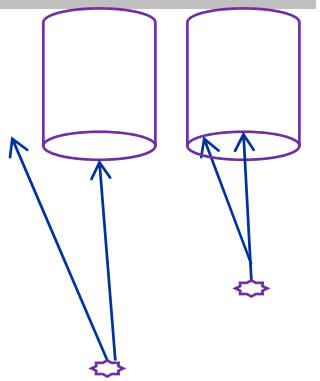
Coincidence Summing



- **Close geometry ▶ summing.**
- **Complex decay schemes for neutron activated isotopes.**
- **Nuclear Astrophysics.**
- **Classical correction needs TOTAL efficiency (Gilmore).**
- **MC ▶ Summing correction.**
- **Simulate Monoenergetic & Full Decay Scheme.**

Total Correction $k_T = k_{ex}\, k_{sa}\, k_s$

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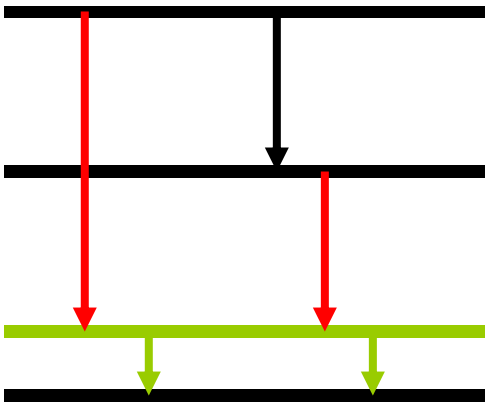
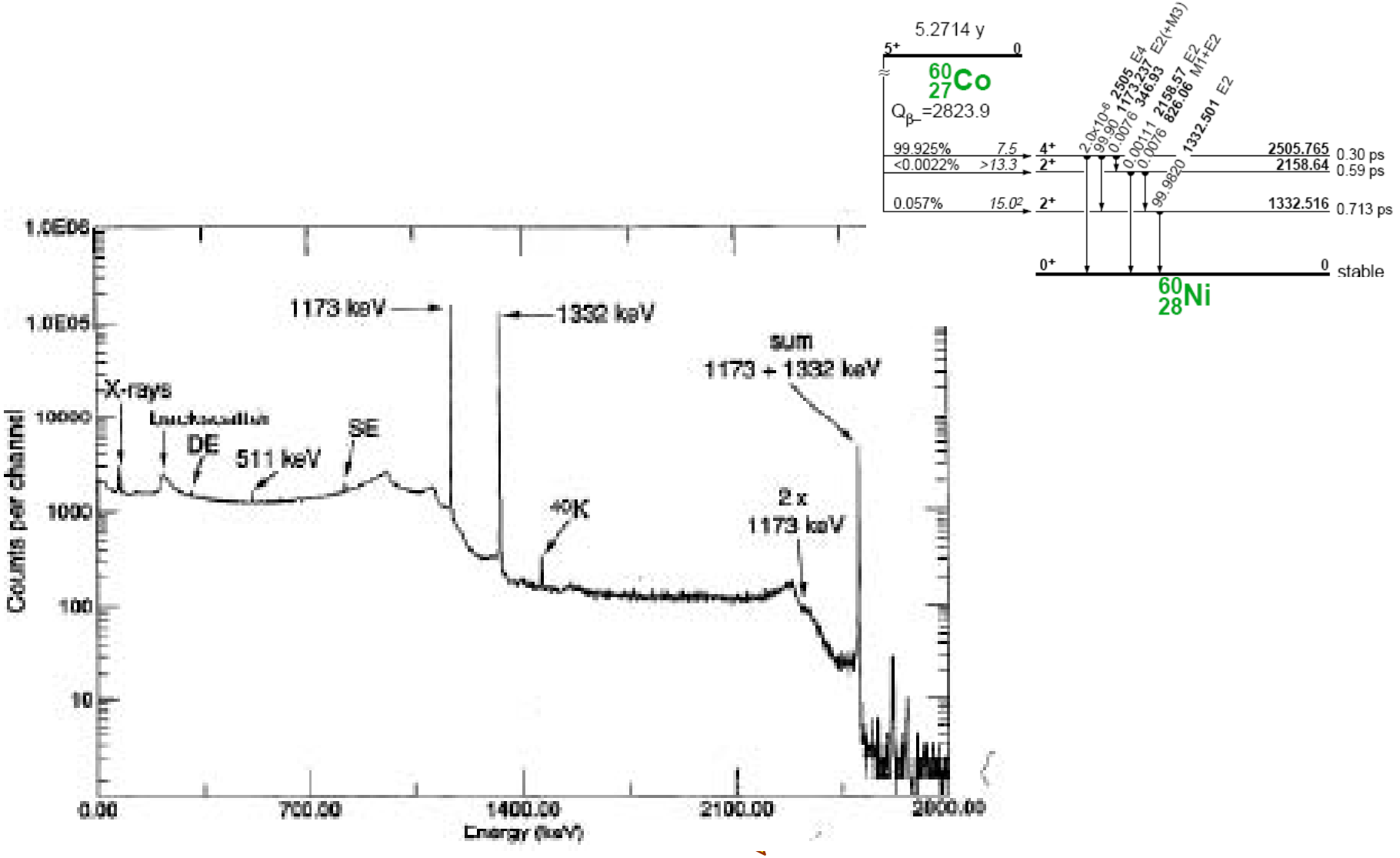


