

## 1. Future forward Calorimeter

- Newly developed to measure CGC.
- Will be installed in forward region from the point of the collision
- Due to high neutron exposure, p-type silicon sensor will be used which are known for high radiation tolerance



The more exposed to radiation, the more their characteristics change rapidly.

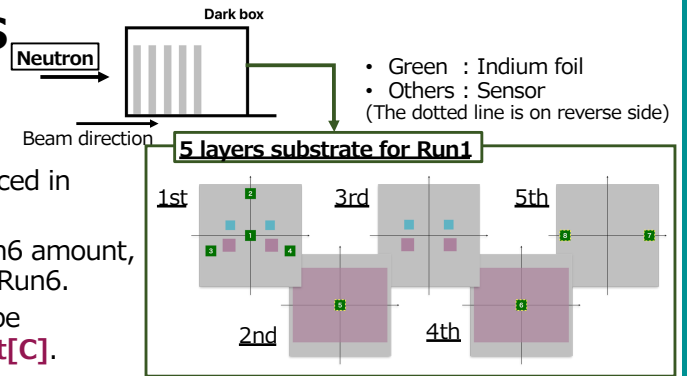
→Need to know what happens if they are exposed to the amount planned for the experiment

## 2. Neutron Irradiation test at RANS

- Neutron irradiation was performed in 10 runs.  
Irradiation amount[C] = current[μA] × time[sec]

Run No.	1	(6)	2~10
time[sec]	3600	450	25707
current[μA]	4.001	30.691	32.160 Average
amount[C]	0.0144	0.0138	0.8673 Total

- The indium foil was placed in **Run1 and Run6** only.
- Compare Run1 and Run6 amount, 1.12 times larger than Run6.
- Neutron dose** should be proportional to **amount[C]**.



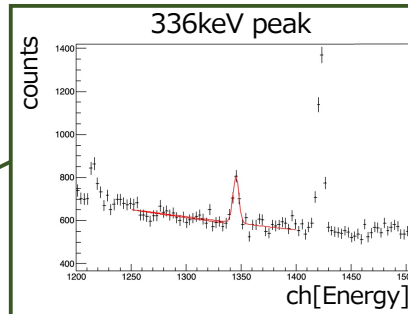
## 3. Evaluation of Neutron dose

- The neutrons strike indium foil, which moves to the excited state and then to the ground state by emitting γ-rays at 336 keV. (isomeric transition)
- The neutron dose is proportional to the γ dose.

### Number of neutron : N

$$N = \frac{1}{\sigma} \cdot \frac{\lambda M t_i}{m R N_A B_f \epsilon_{cap} (1 - e^{-\lambda t_i}) e^{-\lambda t_i} (1 - e^{-\lambda t_m})} \cdot A$$

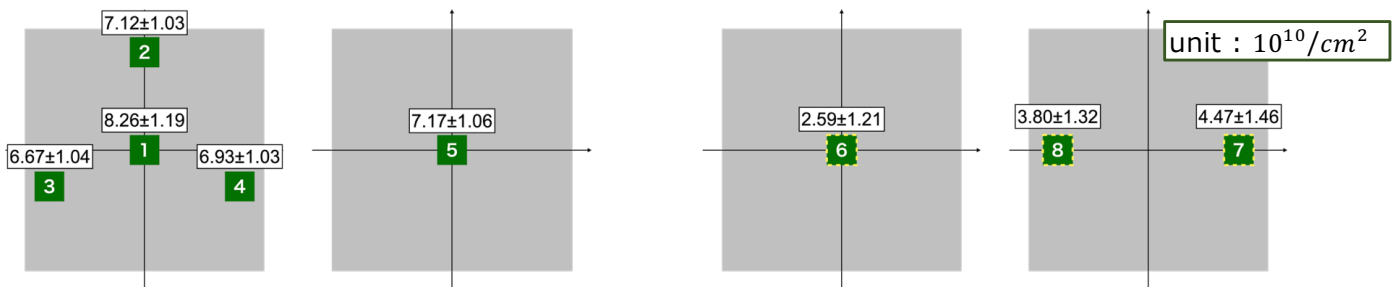
A : number of γ-rays



### Measure method of γ-rays

- Fit with Gaussian+BG (Expo or pol1) function at around this peak (correspond to γ-rays).
- The γ-ray dose within the measurement time:  $t_m$  of the indium foil is obtained by integrating

## 4. Result : Neutron dose



- For the indium foil located in the center, there was a decrease in depth direction.
- But cannot be seen a decrease in the 4th and 5th layers.
- The indium foil located in the center of the 1st layer of Run6 shows the expected neutron dose.

## 5. Summary

- In order to evaluate the performance of p-type Si sensor, Neutron irradiation test was conducted at Riken RANS.
- Decrease should be seen in depth direction, but it could not be seen between the 4th and 5th layer.
- The indium foil located in the center of the 1st layer of Run6 shows the expected neutron dose.