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3.1-P21. Optimization of beta-gamma detector calibration for xenon detection

Three of four radio-xenon monitoring systems have been developed based on beta-gamma coincidence system. Most important step in operation of Xe detection system is calibration by standards. An efficient method to accomplish this step is established using β-γ spectrum of 137Cs . In that case the source position and detector geometrical design might effect the results.A β-γ coincidence spectrometer was developed using a 1"by1" plastic scintillator as beta detector and 3"by3" NaI(Tl) as gamma detector. Detection system is surrounded by a 5cm thick lead shield with 2mm inner Cu layer . The thickness of the scintillator layers (2.0 mm) is adequate for detection of β particles of the Xe-135 spectrum with an end-point energy of 905 keV.A Compton scattered β-γ spectrum of a 137Cs point source (42kBq) was used to calibrate the detection system. The position of calibration source has been changed with respect to the gamma detector.Results obtained from calculating the FOM for different source positions has been shown that there is a preferred position for energy calibration of the system.

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