**Analytical and Monte-Carlo modeling of Multi-Parallel Slit and Knife-Edge Slit Prompt Gamma Cameras**

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Ion-range monitoring by means of prompt gammas (PG) detection is currently investigated for hadrontherapy verification. These PG emitted during the irradiation can be detected with various systems, such as collimated and Compton cameras [1]. From a general point of view, the performances of collimated cameras are mainly determined by a compromise between spatial resolution and detector efficiency.

While collimator features have been extensively investigated in the context of nuclear imaging, no theoretical considerations have been proposed for the specific 1D collimation systems developed in the context of ion-range verification during hadrontherapy, namely Multi-Parallel Slit (MPS) [2] and Knife-Edge Slit (KES) collimators [3].

The present study proposes an analytical model of these two types of collimation that allows for deriving the main intrinsic features of MPS and KES collimators. Monte-Carlo (MC) simulations were performed to evaluate the model and to perform comparisons between the current prototypes developed by IBA and the CLaRyS.

Unlike what can be concluded from previous studies [4,5,6], the proposed analytical model showed that the two types of collimation share, at first order, the same features in terms of detection efficiency and spatial resolution. This result confirmed by MC simulations will be followed by the comparison of the prototypes precision in PG profile fall-off retrieval.

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