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Preclinical Application of Prompt Gamma-Ray Timing for Proton Treatment Verification

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Being a promising candidate for proton treatment verification, Prompt Gamma-ray Timing (PGT) currently undergoes translation into clinical application. Presently, PGT is being extensively investigated under preclinical conditions. For that, a realistic dosimetric head phantom is irradiated with clinically relevant treatment plans. Global and local range deviations are studied with eight 2-inch CeBr₃ scintillators. Moreover, the PGT system's behavior in ensuing conditions (extreme changes in the detector load between beam-on and beam-off phases, gain instabilities, time non-linearities, etc.) is being explored as to improve the system's characteristics. The most recent results of the study will be presented, the main challenges of the PGT method will be addressed, and the future plans and prospects will be outlined.

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