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The MinPET diamond discovery technique

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MinPET is a technology for diamond discovery in rock, specifically, the online, high throughput, quantitative, 3D imaging of local carbon concentration distributions in kimberlite. In the MinPET process, a high-energy photon beam of some tens of MeV irradiates a kimberlite rock stream, exciting the Giant Dipole Resonance. This transmutes especially some of the light stable isotopes within the kimberlite to become transient positron emitters, or Positron Emission Tomography (PET) isotopes. PET imaging of the rock is performed in an online run-of-mine scenario after a hold hopper, which delays detection for 20 minutes. After this time, ^{11}C is the dominant PET isotope. All non-diamond sources of carbon have a much lower carbon concentration than diamond, or they are diluted and finely dispersed within the kimberlite. Diamond is therefore evidenced by reconstructing the 3D quantitative carbon density distribution map. This talk reviews the current status of the R&D towards a Mine Test Unit.

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

Yes

Level for award (Hons, MSc, PhD, N/A)?

PhD

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

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

Yes

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