Contribution ID: **58** Type: **Oral**

Performance study of a large CsI(Tl) scintillator with an MPPC readout for nanosatellites used to localize gamma-ray bursts

Wednesday, 28 November 2018 11:25 (20 minutes)

Currently, we are developing a fleet of nano-satellites for detection and position determination of short gamma-ray bursts (SGRBs) for the proposing CAMEROT (Cubesats Applied for MEasureing and LOcalising Transients) mission. We synchronize time information of each satellite by using a global positioning system, and plan to use large-area CsI(Tl) scintillators which provide a high light output and readout by multi-pixel photon counters (MPPC), which have low power consumption that is suitable for nanosatellite platform.
We plan to use one of the latest-model MPPCs provided by Hamamatsu Photonics, namely, S13360-6050CS, which have an active area of 6×6 mm^2. We compared the performance of two scintillators of different sizes ($150 \times 75 \times 5$ mm^3, $100 \times 75 \times 5$ mm^3); the bigger one is the maximum size that can be mounted on a three-unit satellite we are planning to apply, and found the difference of light yield was only $\sim$13%. We also tested two-MPPC readout to improve the energy threshold and uniformity by using signals from ^{241}Am source. We confirmed the same energy threshold as one-MPPC readout of $\sim$10 keV at 25°C and energy resolution got better by 7% thanks to the improved uniformity. Then we investigated the optimum position of two-MPPCs on the scintitllator by using ray-tracing Monte Carlo simulator, and found that symmetrical configurations against to the center of the scintillator gives the best performance of light yield.

Primary author: TORIGOE, Kento

Co-authors: Mr FUKAZAWA, Yasushi (Hiroshima university); GALGÓCZI, Gabór (Eötvös Loránd University); MIZUNO, Tsunefumi (Hiroshima University); OHNO, Masanori (Hiroshima University); NAKAZAWA, Kazuhiro (Nagoya University); TAKAHASHI, Hiromitsu (Hiroshima University); PÁL, András (Konkoly Observatory); TANAKA, Koji (Hiroshima University); TARCAI, Norbert (C3S Electronics Development LLC.); UCHIDA, Nagomi (Hiroshima University); WERNER, Norbert (Eötvös Loránd University, Hiroshima University, Masaryk University); ENOTO, Teruaki (Kyoto University); FREI, Zsolt (Eötvös Loránd University); ICHINOHE, Yuto (Rikkyo University); ODAKA, Hirokazu (Tokyo University); ŘÍPA, Jakub (Eötvös Loránd University, Charles University); KISS, László (Konkoly Observatory); VÁRHEGYI, Zsolt (3S Electronics Development LLC.)

Presenter: TORIGOE, Kento

Session Classification: Wednesday morning