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# Operating a fast scintillator coupled to a PMT at 10 Mcps for proton therapy

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In proton therapy, the accuracy of the treatment can be monitored by measuring prompt gamma-rays. These are emitted in very short time bursts of 10 milliseconds, but at a rate of 1 billion per second. Detecting as many of them as possible is crucial for detecting treatment delivery errors with significance. To do so, we will use a dense and fast scintillation detector coupled to a PMT. The high count rate variations pose a challenge on the linearity of the PMT voltage divider circuit under design. We also envision a fully-digital data acquisition system with pile-up recovery and without dead time that can cope with detector count rates of about 10 million per second.

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