

Analysis of Two-Dimension Coincidence Spectra

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Recent developments of noble gas systems include new detector technologies. They exhibit very low background count rates. In this case, radioxenon signal as low as a few counts per day is expected. Therefore, for such low count measurements, classical Currie law estimation for measurement detection threshold and detection limits are not accurate enough. In this context, the CEA/DAM implemented several algorithms (matrix inversion, iterative process) and keeps on the effort to improve the data analysis with innovative tools, such as spectral unmixing. Due to low statistics, it is not convenient to test and to compare these algorithms on measured low level spectra of radioxenon, therefore a Monte Carlo simulated database of spectra was generated, for several detection configuration (high resolution beta/gamma spectra, low resolution gamma/high resolution beta spectra, and low resolution beta/gamma spectra). To optimize the analysis of this database, the spectral unmixing algorithm was ported on Graphic Processing Units (GPU), leading to a drastic decrease in computation time and allowing for the processing of large simulated data sets in a reasonable time frame.

Promotional text

Automatic Analysis of 2-D coincidence spectra.

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Oral preference format

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Analysis of Radionuclide Monitoring Data