Contribution ID: **221** Type: **Poster Presentation**

Identification of isotopes using time differential, event-by-event gamma spectroscopy

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<p>In the context of activation studies, in order to uniquely identify an isotope via gamma spectroscopy, both the lifetime and the energy of the emitted gamma rays are required. Traditional detectors collect only integral data, losing information about the timing of individual events. This makes lifetime analysis a manually intensive task, as data points must be obtained by cycling the target in front of the detectors for well defined times at well defined intervals. Lifetime accuracy is limited by the manual details of this cycling procedure.

A gamma spectroscopy system based on event-by-event acquisition implemented on the VME standard offers the advantage of recording time-stamped energy data for each event. The system described is capable of both coincident and single photon detection - enabling in addition the identification of PET isotopes amongst the other nuclides. The data can then be analyzed offline in a time differential manner, to provide both the gamma-line energy and lifetime. If necessary, the lifetime analysis can accommodate correlated and uncorrelated multiple lifetimes. One detection run will therefore yield complete information about both the energies and lifetimes of all isotopes present, allowing for unique isotope identification.

This poster outlines this technique, then goes on to show results from its application to the study of isotopes excited when an electron beam is incident on high Z targets. These experiments were conducted in the context of obtaining activation data for a diamond sorting technique based on positron emission tomography.

Level (Hons, MSc,
   PhD, other)?

PhD

Consider for a student
   award (Yes / No)?

Yes

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Yes

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