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Numerical calculations of received dose due to various geometries of radioactive material

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Abstract content
 (Max 300 words)

Mineral PET is a project to locate diamonds within Kimberlite by first irradiating the rock to induce beta decay in carbon atoms, then imaging the resultant positron emission signals. Due to the irradiation of large bodies of rock in an industrial context, the radiation exposure at different locations is of interest. We investigate various techniques to quantify the radiation dose received by a human-sized target from a body of radioactive material. The first technique assumes various simplified geometries, and makes use of a numerical attenuation computation to create a three dimensional dosage map. This is compared to a full simulation of the physics involved using the Geant4 particle tracking toolkit developed at CERN in a high-energy particle physics context. This allows us to comment on the accuracy of the attenuation model in different configurations. This technique is also useful for identifying hotspots and ascertaining whether further shielding is required.

Apply to be
 consider for a student
 award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
 PhD)?

PhD

Main supervisor (name and email)
and his / her institution

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Would you like to
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Yes

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