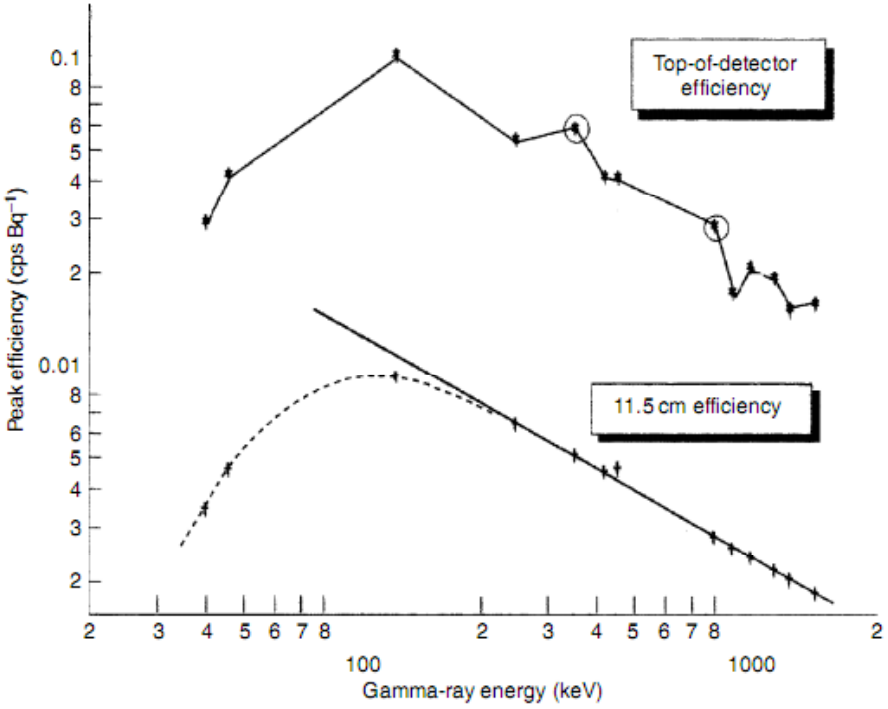
- **Summing-in**
- **Summing-out**

Environmental Samples … ?

