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Integration of data acquisition systems of Belle II outer-detectors for cosmic ray test

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The Belle II experiment is scheduled to start in 2018 and the development of data acquisition (DAQ) system as well as its detector is ongoing. The target luminosity of SuperKEKB, an asymmetric electron-positron collider, is 8x10^35 cm-2s-1, which is 40 times larger than its predecessor, KEKB, and the construction of the DAQ system is challenging. The Belle II detector consists of seven sub-detectors. Frontend electronics for each sub-detector digitizes signals and sends the data to back-end readout boards. To reduce the cost of the development and achieve easier operation, these readout boards are common for all sub-detectors except for the innermost pixel detector. After the readout boards, the data then go through PC farms, where event building and online data-reduction by software trigger are performed, and are stored in a storage system. Currently, most of Belle II outer sub-detectors, including outer tracking detectors, calorimeters and a barrel particle identification detector, have been already installed in the Belle II detector and the integration of DAQ systems for the sub-detectors is in progress. Since the Belle II DAQ system is designed so that we can quickly change operation modes with a standalone sub-detector or combined ones, the DAQ system for is first tested with each sub-detector and then integrated to the combined DAQ system. Towards the global cosmic-ray commissioning with magnetic field in June 2017, we started data-taking of cosmic ray events with central drift chamber and electromagnetic calorimeter separately and the combined data-taking for those two detectors was also tested. We present the status of integration of the DAQ system for the installed sub-detectors.

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