

# Study of Neutron Irradiation of p-type Silicon Sensor for future calorimeter

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Quarks and gluons, normally confined within hadrons by strong interactions, are released from the confinement at high temperatures and densities, which is called Quark-Gluon Plasma (QGP). To understand QGP, high-energy heavy ion collision experiment has been conducted in laboratory and research has been carried out to investigate its property. One unknown about QGP is that it reaches thermal equilibrium much earlier than theoretically expected, and Color Glass Condensation (CGC) is a strong candidate to explain this. The silicon electromagnetic calorimeter has been developed to study the CGC experimentally.

Since this calorimeter will be installed in the forward region where it will be exposed to large neutron dose, it is necessary to investigate the radiation tolerance of the p-type Silicon sensor which is considered to be used for this calorimeter due to high neutron tolerance. To evaluate this, neutron irradiation tests were conducted at the RIKEN (RANS) in July 2023 and May 2024.

In these tests, Indium foil, which is sensitivity to the amount of neutron irradiation was placed around the Si sensor and irradiated with neutron beam of about  $10^{14}n_{eq}/cm^2$  at the maximum, as assumed in the ALICE experiment. Since the neutron dose depends on the distance from the beam, it is necessary to estimate the dose of the Si sensor by analyzing the Indium foil dose. In this poster, an overview of these tests and the status of dose analysis using Indium foil will be discussed.

## Category

Experiment

## Collaboration

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