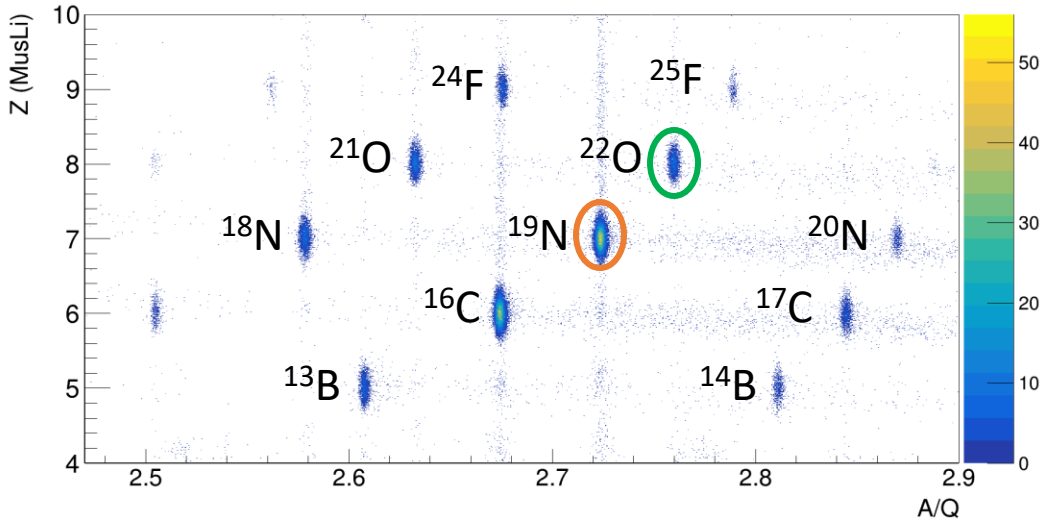
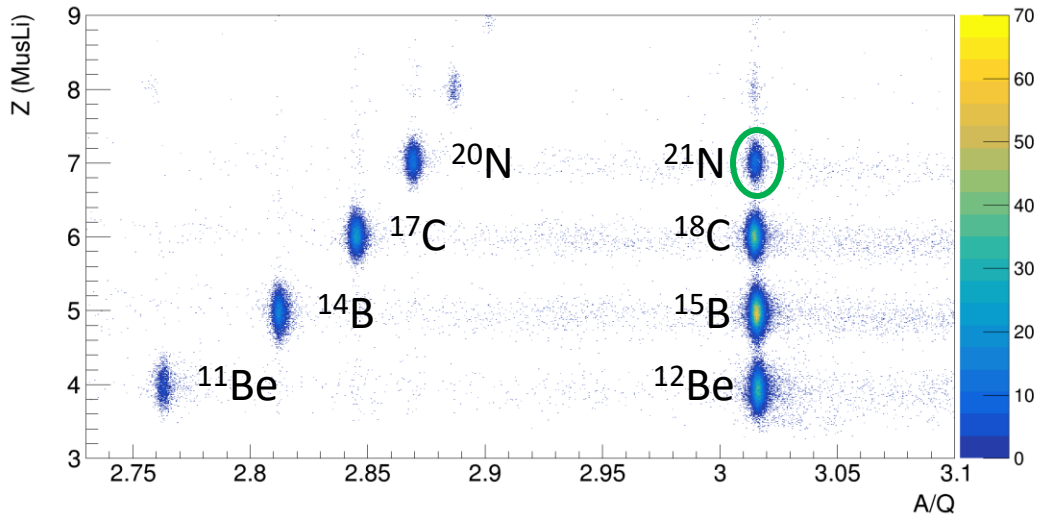
s509 Analysis Part2

Incoming PID



Z vs A/Q
for the ^{22}O setting

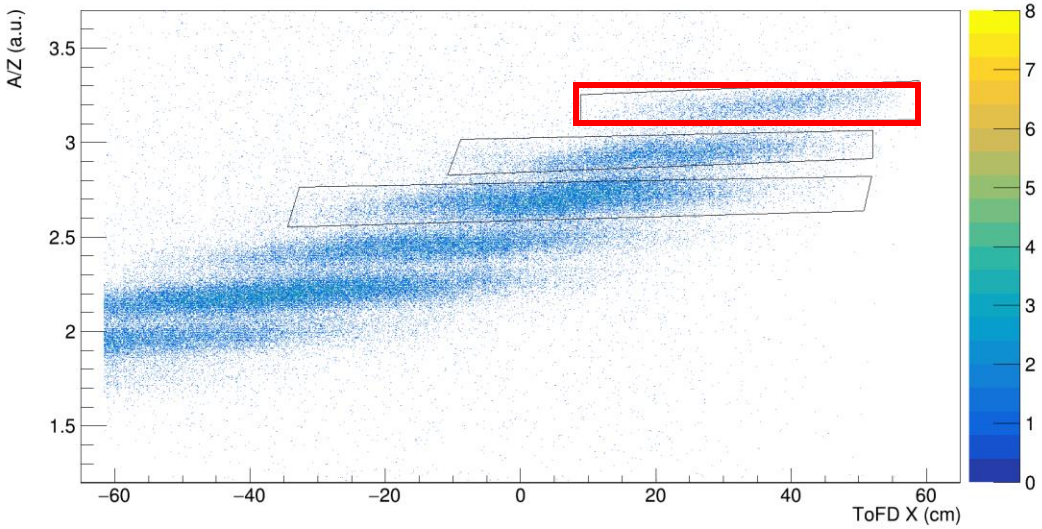


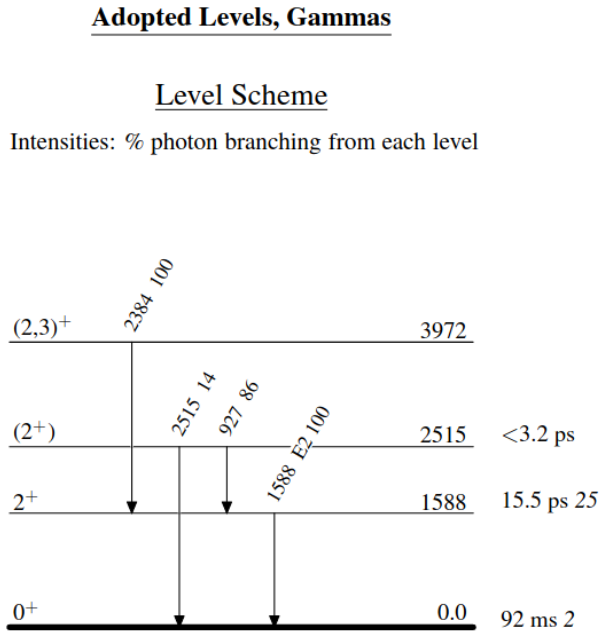
Z vs A/Q
for the ^{21}N setting

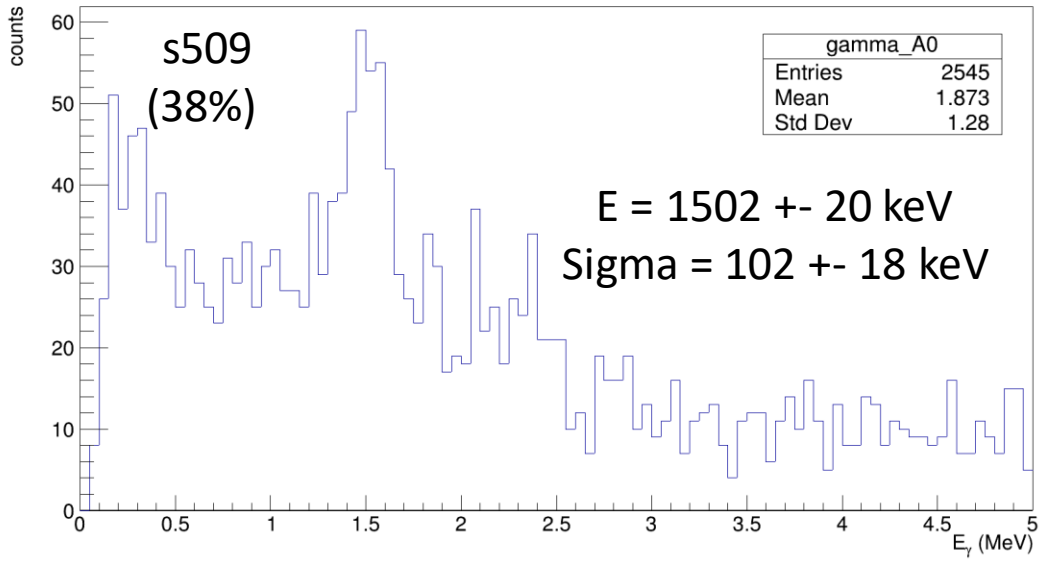
Reference nuclei: ^{19}N(*p,2p*)^{18}C* -> ...

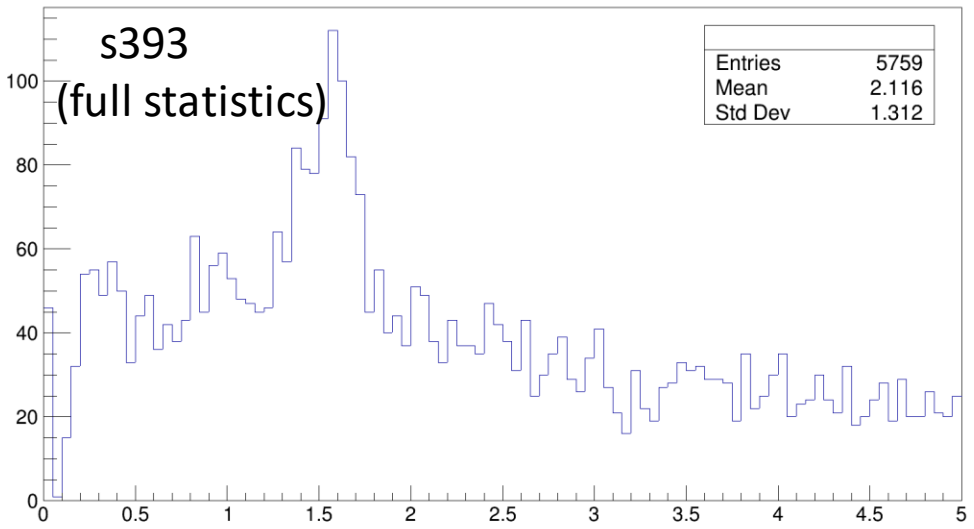
Physics cases of interest: ^{22}O(*p,2p*)^{21}N* and ^{21}N(*p,pn*)^{20}N*

