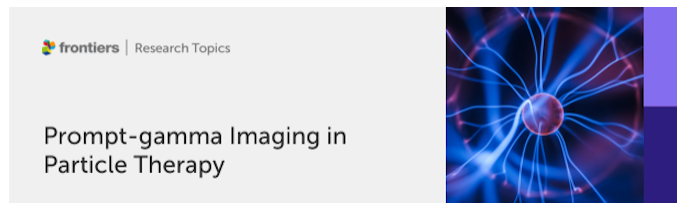Contribution ID: **4**   Type: **Oral**

Simulation for online beam monitoring with a Compton camera (SiFi-CC project)– Young Investigators Workshop

Friday, 7 July 2023 14:10 (30 minutes)

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The SiPM and scintillating Fiber based Compton Camera (SiFi-CC) project is a collaboration between the Jagiellonian University, University of Lübeck, and the RWTH Aachen University for online monitoring of proton therapy. The Compton camera detects prompt gamma radiation which originates from nuclear interactions of the protons. As the prompt gamma radiation impinges on the camera material, the hits are recorded and Compton hits identified. In this way, the origin of a single prompt gamma can be narrowed down to a cone surface. With enough of these cones, the Bragg peak position in the patient can be traced back and, if necessary, the beam can be adjusted. To this end, the collaboration not only needs to construct the Compton camera, but also plan out the analysis. A simulation of the Compton camera, which is currently under construction, is used to test out different scenarios and feed further analysis steps, such as neural networks. The simulation itself consists of multiple steps to mirror each part of the process and is based on the Geant4 framework as well as specialized code made by collaboration members for this use case. To ensure the simulation's accuracy, it is validated against measurements and and adjusted to changes in the Compton camera design. All steps of the project are connected and will be covered in the presentation, with focus on the simulation.

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