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The MinPET diamond discovery technique – an update

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MinPET is a novel technology that provides the first ever high-throughput 3D quantitative imaging of locked diamonds within kimberlite rocks presented as a close packed run-of-mine stream. It is a patented technique that combines two existing technologies in a novel way. The ore is activated by an electron accelerator which produces a high-energy photon beam of some tens of MeV via bremsstrahlung. PET isotope production is the most significant source of photons for delay times of the order of 30 minutes. After this delay time, scanners based on medical PET (Positron Emission Tomography) technology image the activated rocks for diamond. Essentially a carbon density distribution map is created and analysed. This presentation will look at MinPET performance results based on a Full Dress Rehearsal of Activation, Detection, Analysis using experimental datasets with statistics that would typically be collected in a run-of-mine scenario at 700 tons per hour of rock throughput. The data was collected using the PET detectors optimized by the Research Group and Net Instruments and various spiked kimberlite samples at the electron injector microtron of the ASTRID storage ring of the ISA, Centre of Storage Ring Facilities at the Department of Physics in Aarhus University, Denmark.

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