$^{19}N(p,2p)^{18}C^* \Rightarrow {}^{18}C + \gamma$



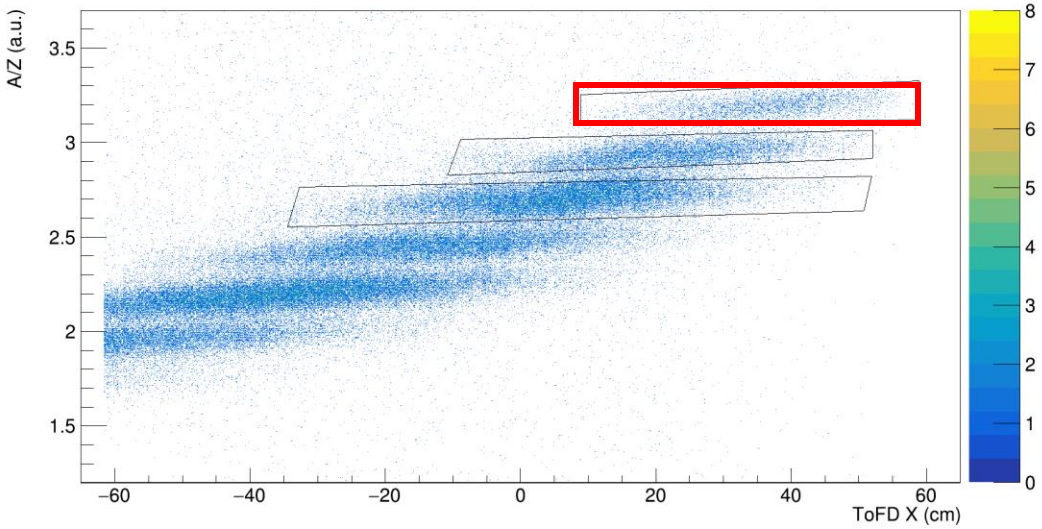


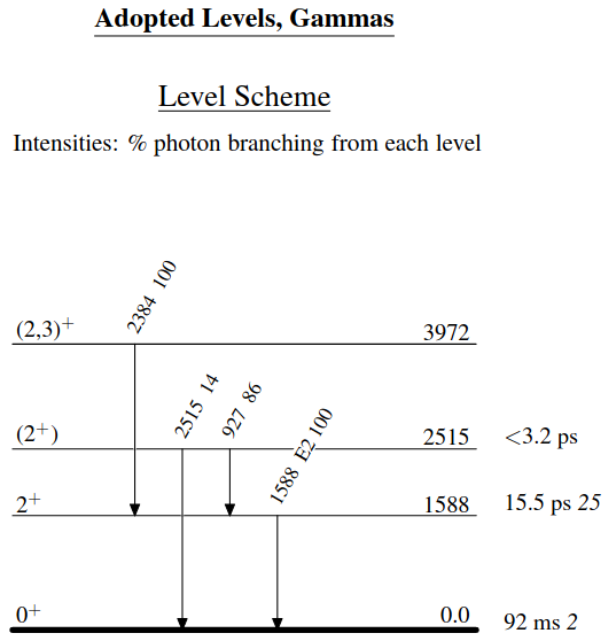


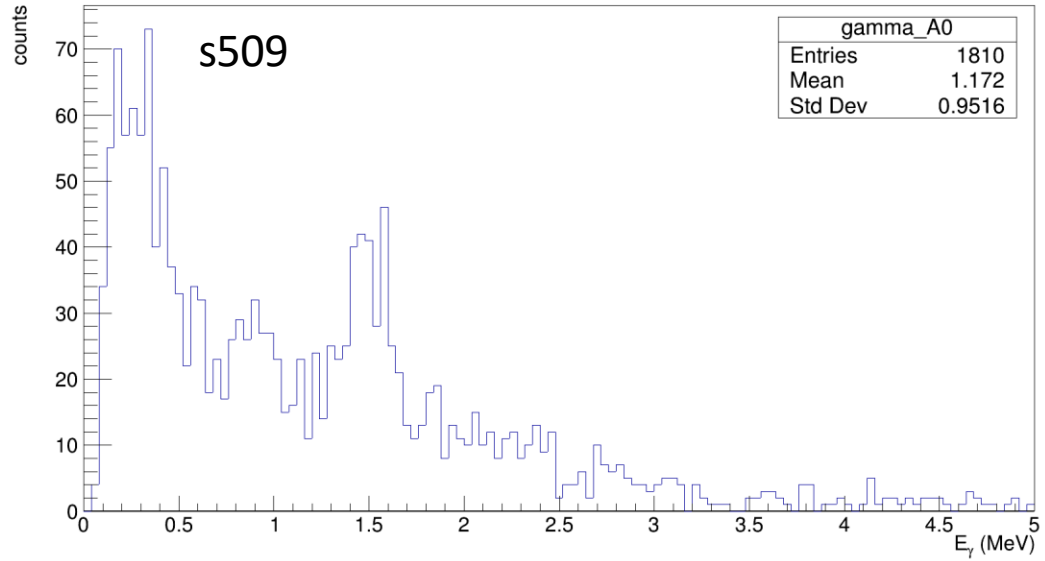


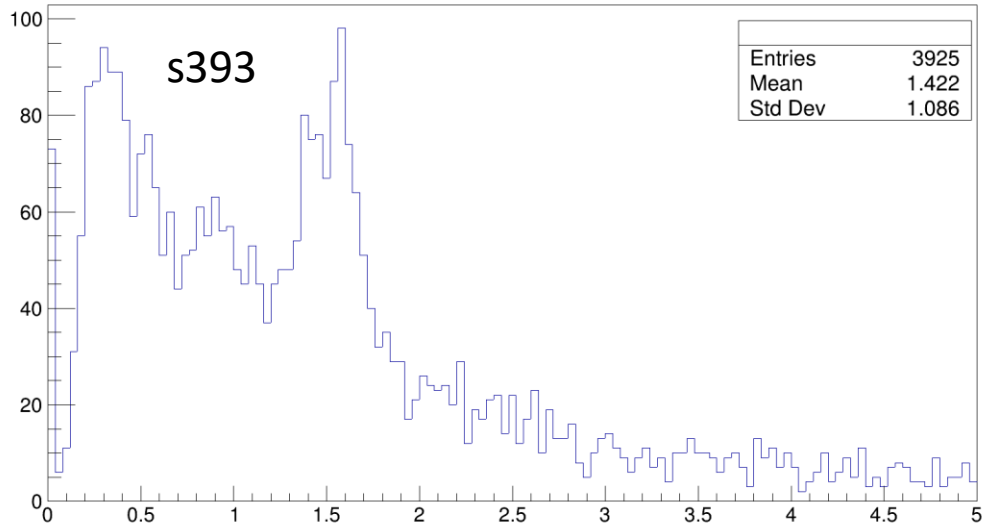
Gamma spectra without p2p condition and with only Emax