Coincidence Summing



Coincidence Summing

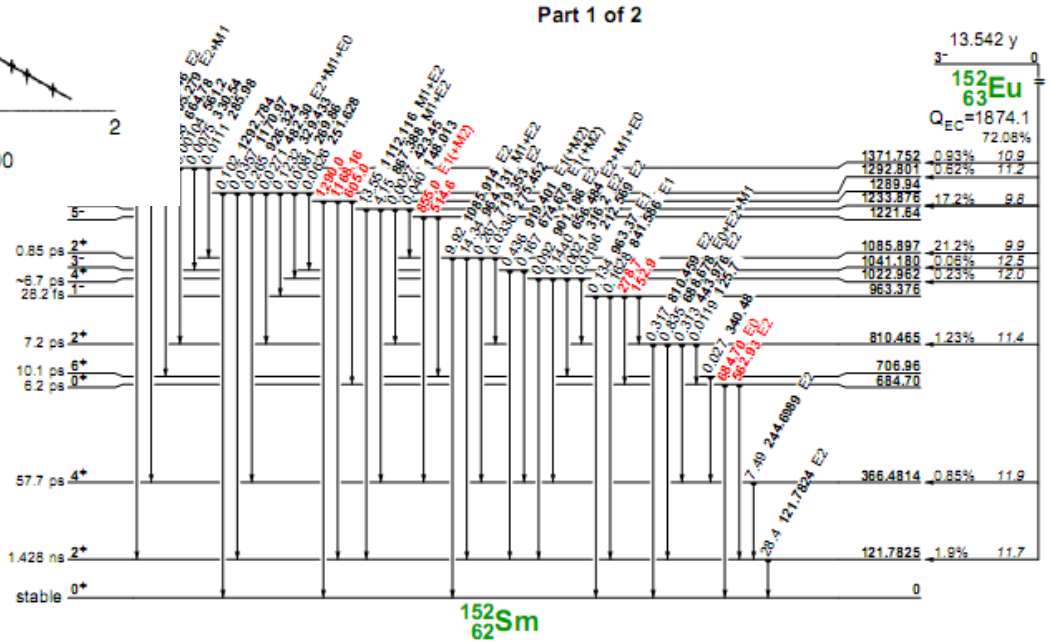


Efficiency calibration

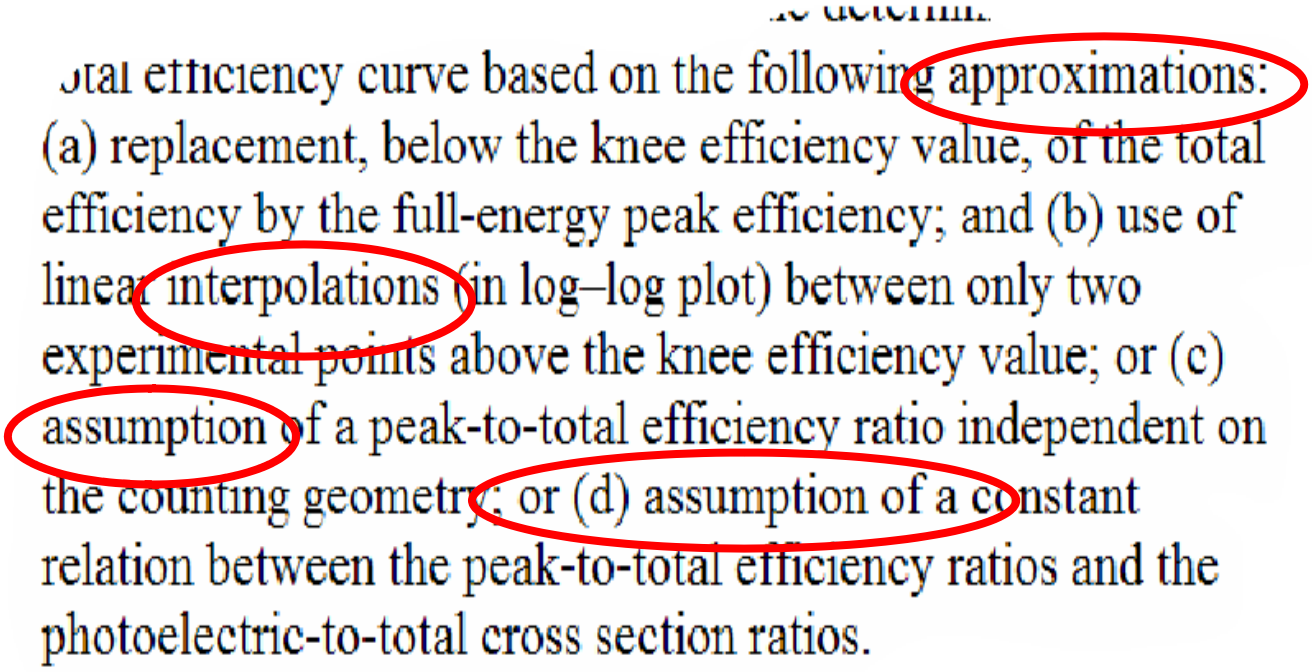
Mathematical Corrections

Gilmore Ch. 8.

