Disassembly at RAL (2014/8)
Slow μ^+ profile (2017/3)
 μ^+ deceleration & BPM(2016/2)
Mu $^+$ observation (2016/12)

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Acceleration test setup

@J-PARC MLF D2

μ^+ (~3MeV)

Mu $^-$ generation (3 MeV→<keV)

Electro-static lens (5 keV)

Proto-type RFQ (90 keV) [J-PARC RFQ #0]

Beam diagnostic (quadrupole pair and bending magnet)

MCP detector

	H-	H-	μ^-
Injection (keV)	50	5.6	
Extraction	810	89	
Interval V(kV)	81	9.1	
Power (kW)	180	2.3	

Space 84mm

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Simulation results

Transport efficiency

Expected tof

Sufficient events for demonstration
(>100 events / 2days)

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Result with Mu $^-$

Preliminary

Events/50 ms/4x10¹¹ μ^+ incident

time of flight [ns]

RF on
RF off
signal simulation

Measured ~0.5 mHz,
expected ~ 0.6 mHz,
details are being under
investigation

Succeeded to accelerate muon!

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