$^{19}N(p,2p)^{18}C^* \Rightarrow {}^{18}C + \gamma$



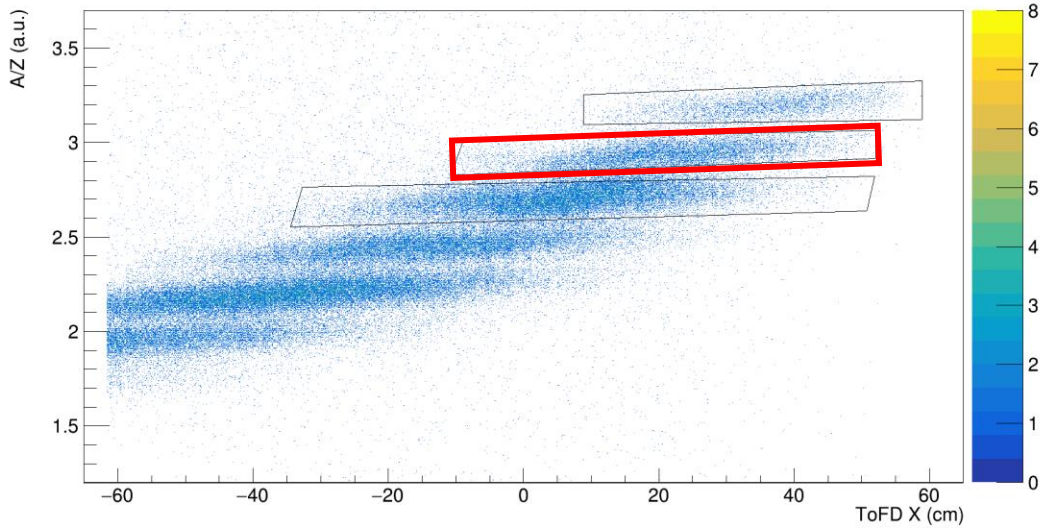


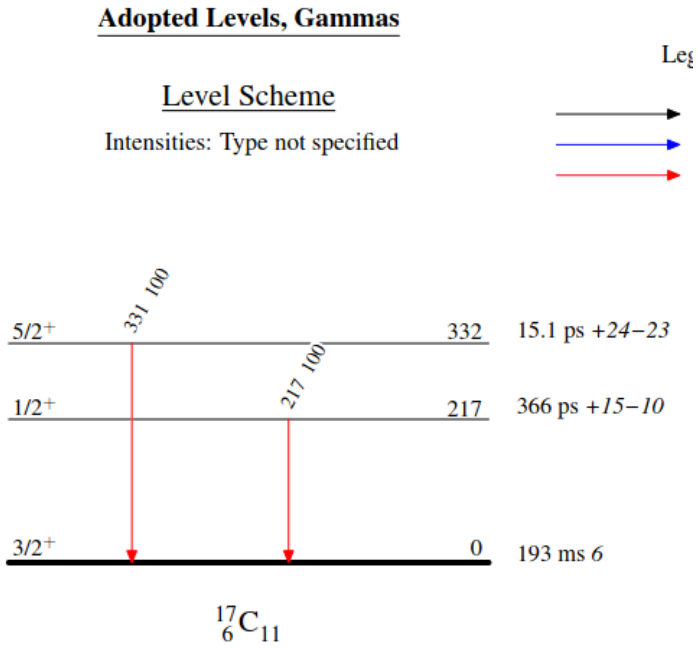


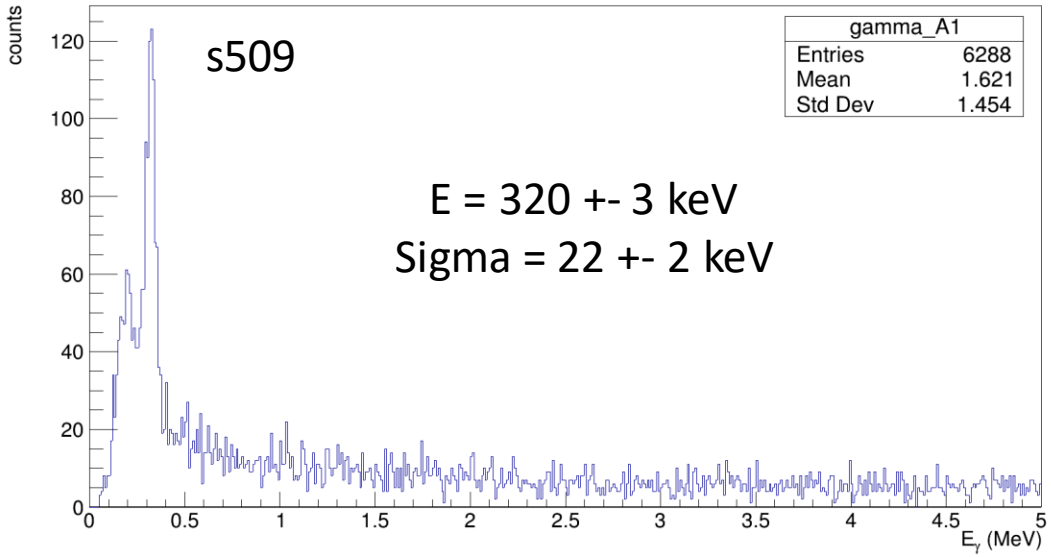


Gamma spectra without p2p condition and with cluster multiplicity < 3

$^{19}N(p,2p)^{18}C^* \Rightarrow {}^{17}C + 1n + \gamma$

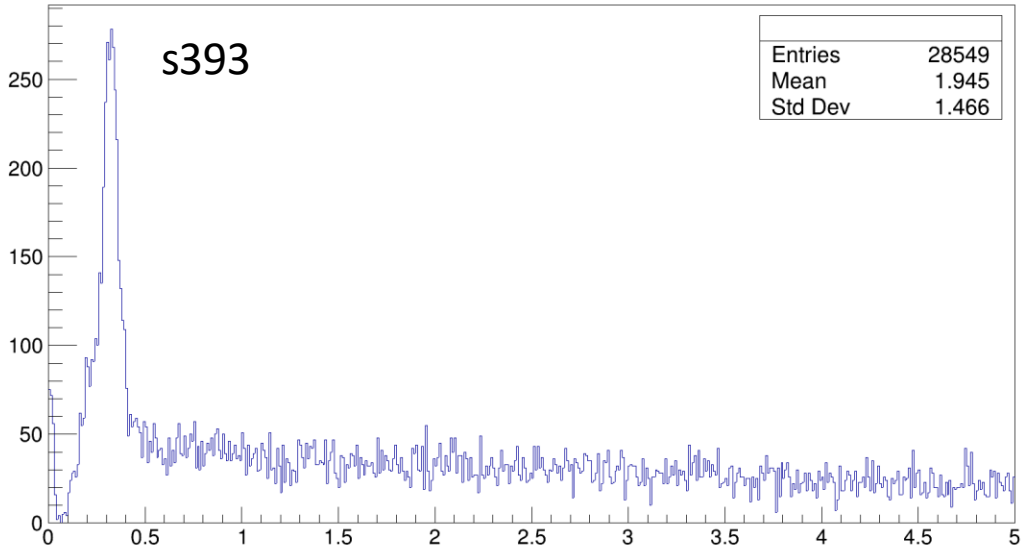






E = 320 +- 3 keV

Sigma = 22 +- 2 keV



Gamma spectra without p2p condition and with only Emax

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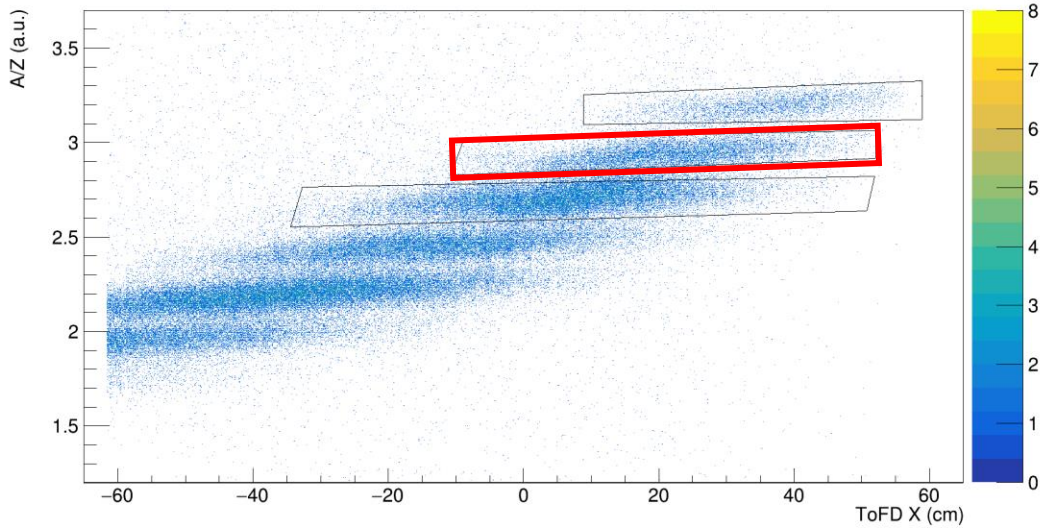
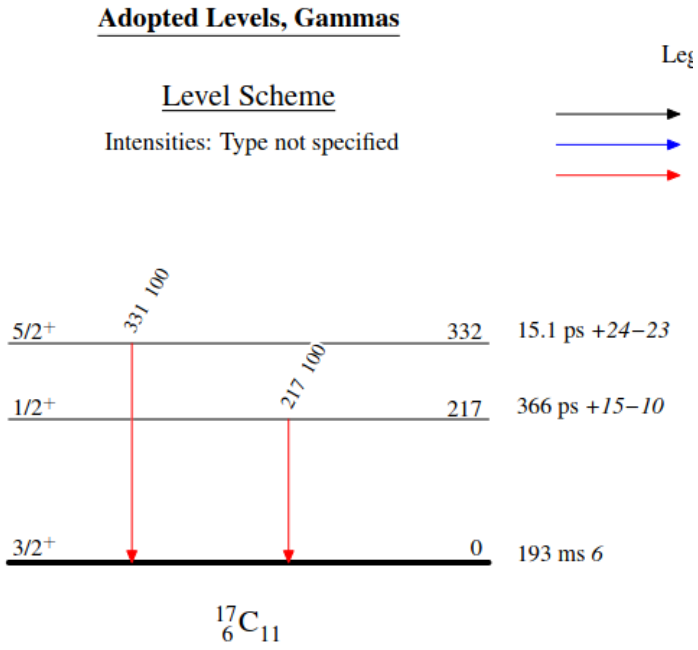
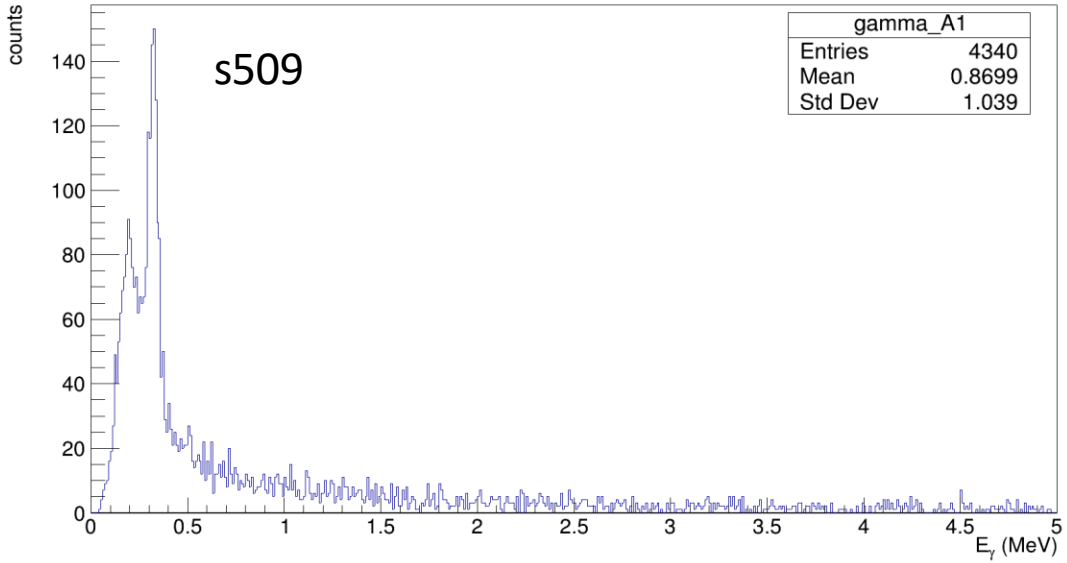
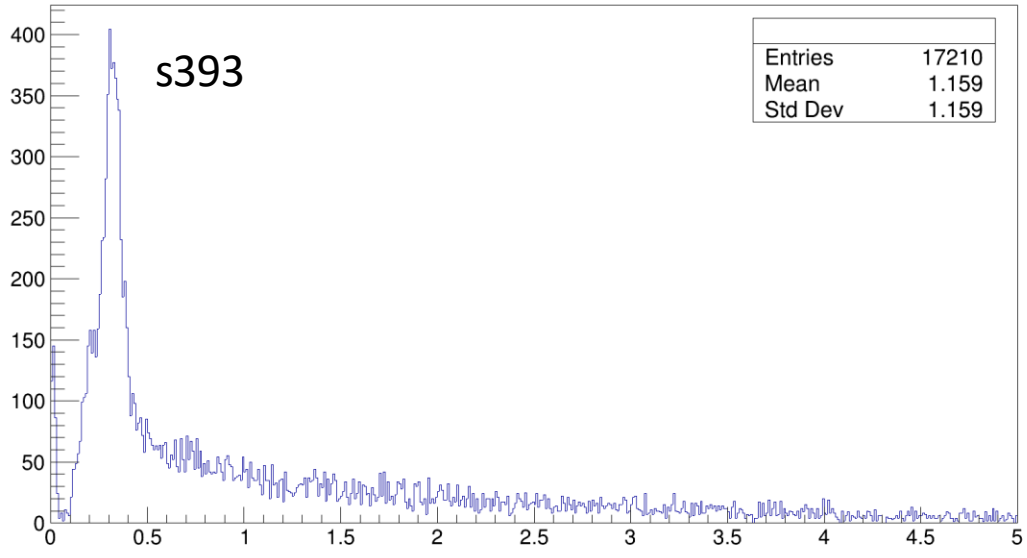


