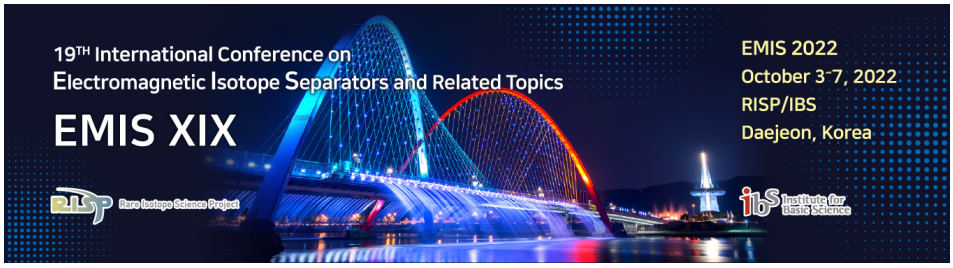

Contribution ID: **44** Type: **Poster Session**

Study on the application of SiPM to γ-ray and charged particle measurement using scintillation crystals

Tuesday, 4 October 2022 18:56 (8 minutes)

Silicon Photo Multiplier (SiPM) is a light sensor which has multi micro pixels working in Geiger mode with several tens of volts. The SiPM has been recognized as an alternative to the Photo Multiplier Tube (PMT) for its compact size of millimeter order and its robustness to magnetic field. The signals from SiPM are proportional to the number of fired pixels, not directly to the number of incident photons and they can be different from those of PMT. Recently, the SiPM-based scintillation detectors are actively studied for various purposes including energy calorimetry [1, 2], time of flight measurement [3] and imaging for medical scan [4 - 8]. Their performance showed large variance implying the versatility of such detector systems. Thus, it is crucial to find an optimized application of SiPM for each detector system.
The purpose of our study is to develope SiPM-based scintillation detector system for γ-ray and charged particle measurement. We have inspected the performance of the SiPM attached on CsI(Tl) and GAGG(Ce) crystals by applying radiation sources. The energy resolution and gain depending on the over voltage are identified with single SiPM on the crystals, and we identified improved energy resolutions using multiple SiPMs under the optimized over voltage. Furthermore, the position dependence of energy spectra from separated SiPMs on single bulk crystal is noticed, and a possible way to merge separated signals from multiple SiPM on a bulk scintillator without relative gain matching is demonstrated. We will present these results and future applications of the SiPM-based scintillation detector system for nuclear physics experiments.

Primary authors: BAE, Sunghan (Center for Exotic Nuclear Studies, IBS); AHN, Sunghoon(Tony) (Institute for Basic Science); CHA, Soomi (Center for Exotic Nuclear Studies); HWANG, Jongwon (Center for Exotic Nuclear Studies, Institute for Basic Science); KIM, Dahee (Center for exotic nuclear studies, Institute Basic Science); Dr KIM, Yunghee (Center for Exotic Nuclear Studies, IBS); PARK, Chaeyeon (EWHA Womans University / CENS(IBS)); Dr HAHN, Kevin Insik (Center for Exotic Nuclear Studies, Institute for Basic Science)

Presenter: BAE, Sunghan (Center for Exotic Nuclear Studies, IBS)

Session Classification: Poster Session