

Contribution ID: 347 Type: Oral Presentation

The MinPET diamond discovery technique

Friday, 7 July 2017 12:50 (20 minutes)

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, 11C 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
br> considered for a student
 award (Yes / No)?

Yes

Level for award

- (Hons, MSc,

- PhD, N/A)?

PhD

Main supervisor (name and email)

-br>and his / her institution

SH Connell University of Johannesburg

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

Yes

Primary author: Mr NEMAKHAVHANI, Thendo (University of Johannesburg)

Co-authors: Mr UNWUCHOLA, Doomnull Attah (University of Johannnesburg); Mr COOK, Martin (University of Johannesburg); Dr ANDREW, Richard (University of Pretoria); Prof. CONNELL, Simon (University of Johannesburg)

Presenter: Mr NEMAKHAVHANI, Thendo (University of Johannesburg)

Session Classification: Applied Physics

Track Classification: Track F - Applied Physics