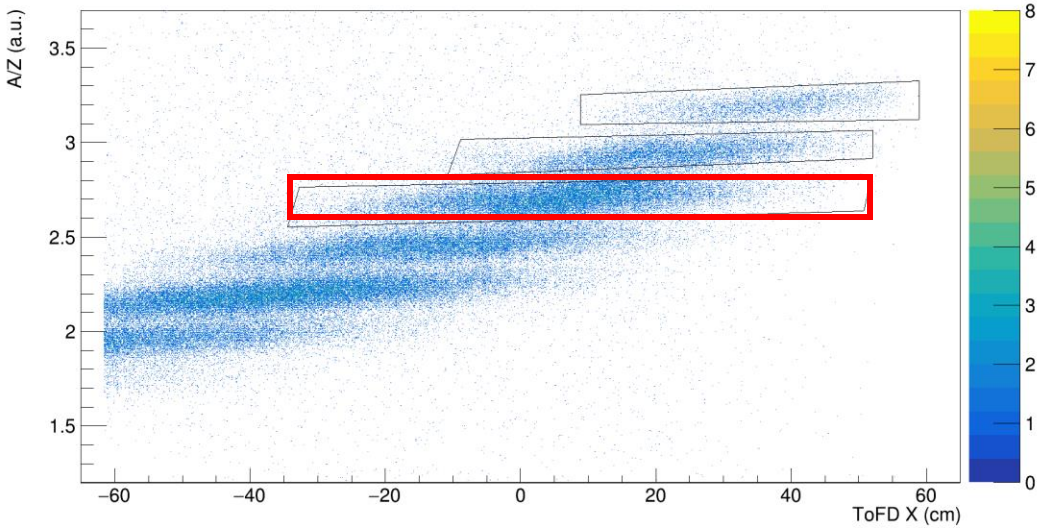


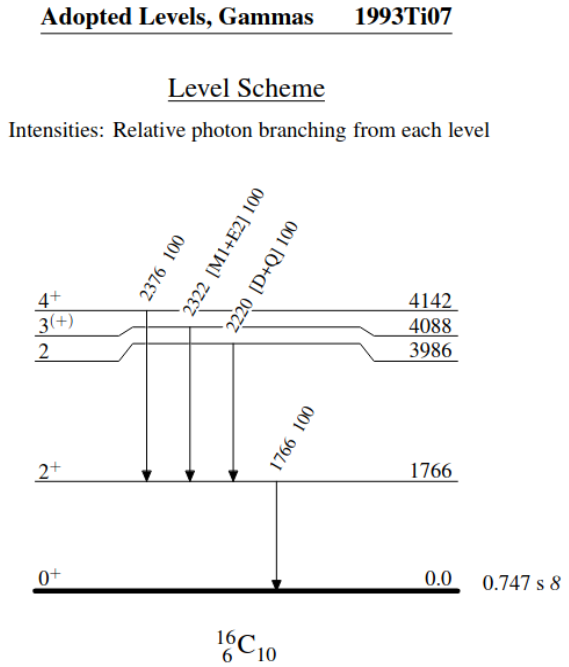


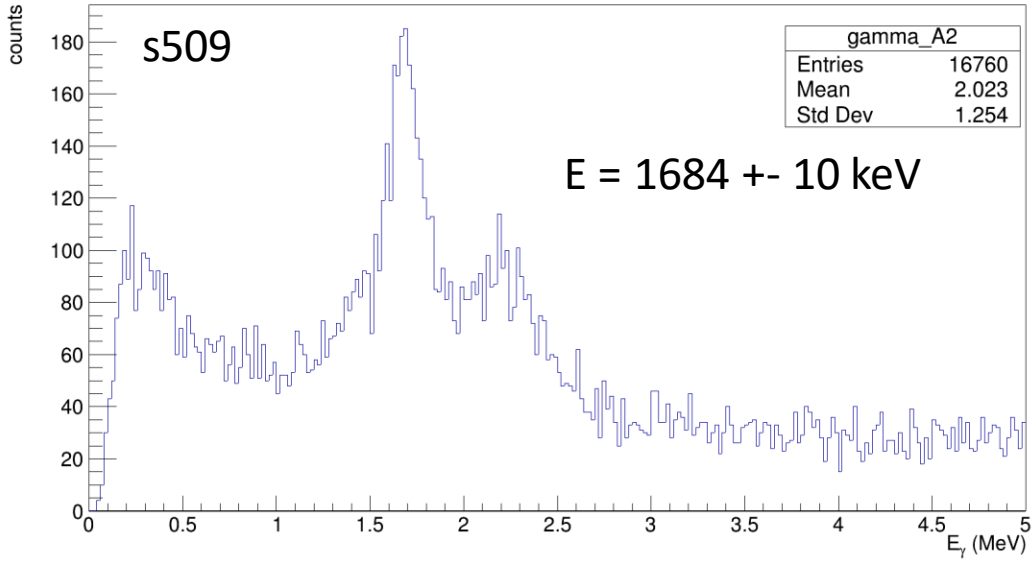


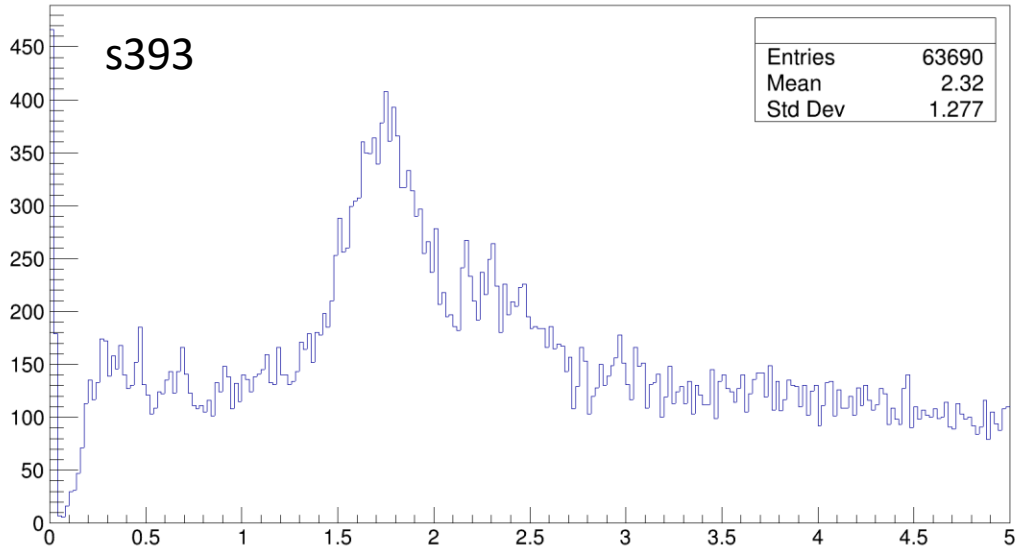
Gamma spectra without p2p condition and with cluster multiplicity < 3

