

the Most Sensitive Beta-Gamma Coincidence Detector System for Radioxenon Measurements at the Comprehensive Nuclear-Test-Ban Treaty Organization's Radionuclide Laboratories

Wednesday, 21 June 2023 11:17 (1 minute)

GBL15, the UK's noble gas certified Comprehensive Nuclear-Test-Ban Treaty Organization's radionuclide laboratory, supports the International Monitoring System (IMS) through the measurement of environmental radioxenon samples using beta-gamma coincidence spectrometry. GBL15 currently utilizes a system comprised of NaI(Tl) photon detectors and plastic scintillator electron-detectors in a SAUNA system to measure coincident emissions from four radioxenon isotopes of interest: Xe-133, Xe-135, Xe-131m and Xe-133m. A high-resolution electron-photon coincidence detector system comprising of high purity germanium (HPGe) detectors and a PIPSBBox detector demonstrates improved discrimination between signals and less interference compared to the current system, although with a lower detection efficiency. Here we present the case for a HPGe-plastic beta-gamma coincidence detector system, which can demonstrate improved selectivity, but with greater detection efficiency. The minimum detectable activities for the radioxenon isotopes of interest have been quantified with various levels of interference.

E-mail

matthew.goodwin@awe.co.uk

Promotional text

A new type of beta-gamma coincidence detector system has been setup, optimized and tested. This talk presents the advantages and disadvantages of such a system, which is pertinent to the operations of radionuclide noble gas laboratories in the IMS.

Oral preference format

in-person

Primary author: GOODWIN, Matthew (Atomic Weapons Establishment (AWE) Aldermaston)

Co-authors: Mr DAVIES, Ashley (CTBTO Preparatory Commission); Prof. REGAN, Patrick (University of Surrey); Dr BRITTON, Richard (CTBTO Preparatory Commission); BELL, Steven James (National Physical Laboratory); GILL, Taylor (Atomic Weapons Establishment (AWE))

Presenter: GOODWIN, Matthew (Atomic Weapons Establishment (AWE) Aldermaston)

Session Classification: Lightning talks: P2.2, P3.2, P3.6

Track Classification: Theme 3. Monitoring and On-Site Inspection Technologies and Techniques: T3.2 Radionuclide Technologies and Applications