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## FPGA algorithm of beam diagnostic devices for fast protection system

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RAON is a multi-purpose accelerator facility that can accelerate various heavy ion beams and exotic rare isotope beam, with a maximum energy of 200 MeV/u for uranium beams. Abnormal behavior or excessive instability of the device may result in damage to the device when an ion beam is irradiated onto the device. A fast protection system has been built, which quickly blocks the beam and prevents damage to devices. Signals generated from LLRF, SSPA, and beam diagnostic devices cause the MPS to block the beam within 50  $\mu$ s. In beam diagnostic devices, AC current transformer (ACCT), mTCA-based data acquisition (DAQ), and beam position monitor (BPM) electronics are used to inform the MPS of beam transmission status in real time. Post-mortem data is stored on each device, allowing the cause of errors to be identified in the short term before fast protection is activated. This poster shows the measurement details and signal generation algorithm for fast protection in three beam diagnostic electronic circuits produced by the RAON heavy ion accelerator.

### Footnotes

### Funding Agency

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Yes

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