



Contribution ID: 2

Type: **Oral Presentation**

A XENON RADIONUCLIDES DETECTOR FOR NUCLEAR EXPLOSION MONITORING

Tuesday, 3 May 2022 14:30 (20 minutes)

The Comprehensive nuclear Test Ban Treaty (CTBT) is an international effort started in 1996 to stop all nuclear tests. To ensure that the treaty is respected, an International Monitoring System (IMS) has been globally deployed to measure seismic, hydro-acoustic, infrasound and radionuclide signals (particulate and gaseous) from potential nuclear events. The typical signature for such events is the presence of xenon radionuclides in the air.

The Mobile Analyzer of Radioactive Gases Outflows (MARGOT) is a spectrometer developed to measure trace amounts of ^{131}mXe , ^{133}mXe , ^{133}Xe , and ^{135}Xe in air samples, with the objective to be integrated to the gas monitoring stations of the IMS. The MARGOT system is based on the coincidental detection of beta and gamma radiation, using silicon detectors for the electrons and inorganic scintillators combined with photomultiplier tubes for the photons. Its design was motivated by the will to obtain a higher detection efficiency than current detectors, which compromise either on detection resolution or on angle of detection.

The MARGOT system is compact, unshielded, relatively low cost and operates at ambient temperature. In this presentation, the performances of the system will be discussed, and the upgrades in terms of detection and data acquisition will be presented.

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Session Classification: Techniques for low-level α -particle, β -particle and γ -ray measurements

Track Classification: Techniques for low-level α -particle, β -particle and γ -ray measurements