Contribution ID: **132** Type: **Oral Presentation**

Application of IAEA Radio-Photoluminescence Glass Dosimeter for Radiation dose monitoring

Friday, 7 July 2023 10:00 (20 minutes)

Radio-Photoluminescence Glass Dosimeters are solid-state detectors, which use the accumulation of radiation counts technique to measure the amount of radiation dose acquired. In this study, they were applied to measure the personal dose equivalent from two gamma radiation sources, i.e Co-60 teletherapy source, and Cs-137 low-level radiation source. Two reference detectors (0.6 cc farmer chamber and 1000 spherical ionization chamber) were used to determine the reference dose measurements, and the RPLGD was introduced as the Device under test using the substitution method. The reference measurements of absorbed dose to water and air kerma were made. Calibration coefficients for both sources were used to convert the measurements from air kerma (Grey) to a personal dose equivalent (Sievert). The RPLGD measurements comprised determining the following quantities; sensitivity, accuracy, reproducibility, fading effect, energy dependence, dose range, and the uncertainty budget. It was noted that RPLGDs are user friendly and reliable for personal radiation dose monitoring. They can be read multiple times without losing radiation signal and can reproduce the same signal up to an accuracy of 3 %. Correction factors were used to adjust for any anomalies in the measurements of all quantities. The uncertainty budget of the RPLGDs in both radiation sources did not exceed 5 % and it included all the significant contributors that affected the measurements and maximum expanded uncertainty. This was at a confidence level of 95 %.

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

NO

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

N/A

Primary authors: Prof. MATHUTHU, Manny (North-West University, Center for Applied Radiation Science and Technology (CARST)); Mr DITHOLE, Seepamore (National Metrology Institute of South Africa); Mr MASELESELE, Vincent (Steve Biko Academic Hospital, Dr Savage Road, Pretoria, 0001, South Africa)

Presenter: Prof. MATHUTHU, Manny (North-West University, Center for Applied Radiation Science and Technology (CARST))

Session Classification: Nuclear, Particle and Radiation Physics

Track Classification: Track B - Nuclear, Particle and Radiation Physics