Subject: Double Escape Peaks

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>
> When detected photon energy exceeds 1022 keV (twice the rest mass of an
> electron) the predominant mode of interaction shifts from Compton and
> Photoelectric to Pair Production. The "pair" produced is an
> electron-positron pair.
> When both these particles remain inside the detector probe, they add to
> the
> total energy peak. What we see as a photo peak on an MCA is actually a
> combination of all the various interactions a particular photon creates.
>
> For Co-60 there are two energies that exceed 1022 keV. Those being 1173
> and
> 1333. These occur in equal quantities, so each will likely create its own
> electron-positron pair.
>
> Since our probes are not of infinite sizes (none are), sometimes one or
> the
> other of the "pair" will escape outside the probe, taking its energy along
> with it. The result is a peak below the photo-peak, removed by either 511
> keV (single escape) or 1022 keV (double escape)
>
> Sodium iodide detectors cannot separate closely occurring peaks like HPGe
> probes can, therefore when we look at the escape peaks, instead of seeing
> two distinct peaks, one for 1173 the other for 1333, we see but one,
> average
> between the two.
>
> The picture highlights the Double Escape Peak, average value of 231 keV.
>
> Simpler gamma emitting isotopes, such as K-40 will have a more clearly
> defined double escape peak, since there is but one 1460 photon.
>
> Have fun
>
> Geo

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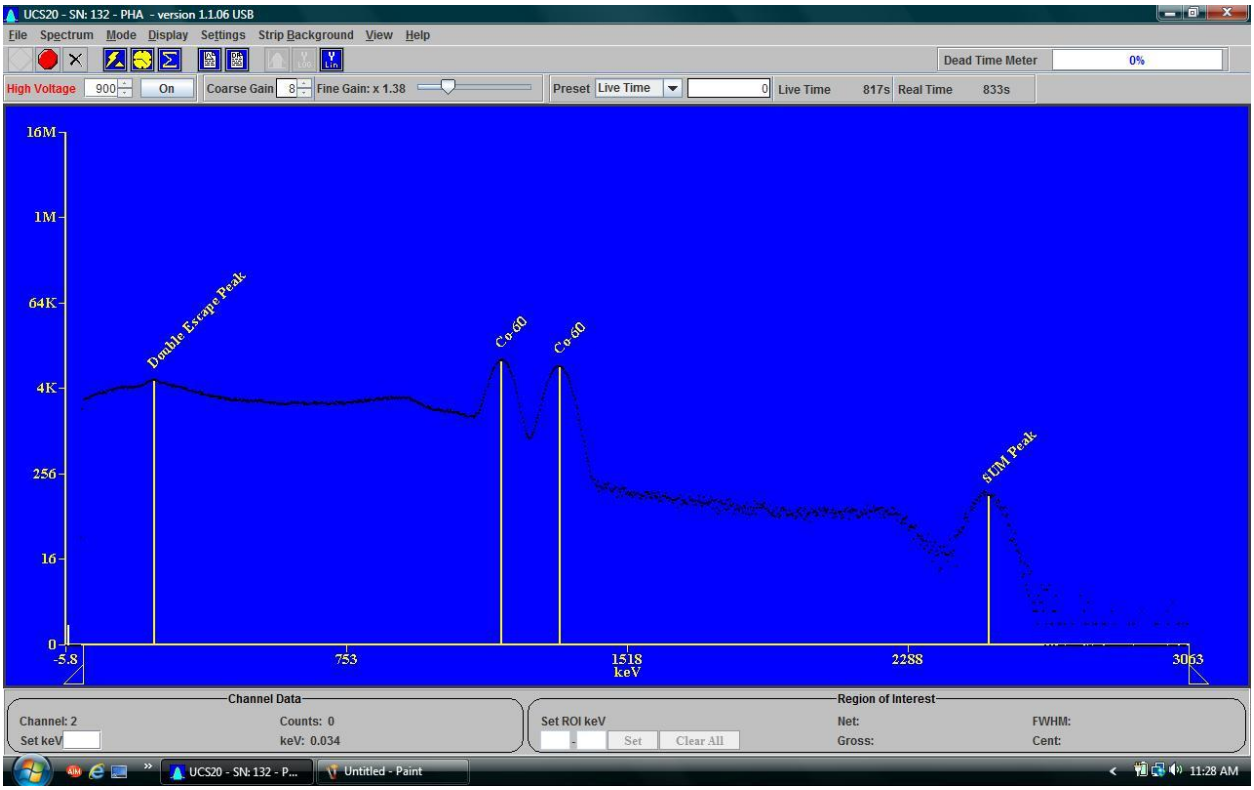
UCS20 - SN: 132 - PHA - version 1.1.06 USB
File Spectrum Mode Display Settings Strip Background View Help
Dead Time Meter 0%
High Voltage 900 On
Coarse Gain 8 Fine Gain: x 1.38
Preset Live Time 0
Live Time 817s Real Time 833s
16M
1M
64K
4K
256
16
0
Double Escape Peak
Co 60
Co 60
SUM Peak
-5.8
753
1518
keV
2288
3063
Channel Data
Channel: 2
Set keV
Counts: 0
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Region of Interest
Set ROI keV
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UCS20 - SN: 132 - P...
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