$^{19}N(p,2p)^{18}C^* \Rightarrow {}^{16}C + 2n + \gamma$



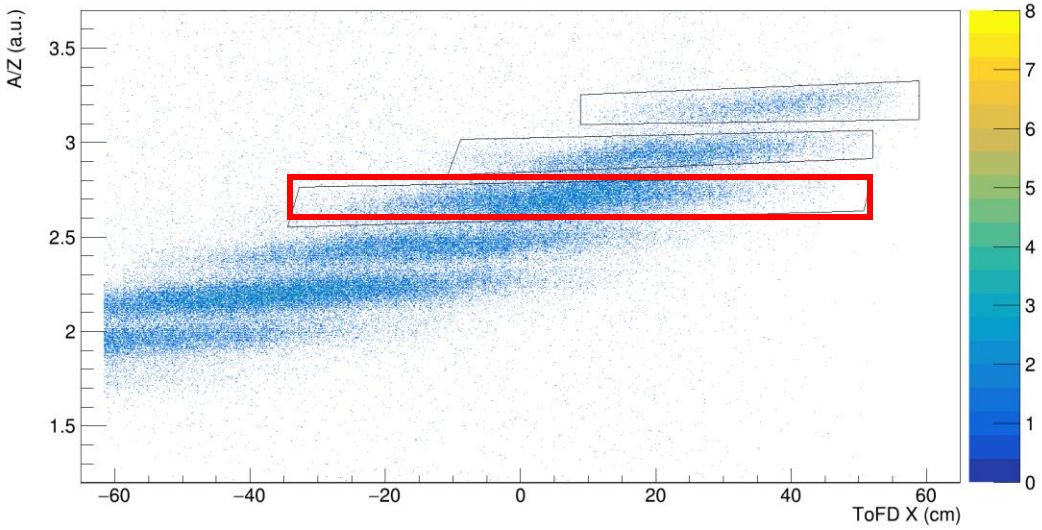


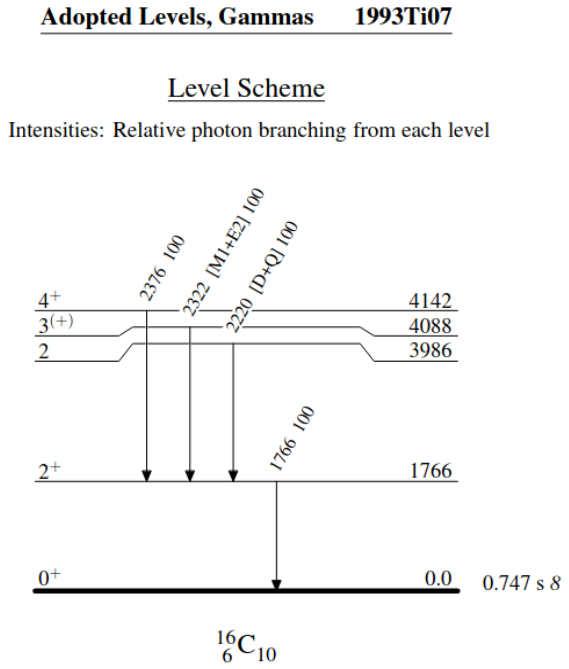


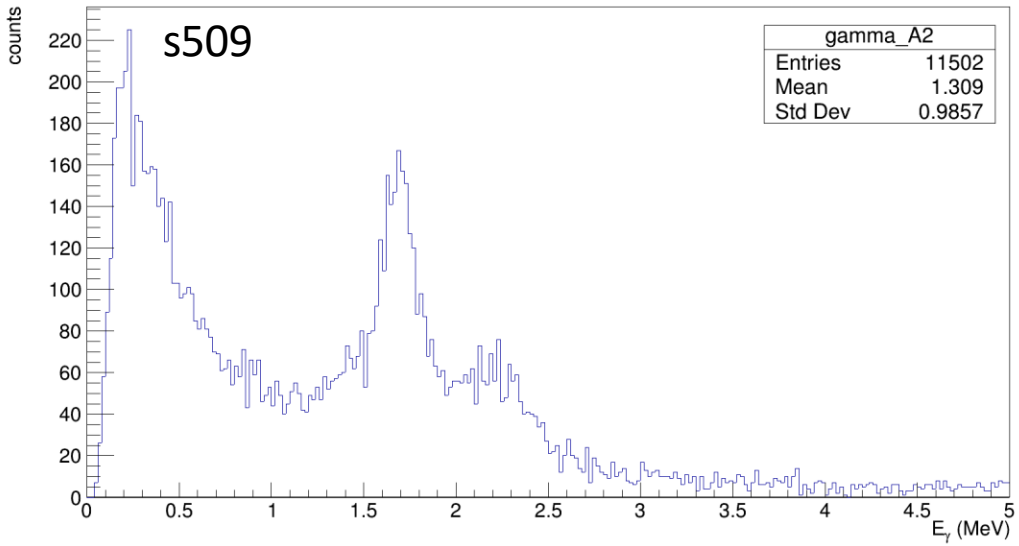


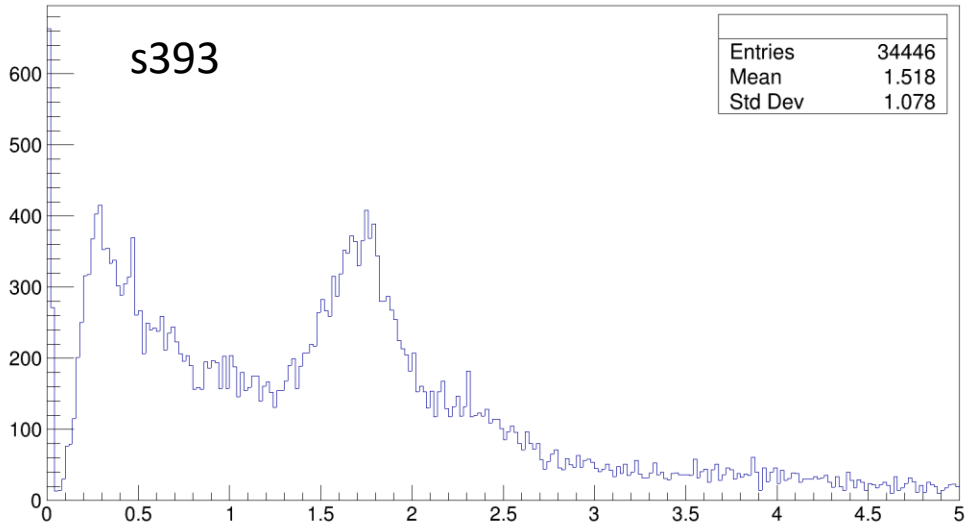
Gamma spectra without p2p condition and with only Emax

$^{19}N(p,2p)^{18}C^* \Rightarrow {}^{16}C + 2n + \gamma$



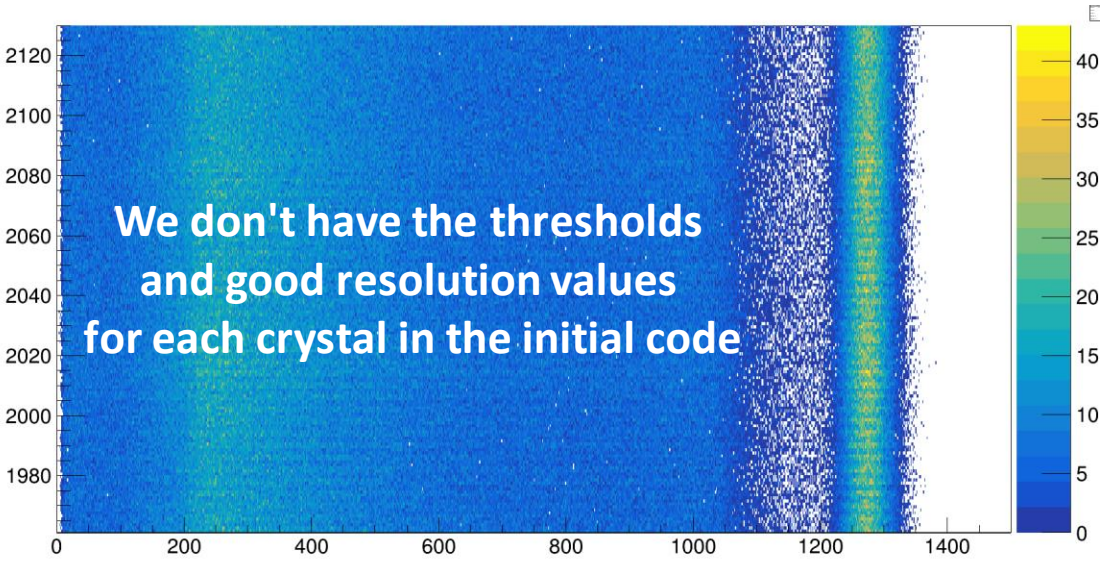




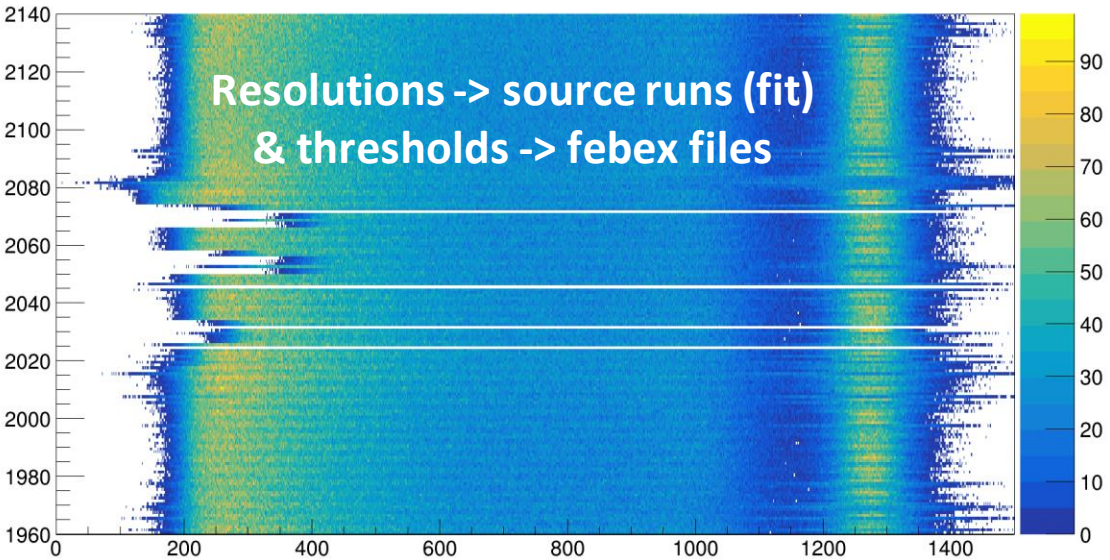


Gamma spectra without p2p condition and with cluster multiplicity < 3

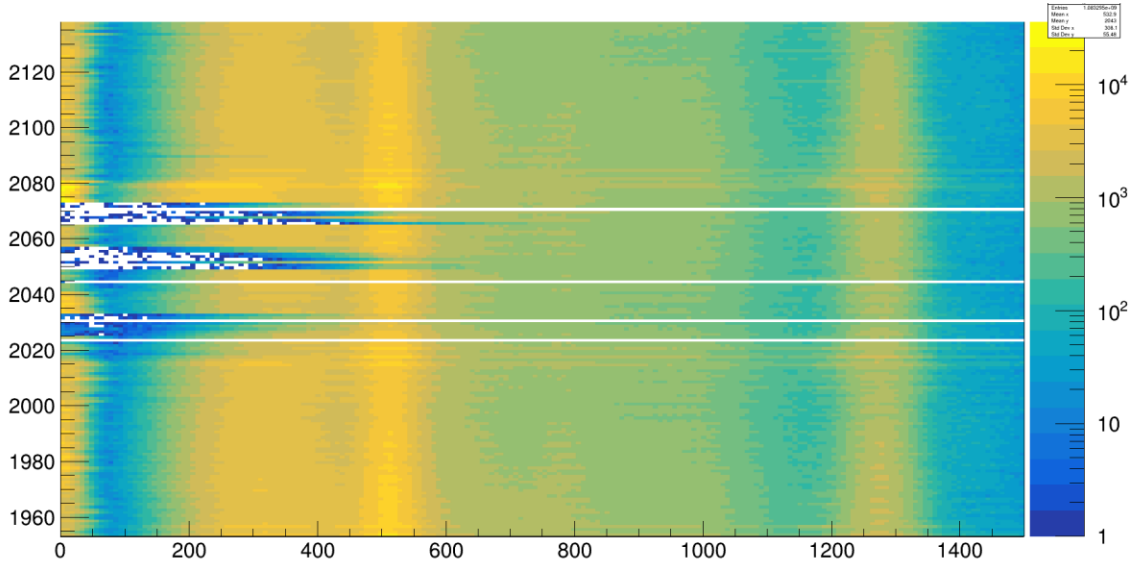
Simulations



Crystal Id vs energy in simulations: 1275keV peak



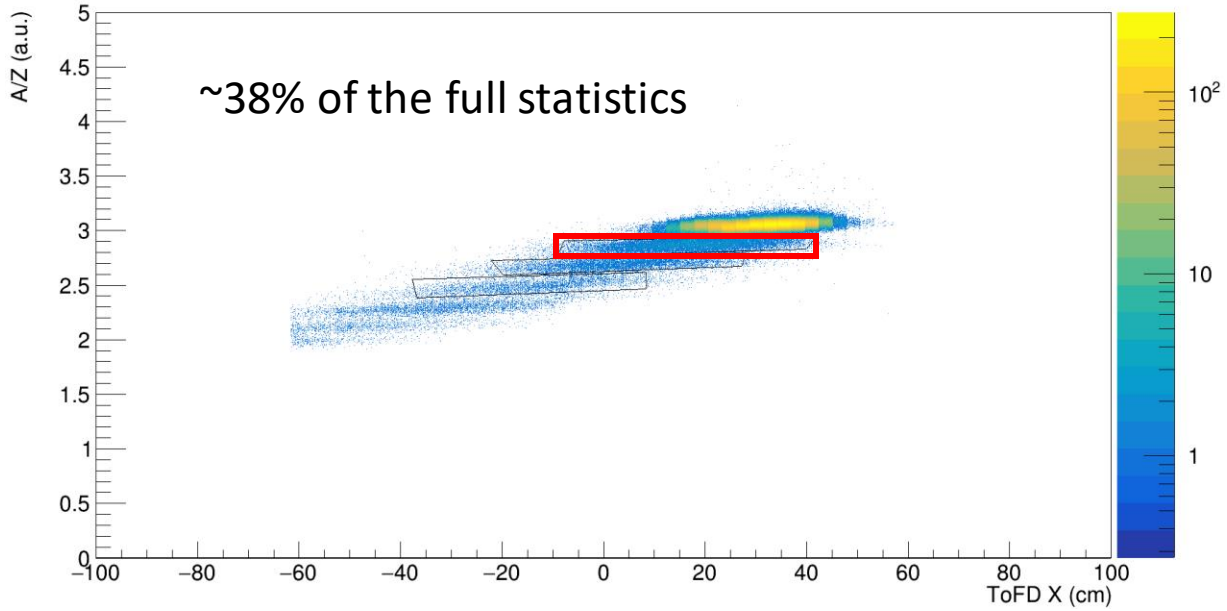
Crystal Id vs energy in simulations: 1275keV peak



