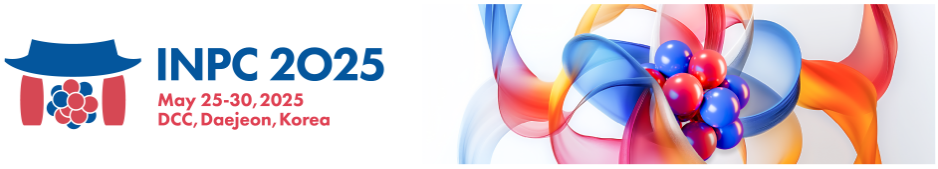

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Challenges of calorimeter using over 100 GAGG crystals for intermediate-energy experiments

Cluster formation is a fundamental phenomenon in nuclear physics and is crucial for understanding nuclear structure and dynamics. To study cluster formation in nuclei, we use quasi-free knockout reactions with a proton probe to directly measure clusters formed in the nucleus. This approach, combined with inverse kinematics, allows measurements over a wide range of nuclei.

To implement this method, we are constructing a TOGAXSI telescope consisting of a silicon strip tracker and a calorimeter made of GAGG(Ce) scintillators. GAGG(Ce) is particularly suitable for (p, pX) reaction measurements due to its high density, fast response, high light output, and non-hygroscopic properties. The TOGAXSI telescope consists of over 100 large GAGG(Ce) crystals.

We are struggling with challenges in energy calibration and mass integration of the GAGG(Ce) crystals. In this talk, we will discuss fundamental difficulties of the calorimetric method and report on the progress of the construction of the calorimeter.

[1] R. Tsuji et al., RIKEN Accel. Prog. Rep. 56, 83 (2022).

Primary authors: SUGIYAMA, Taiki (RIKEN / Saitama univ.); COLLABORATION, ONOKORO

Presenter: SUGIYAMA, Taiki (RIKEN / Saitama univ.)

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