K 223 - Angular $\gamma\gamma$ - correlations

Preparation tasks

1 - Which distances?

- How does the count rate of one detector change with the distance?

$$N \propto \frac{1}{r^2}$$

- How does the coincidence rate change with the distance?

$$N_c \propto \frac{1}{r^2}$$

- How does the asymmetry seen in the experiment differ from the theoretical prediction?

    we can only move one detector? $\rightarrow \frac{1}{r}$

- How do the factors influence the error?

$$A_{kk} = \frac{P_{kk}^{exp}}{Q_{kk}} \qquad \Delta A_{kk}^2 = \sqrt{\left(\frac{1}{Q_{kk}} \Delta P_{kk}^{exp}\right)^2 + \left(\frac{A_{kk}^{exp}}{Q_{kk}^3} \Delta Q_k\right)^2}$$

$$\longrightarrow 0 \qquad Q_k \rightarrow 1$$
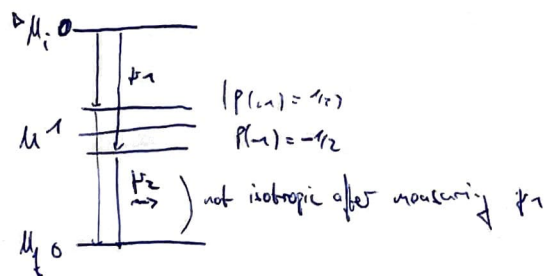
2 - Which angles?

- most important maximum and falling flanks

3 - How to correct for de-adjustment?

- if the source is not aligned we do not measure isotropically distributed angular photons

- renormalize $n_c \rightarrow \frac{n_c(\theta_0)}{n_z(\theta)} \cdot n_c$

Knowledge

$$|P(m) = \frac{1}{2})$$
$$P(-1) = -\frac{1}{2}$$

) not isotropic after measuring γ_1

- $W(\theta) \propto P_\ell(\cos\theta)$ ((hk) $P(M) = \sum_{M_i} G(M_i \rightarrow M) \, F_{\ell_1 m_1}(\theta_1)$

  $\Rightarrow W(\theta) \sim \sum_{M_i M_f} P(M) \, G(M \rightarrow M_f) \, F_{\ell_2 m_2}(\theta)$

- distributed by HFI interactions $(\theta_1 - \theta_1)$

▷ not all measured coincidences are real → random coincidences

▷

▷

$$^{60}_{27}Co$$

$4^+ \ ^{60}_{28}Ni$

2^+ | μ_1 1,173 keV

0^+ | μ_2 1,332 keV