Crystal Id vs (calibrated) energy in data: ^{22}Na source

Last improvement: adding a "new "dependency.
RES(E) => RES(E,#cryst) = a(#cryst) / sqrt(E) +b(#cryst)

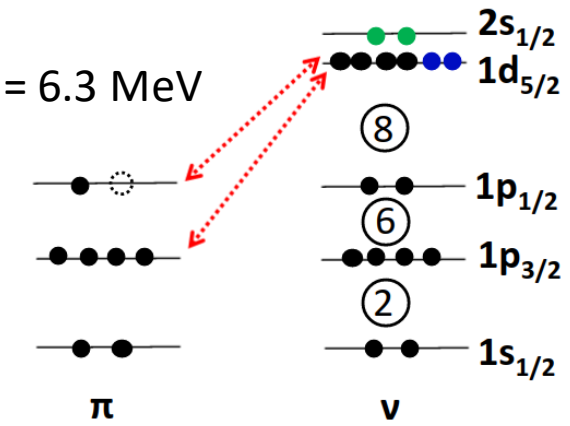
Physics cases

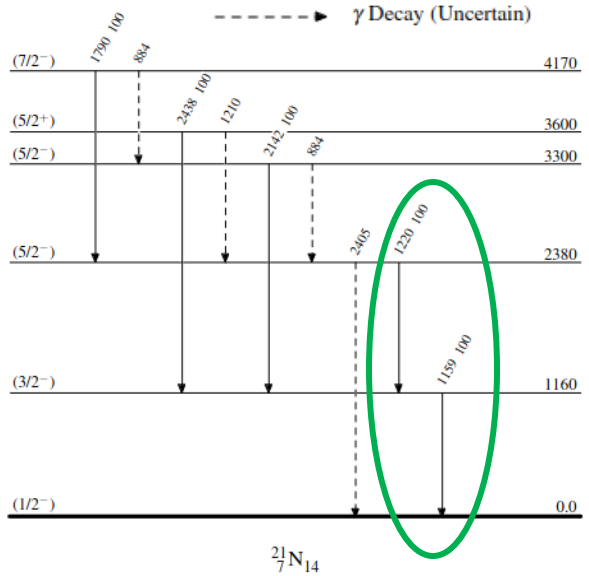


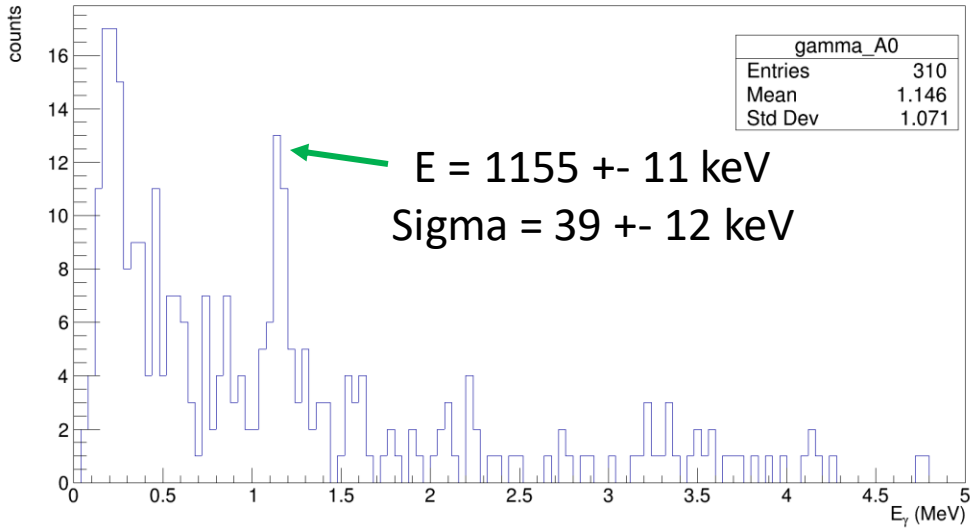
Contribution of the tensor force to the modification of the SO splitting in the N chain :

In ^{15}N : $E_{sp}(3/2_1^-) - E_{sp}(1/2_1^-) = 6.3$ MeV

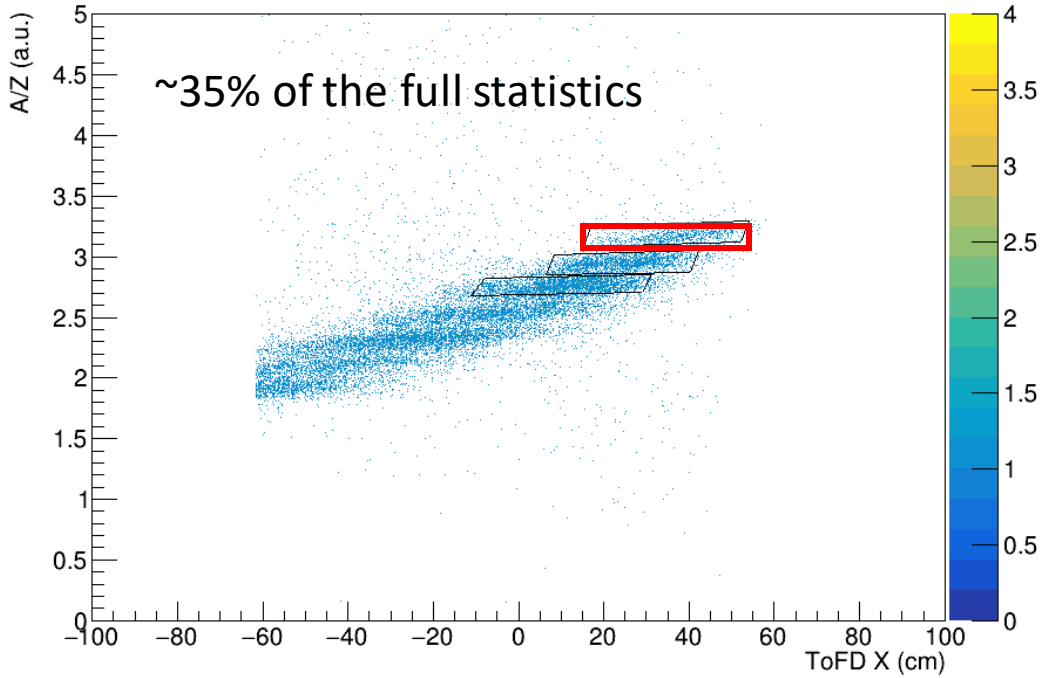
In ^{21}N : ? => ^{22}O(p,2p)^{21}N*
=> Some of the states of interest decay by neutron emission





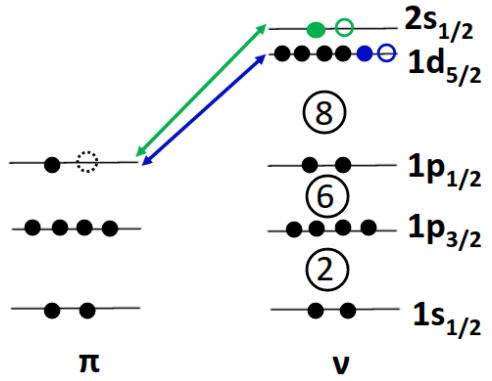


Physics cases

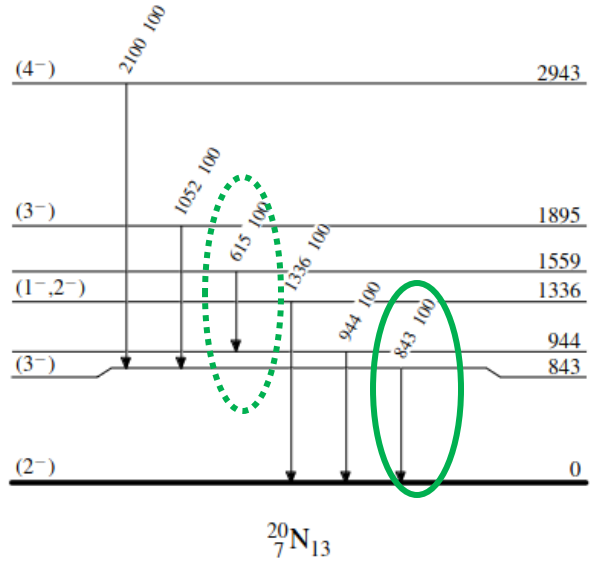


… but is the $d_{5/2}$ fully filled in ^{21}N ?

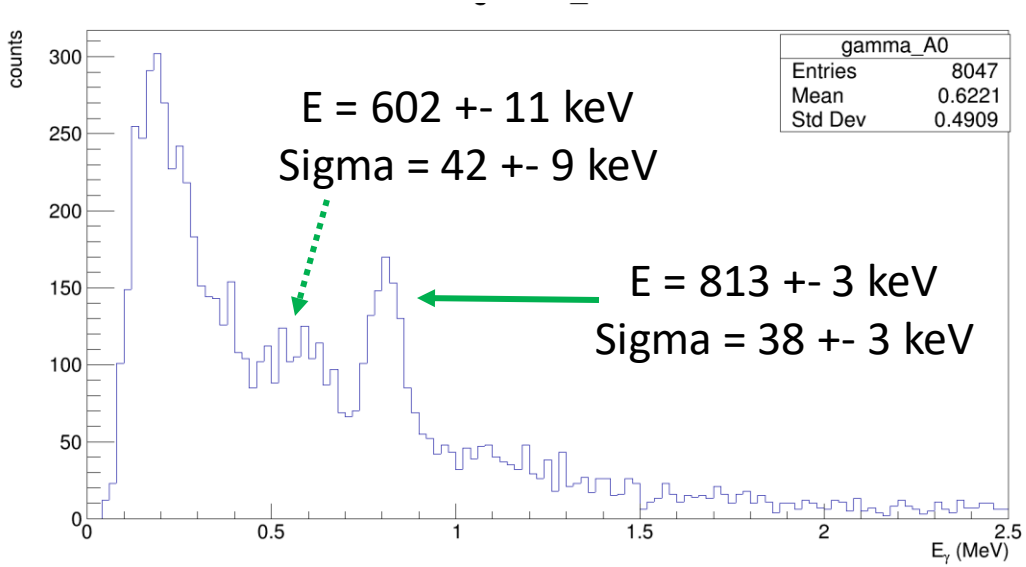
We need to study the Fermi surface of neutrons in ^{21}N with the ^{21}N(*p,pn*)^{20}N* reaction



$J^{\pi} = \{0^-, 1^-\}$ and $J^{\pi} = \{2^-, 3^-\}$



$^{20}_{7}N_{13}$



Outlooks

What was reported here?

