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Electronics for E61 multi-PMTs

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We propose using multi-PMTs (mPMTs) for the photosensors for the E61 near detector (as well as a fraction of Hyper-K photosensors). Our mPMT design has nineteen 3" PMTs enclosed in water-tight pressure vessel, providing excellent spatial imaging of the Cherenkov light ring. This talk will describe the design of the signal digitization electronics for the E61 mPMTs. We will start by explaining the key requirements that drive the design, including the requirements for precision hit time and charge resolution; these requirements are balanced by equally strong requirements for low power, low cost and high reliability electronics. E61 also has additional requirements related to handling the large rate of pile-up events from the high-intensity J-PARC neutrino beam. We will describe an electronics designs based on low power 100-200MSPS ADC with on-board signal processing in the FPGA. We will also briefly describe our work on HV design for the PMTs.

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