$$\log(\varepsilon) = a_0 + a_1 \log(E_\gamma) + a_2[\log(E_\gamma)]^2 + \cdots + a_n[\log(E_\gamma)]^n$$



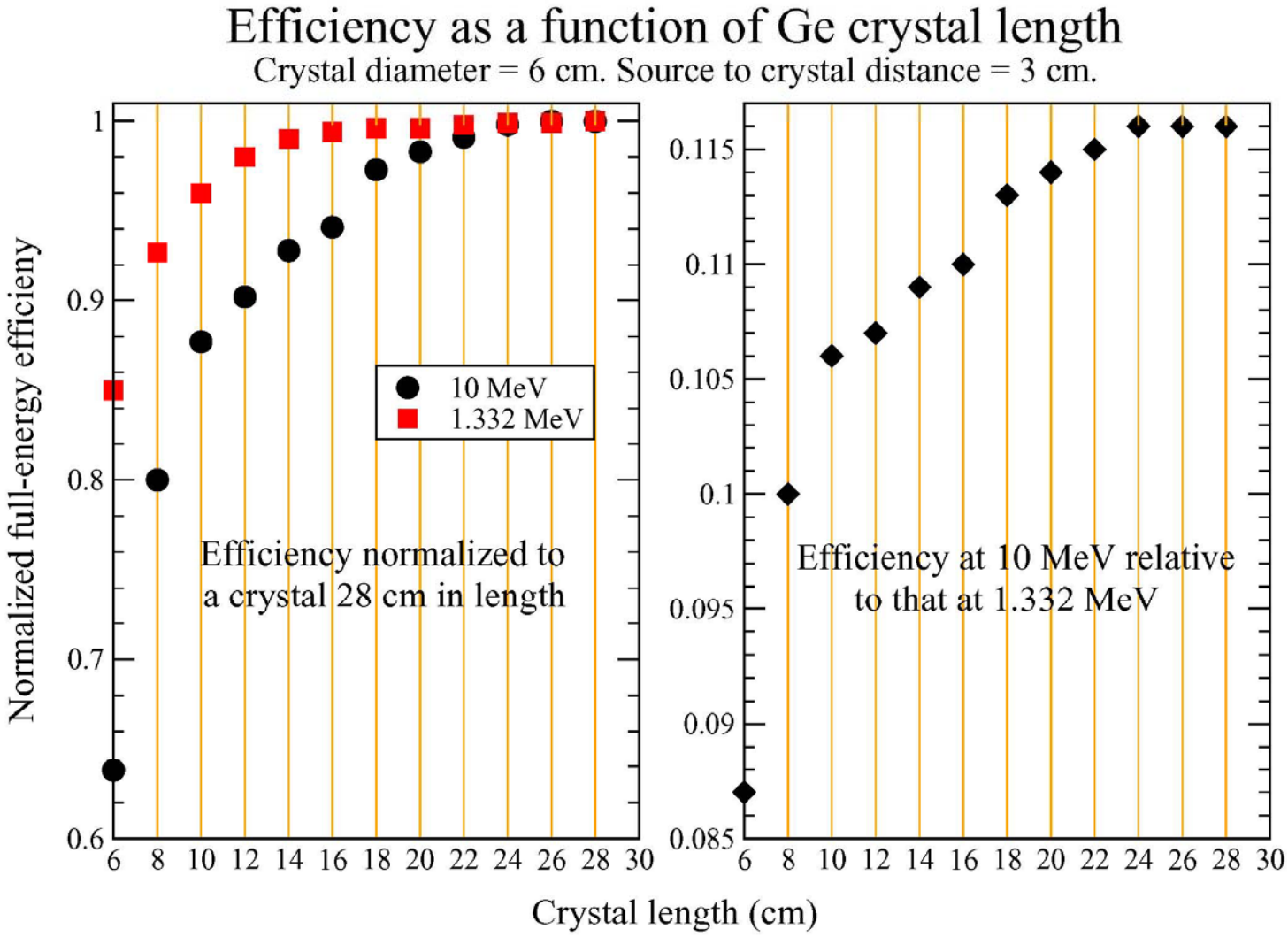
A real classical issue is now solved



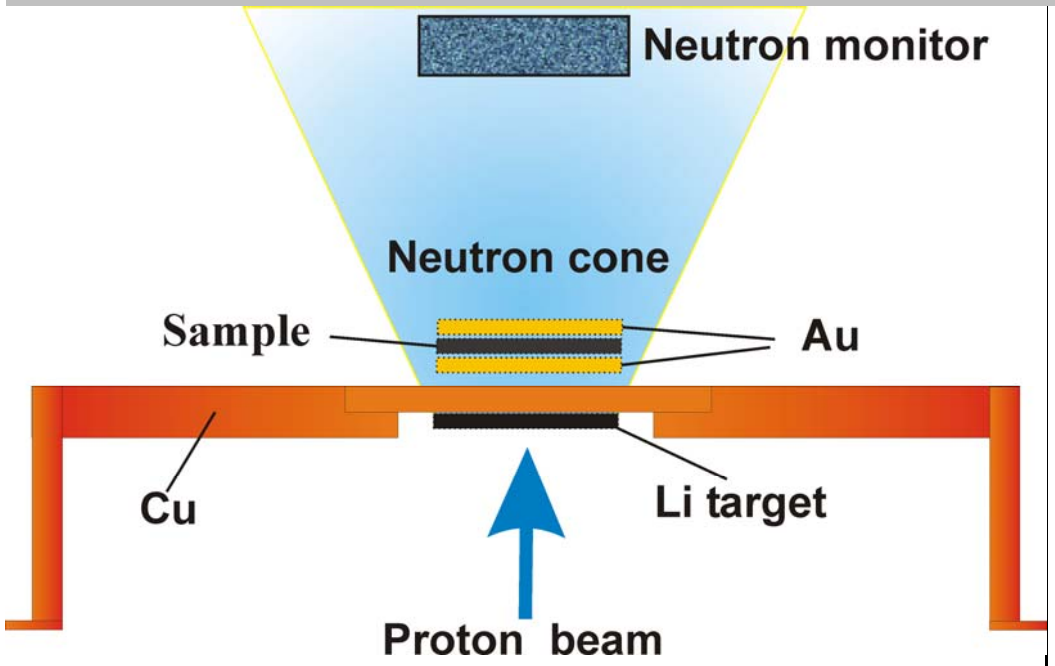
...total efficiency curve based on the following approximations: (a) replacement, below the knee efficiency value, of the total efficiency by the full-energy peak efficiency; and (b) use of linear interpolations (in log–log plot) between only two experimental points above the knee efficiency value; or (c) assumption of a peak-to-total efficiency ratio independent on the counting