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

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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 PIPSBox 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.

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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

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