- Checks of gamma spectra with reference nuclei

- 2 first steps to make the gamma simulations more realistics (thresholds + resolution @1MeV)

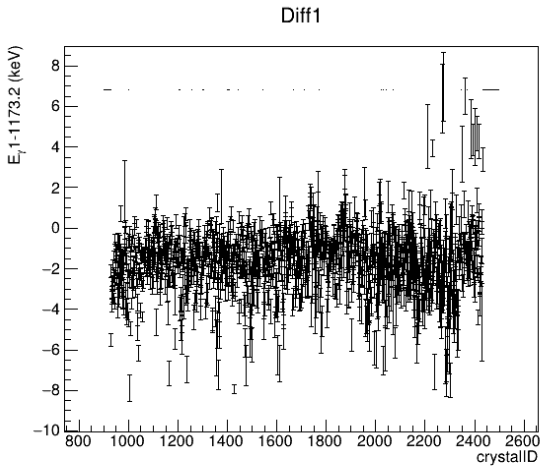
What are the next steps?

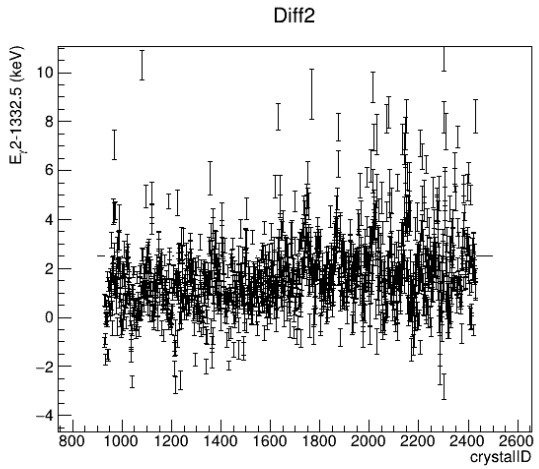
- To complete the gamma simulation setting (Resolution function and crystal_ID)

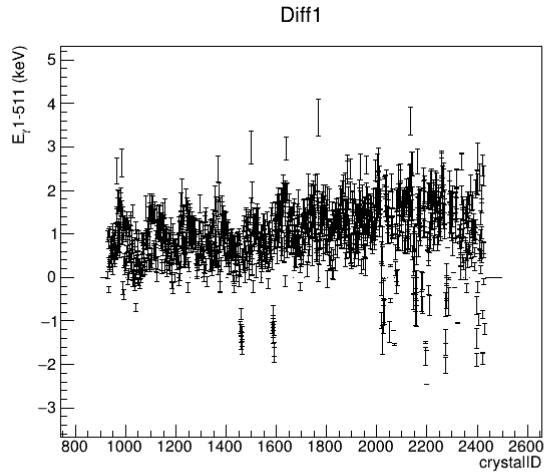
- After checking the response function -> efficiency curve

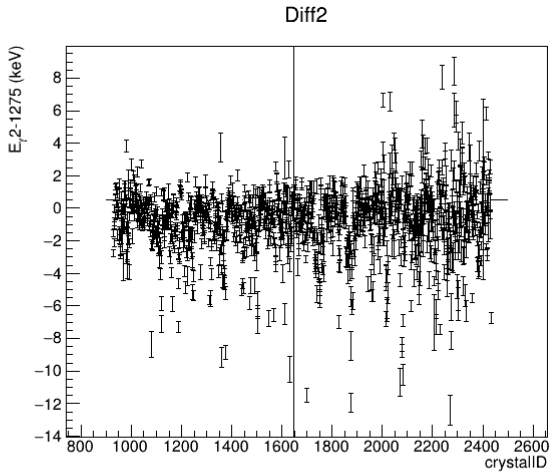
- Common outlooks with Nikhil about the E_{rel} reconstruction to study 1n and 2n decays