geometry; or (d) assumption of a constant relation between the peak-to-total efficiency ratios and the photoelectric-to-total cross section ratios.

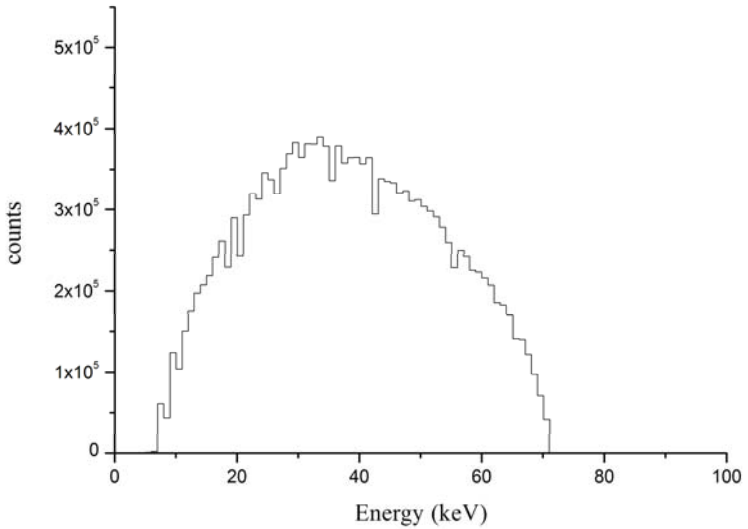
So, those classical chronic issues related to correction factors are solved by MC.
Now, why not go close to the detector and increase efficiency without worrying for corrections?

Canberra … Design



Neutron Activation





- Neutron source: $^{7}Li(p,n)^{7}Be$.
- Kinematically collimated beam.
- Optimized using MC.

Neutron energy distribution in the sample. Monte-Carlo calculations.

Phys. Rev. C 69 (2004) 025803.