

Physics Department Seminar

Friday February 22nd, 2013

11:00am in PhSc 105

Rapid Automatic Identification Of Uranium With High-Resolution Gamma-Ray Detectors

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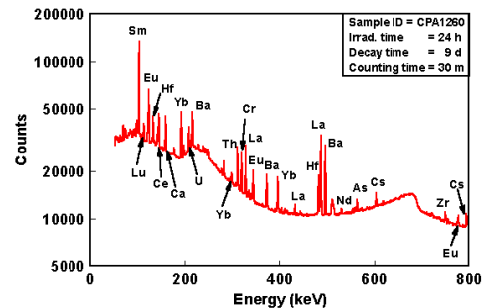
Lawrence Livermore National Lab

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Abstract:

Every gamma-ray spectrum tells a story and, like a book, it can be read if you understand the language. A book in good condition with crisp print can be easily read. A book in poor condition, such as a tattered ancient biblical scroll with voids in the document, can only be read with imprecision. Similarly, a gamma-ray spectrum acquired in the field for a brief period of time and smeared by a detector with poor energy resolution is likely to be read with similar imprecision, sometimes resulting in nuclide misidentification.



Our rule-based expert system, *HPGe ID*, is used to rapidly and automatically identify well over 200 radioactive sources in less than one second from their gamma-ray signatures in high-resolution gamma-ray spectra from field measurements. One of the most important sources, uranium, is the most complex in terms of natural or processed form, enrichment grade, and even reactor fuel cycle. Working for nearly a decade, we have reduced the frequency of *HPGe ID* misidentifications to the point that the application is now highly valued by its users.