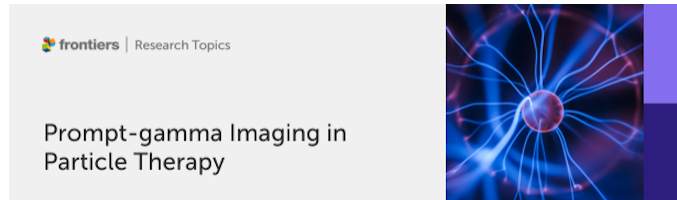Contribution ID: **10**   Type: **Keynote**

The role of Monte Carlo tools in prompt-gamma radiation monitoring research

Thursday, 6 July 2023 15:45 (1 hour)

We are three months from the 20th anniversary of the pioneering proposal to use prompt-gamma (PG) radiation for particle therapy monitoring by Jongen and Stichelbaut at the 39th PTCOG conference. Considerable developments ensued, covering all aspects pertaining exploitation of prompt gammas, from fundamental research to clinical usage of prompt-gamma cameras. Monte Carlo (MC) tools are essential to such a development. This talk will give examples of the type of applications of MC tools in PG monitoring. First, the talk will provide an overview of the research assessing the accuracy of MC simulations for PG emission. This step in PG monitoring research has pitfalls, and the discussion will raise awareness of some of the issues. An overview of the usage of MC tools for PG camera optimization will follow. Finally, the talk will cover several developments in bringing PG monitoring into clinical applications and how MC tools are vital to such a path. These developments range from understanding how to utilize PG radiation in clinical scenarios, namely in adaptive radiation therapy, to creating PG prediction tools that can be integrated into clinical workflows.

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