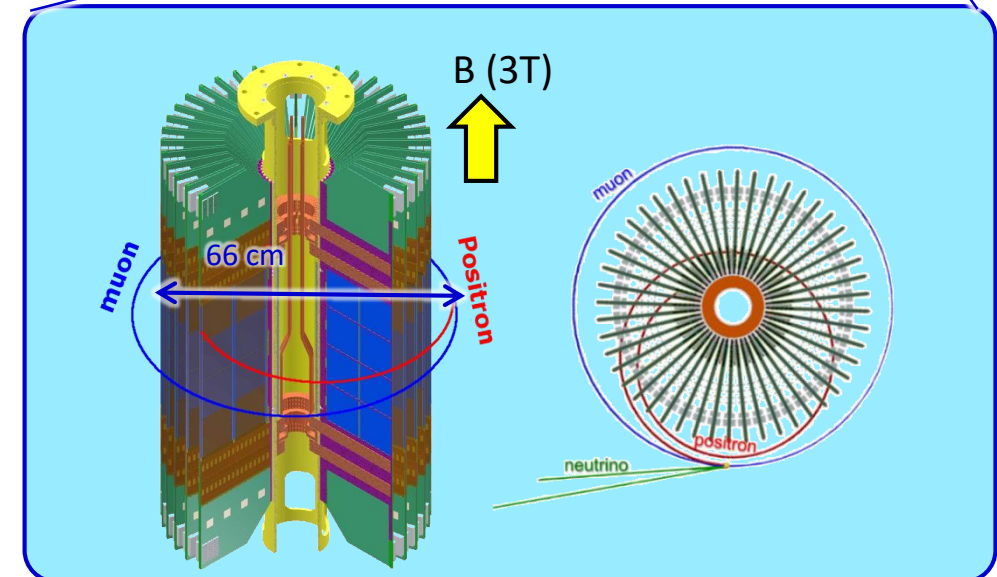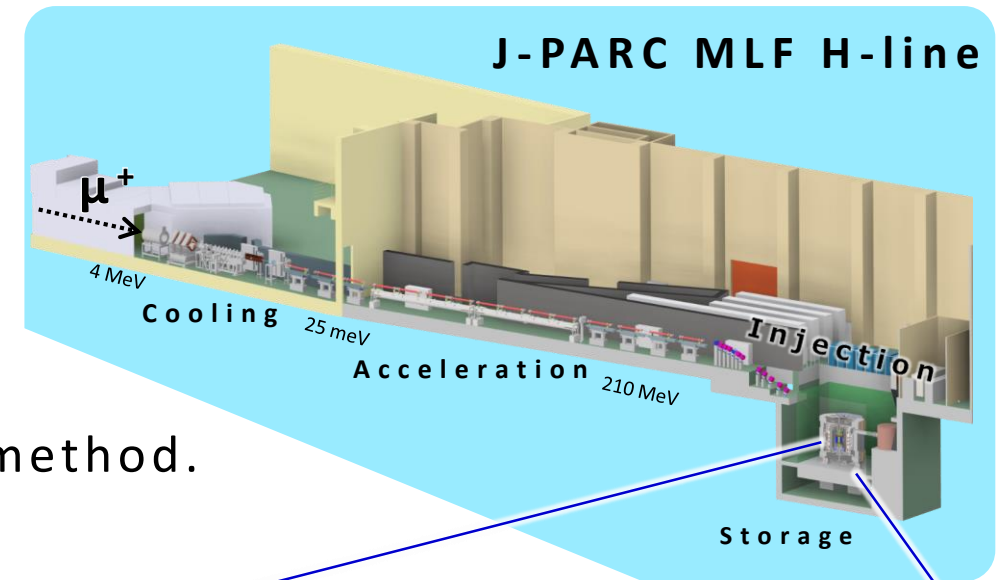# A strip-sensor readout chip
for the J-PARC muon g-2/EDM experiment

- Muon *g*-2 is sensitive to new physics beyond SM.

  – 4.2 σ discrepancy between theoretical prediction and the experimental measurements.

J-PARC muon g-2/EDM experiment

- Completely different approach from BNL/Fermilab method.

  – Super-low emittance muon beam

  – Compact storage ring

  – No strong focusing

  – **Full tracking detector**

- Positron tracks from muon decay are measured by **silicon-strip detector**.

- ➤ **Front-end readout chip** was developed for high-intensity pulsed muon beam at J-PARC

J-PARC MLF H-line

μ⁺

4 MeV
Cooling   25 meV
Acceleration   210 MeV
Injection
Storage

B (3T)

muon   66 cm   positron

muon

positron

neutrino

● **Mass production of the "SliT128D" chip** was successfully completed.

Feature of the SliT128D chip

● Timing stability is important for the measurement of the muon g-2.

→ Fast response to tolerate a high hit rate

● Readout sequence is designed for pulsed muon beam at J-PARC

→ Binary readout with 5 ns time stamp and larger memory buffer (8192 depth per channel), in which the data with a period of 40.96 µs can be stored.

➢ In poster presentation, we report the performance of SliT128D chip and future prospect for the assembly of the detector module.

8 inch diameter
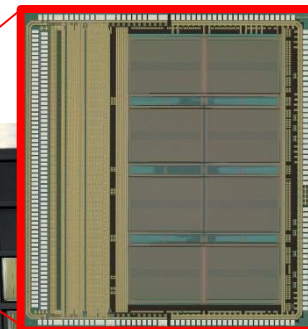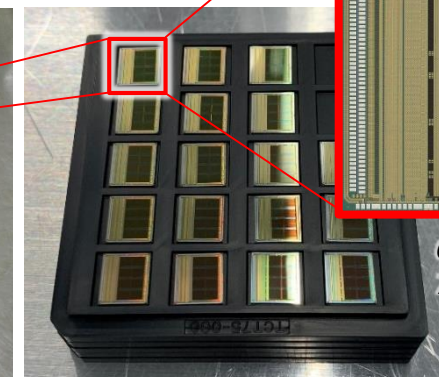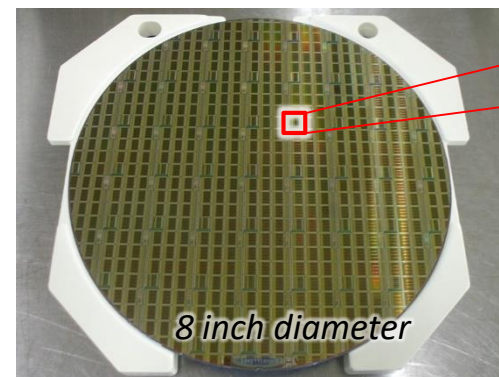
*Chip size :
7.24 mm x 6.58 mm*

Requirements to ASIC

• Peaking time < 50 ns

• Pulse width < 100 ns

• Dynamic range > 4 MIP
  (1 MIP = 24,000e)

• Noise : ENC < 1600 e
  @C_{det} = 30 pF

• Time walk < 1 ns

• Power consumption : 5 mW/ch