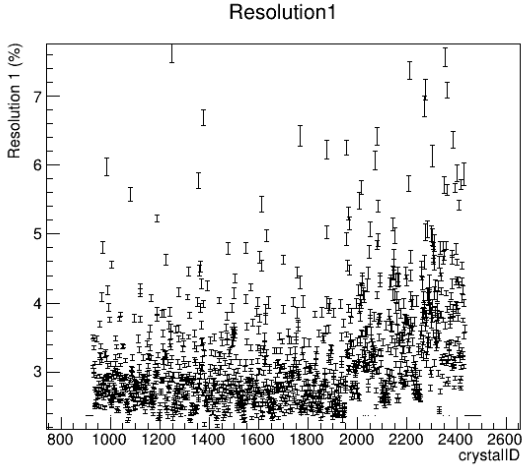
extra slides

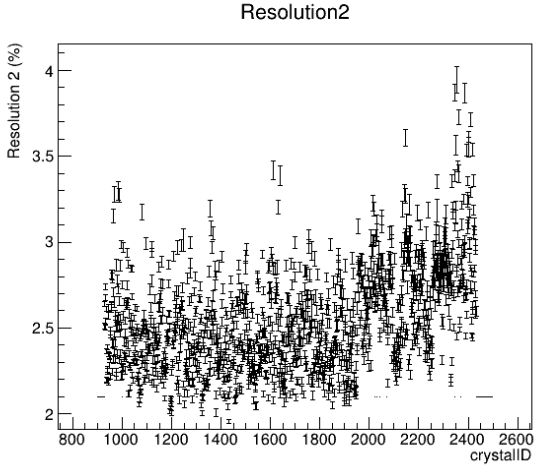

Diff1
E_γ1-1173.2 (keV)
crystalID

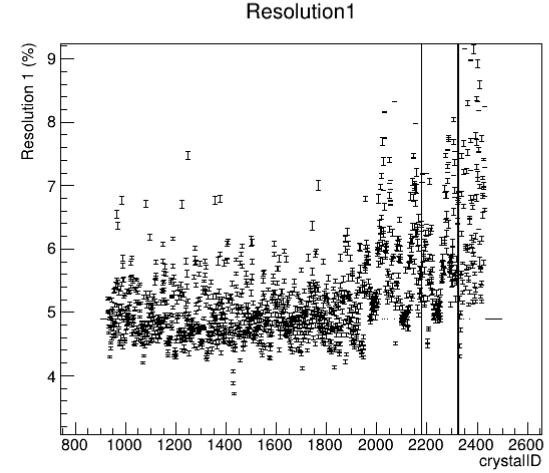

Diff2
E_γ2-1332.5 (keV)
crystalID

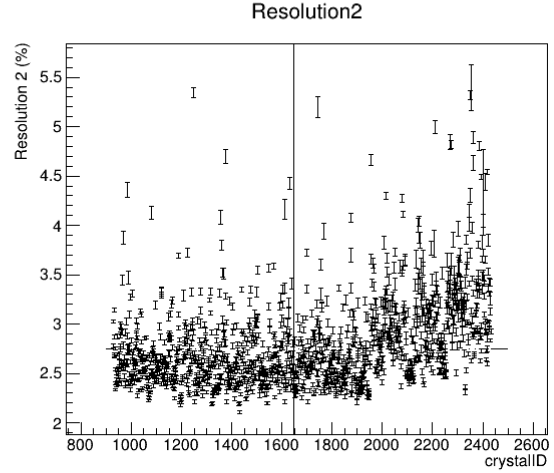

Diff1
E_γ1-511 (keV)
crystalID


Diff2
E_γ2-1275 (keV)
crystalID

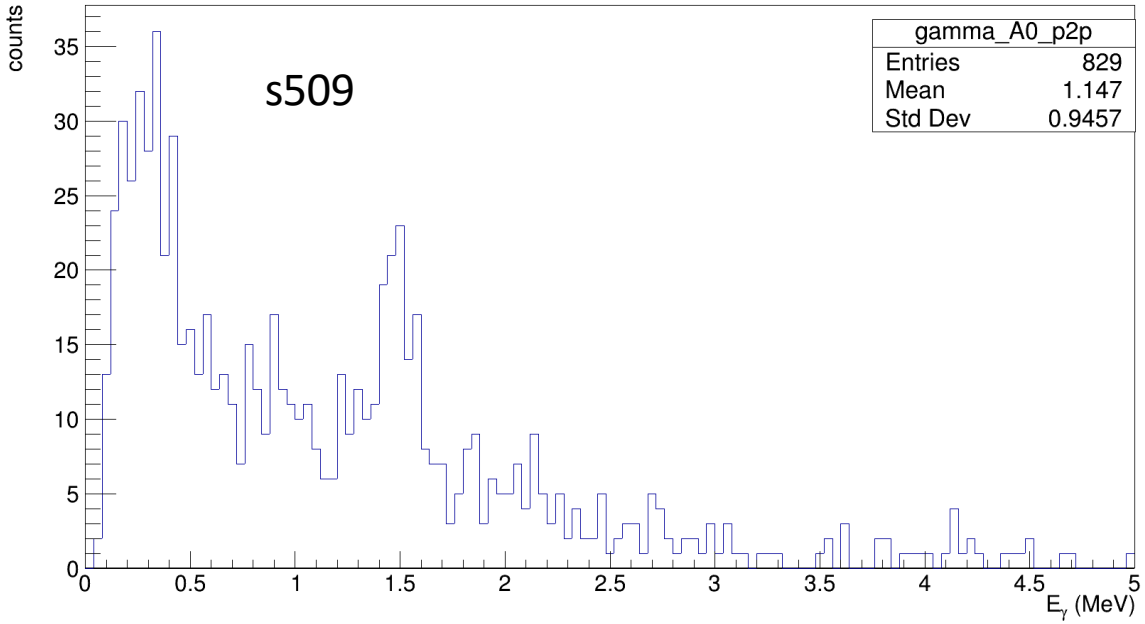

Resolution1
Resolution 1 (%)
crystalID

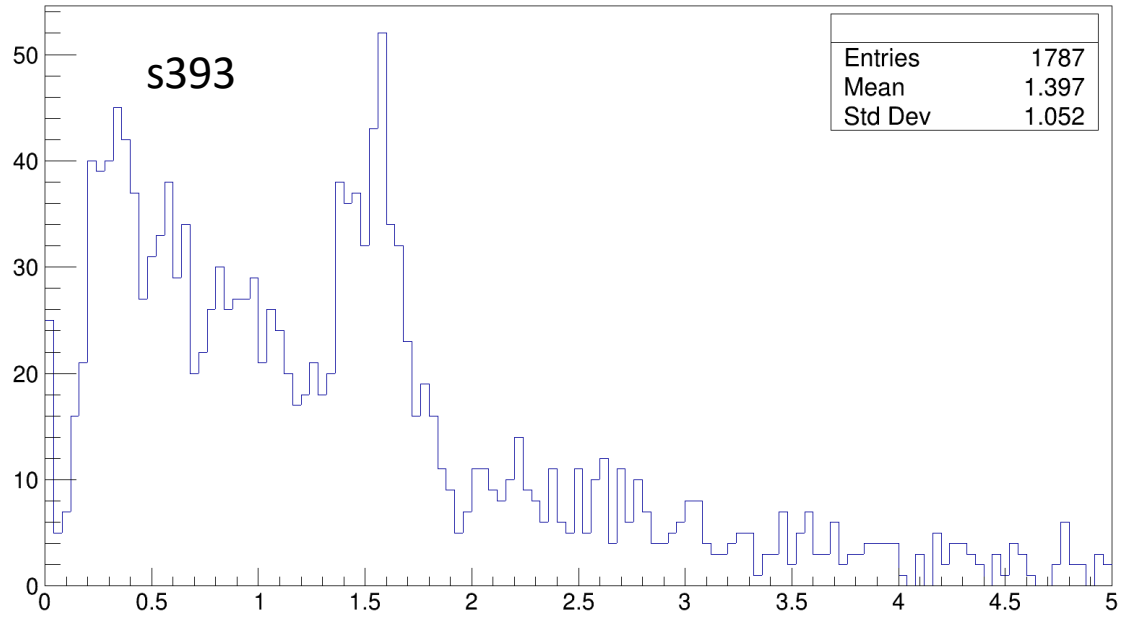

Resolution2
Resolution 2 (%)
crystalID


Resolution1
Resolution 1 (%)
crystalID


Resolution2
Resolution 2 (%)
crystalID

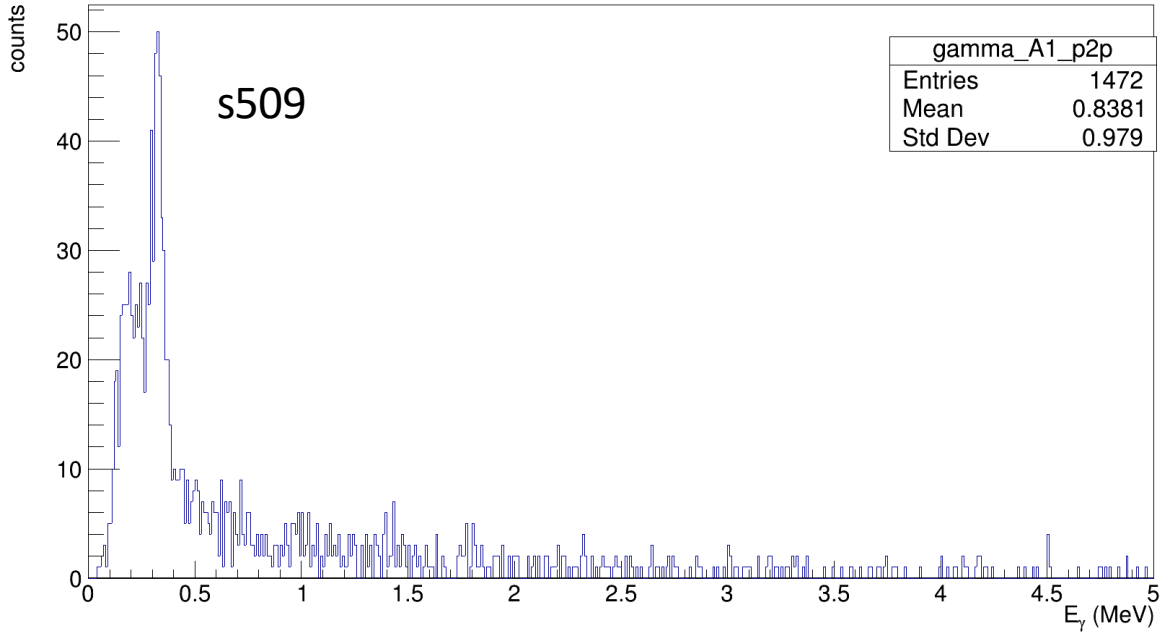
$^{19}N(p,2p)^{18}C^* \Rightarrow {}^{18}C + \text{gamma}$

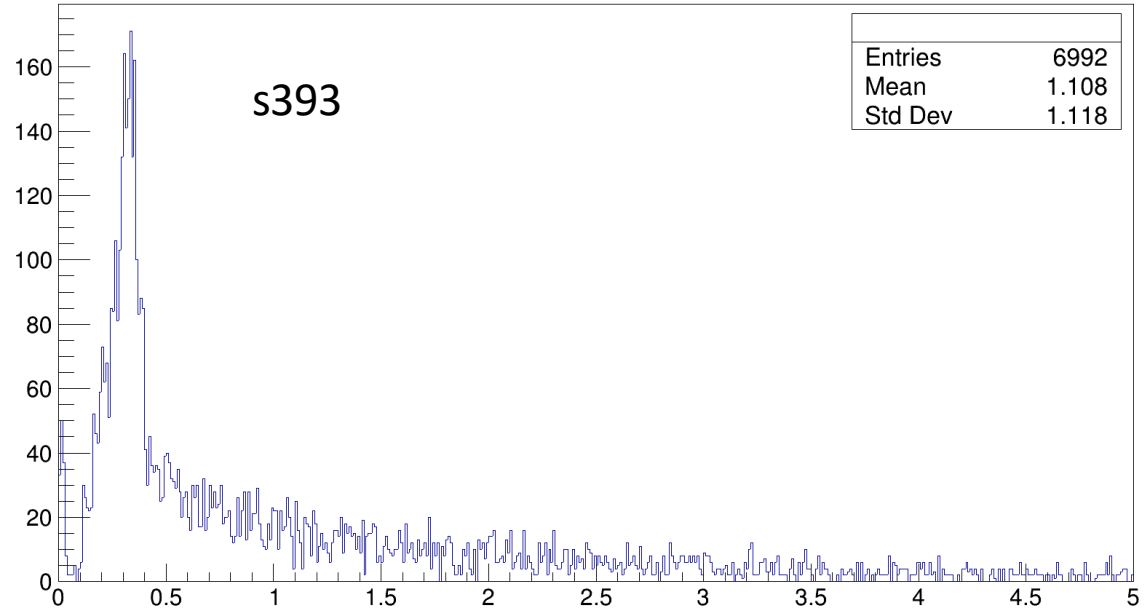




Gamma spectra with p2p condition and cluster multiplicity < 3

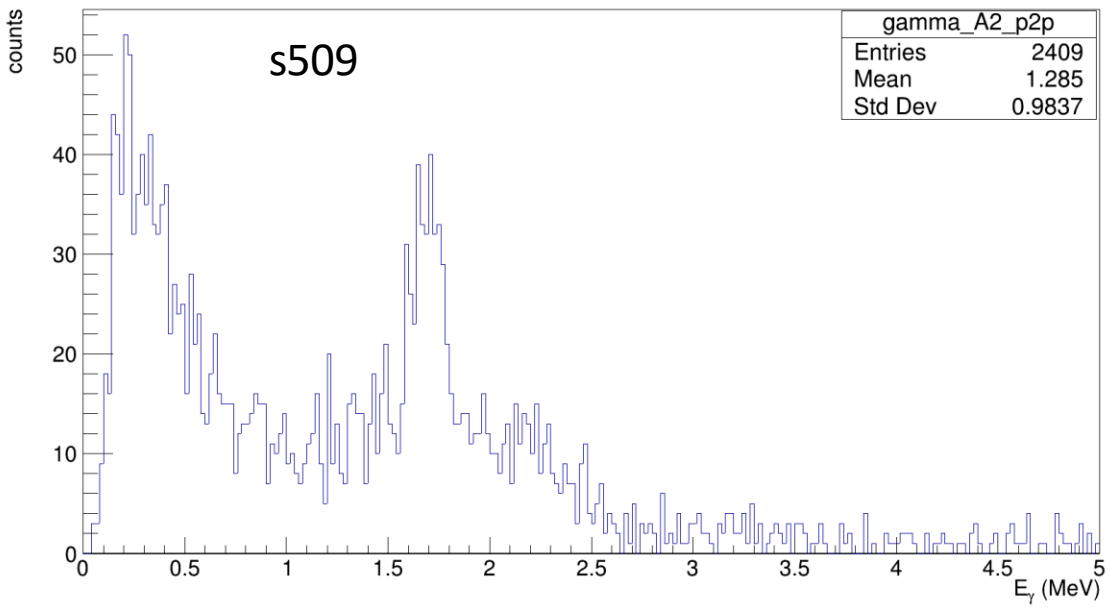
$^{19}N(p,2p)^{18}C^* \Rightarrow {}^{17}C + 1n + \text{gamma}$

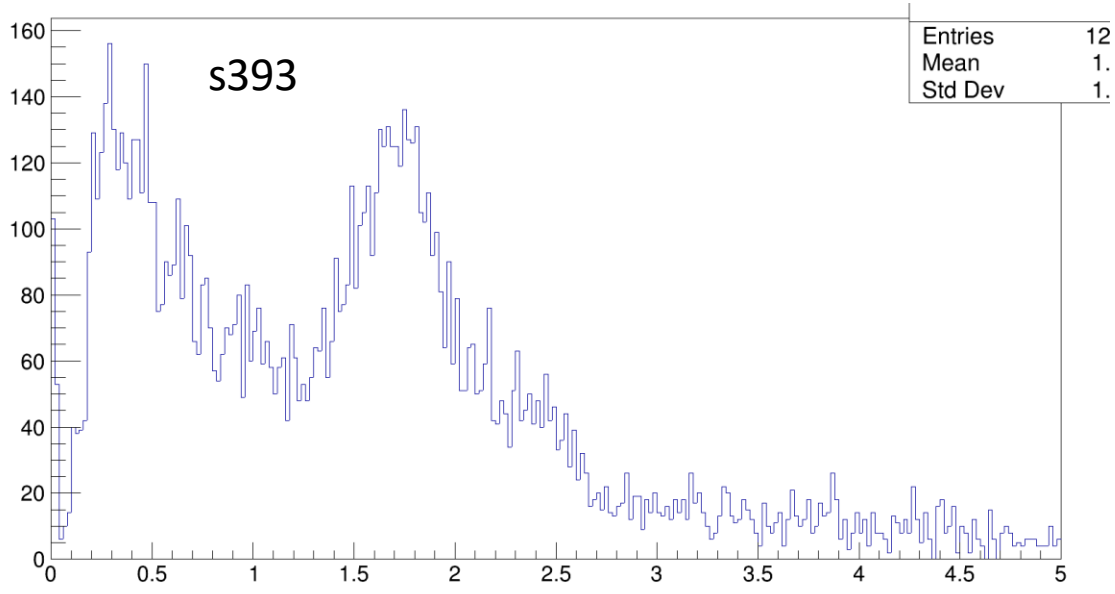




Gamma spectra with p2p condition and cluster multiplicity < 3

$^{19}N(p,2p)^{18}C^* \Rightarrow {}^{16}C + 2n + \gamma$





Gamma spectra with p2p condition and cluster multiplicity < 3