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## The BGO system for Real Time Beam Background Monitoring in BEAST II

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The SuperKEKB collider in KEK Japan is designed to supply high luminosity of  $e^+/e^-$  collision for B physics study at Belle II experiment. It has started its first beam circulation this year. The BEAST II experiment is designed to study the beam-induced backgrounds prior to the Belle II full installation and commissioning. This is very useful for beam control practice in the beginning of beam commissioning and to protect the real Belle II detectors from unexpected high radiation.

The NTU-HEP group has designed and built a BGO system, as one of the BEAST-II detectors, for the beam background monitoring. Eight Bismuth Germanium Oxide (BGO) scintillator crystals are installed near the designed interaction point of the Belle II experiment. The signals from BGO are conducted to one MAPMT via 40 m optical fibers with light-tight treatments. The readout electronics is equipped with a FPGA running at 40MHz clock to process the digitized signals in pipeline. The accumulated deposit energy in BGO is calculated online and can be fed back to the accelerator group for comparison. This system can also find the coincidence hits in different BGO channels, which has the potential to detector Bhabha events for online luminosity monitoring. Highlights of the BGO system design and preliminary results from BEAST II commissioning will be presented.

Index Terms—SuperKEKB, Belle II, BEAST, beam background, BGO

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