fragment PI

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I show the analysis of fragment PI briefly.
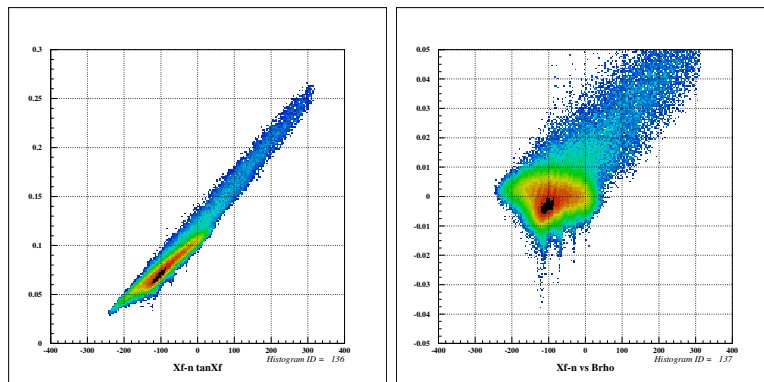 fragment PI method
  fragment PI(^{24}O,^{23}O beam run)
  level scheme of ^{20}O,^{21}O,^{22}O
  Mass spectrum(^{24}O,^{23}O beam run)

1   fragment PI method

I used following gate.
BEAM trigger
beam@F2 : Z=8 beam
target size @NDC : ϕ 40.0 mm
VETO : no hit

$$\frac{\Delta \text{Brho}}{\text{Brho}} = \tan\theta_{\text{f}} - (\text{A}_1 + \text{B}_1 * (\text{x}_{\text{f}} - \text{x}_{\text{tgt}})) \tag{1}$$
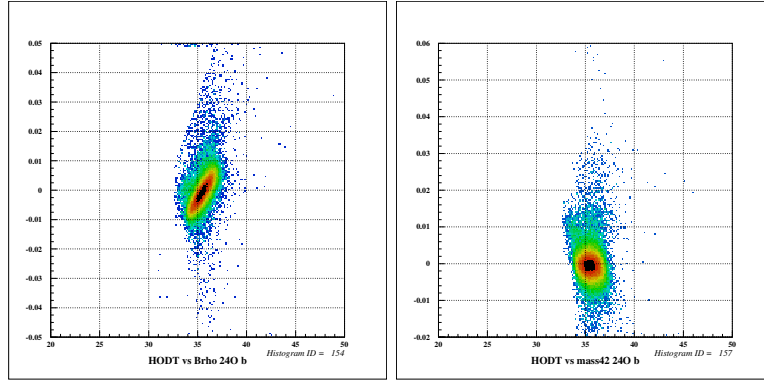

1: $x_f - x_{tgt}$ vs $\tan\theta_f$

1

Then, I used following gate.

BEAM trigger

beam@F2 : ^{24}O beam(^{24}O beam run), ^{23}O beam(^{23}O beam run)

target size @NDC : ϕ 40.0 mm

VETO : no hit

$$\text{mass(a.u.)} = \frac{\Delta \text{Brho}}{\text{Brho}} - (A_2 + B_2 * \text{TOF(tgt} - \text{HODO)}) \tag{2}$$

2: HODT vs Brho(a.u.)

2　fragment PI(^{24}O,^{23}O beam run)

I saw 'mass(a.u.)' with the following gate.

BEAM × NEUT trigger

beam@F2 : ^{24}O beam(^{24}O beam run), ^{23}O beam(^{23}O beam run)

target size @NDC : ϕ 40.0 mm

VETO : no hit　　NEUT : multiplicity = 1,2,3,...

NEUT : pulse height of QDC $\geq$ 6.0MeVee

HODO : Z=8 (using only ID=2,3,4,5)

Then, I saw mass(a.u.) vs Energy of gamma-ray with the added gate.

BEAM × GAMMA trigger

GAMMA : multiplicity = 1

I didn't change parameters about DALI. So, I used same parameters about DALI with online analysis.

I think that the big peak of mass(a.u.) spectrum in ^{24}O beam run is not ^{23}O and it's ^{22}O, because we can see energy of gamma-ray corresponding 1383keV,3199keV gamma-ray from ^{22}O in this big peak. Also we can see similar Egamma spectrum in ^{22}O-fragment gate in ^{23}O beam run.
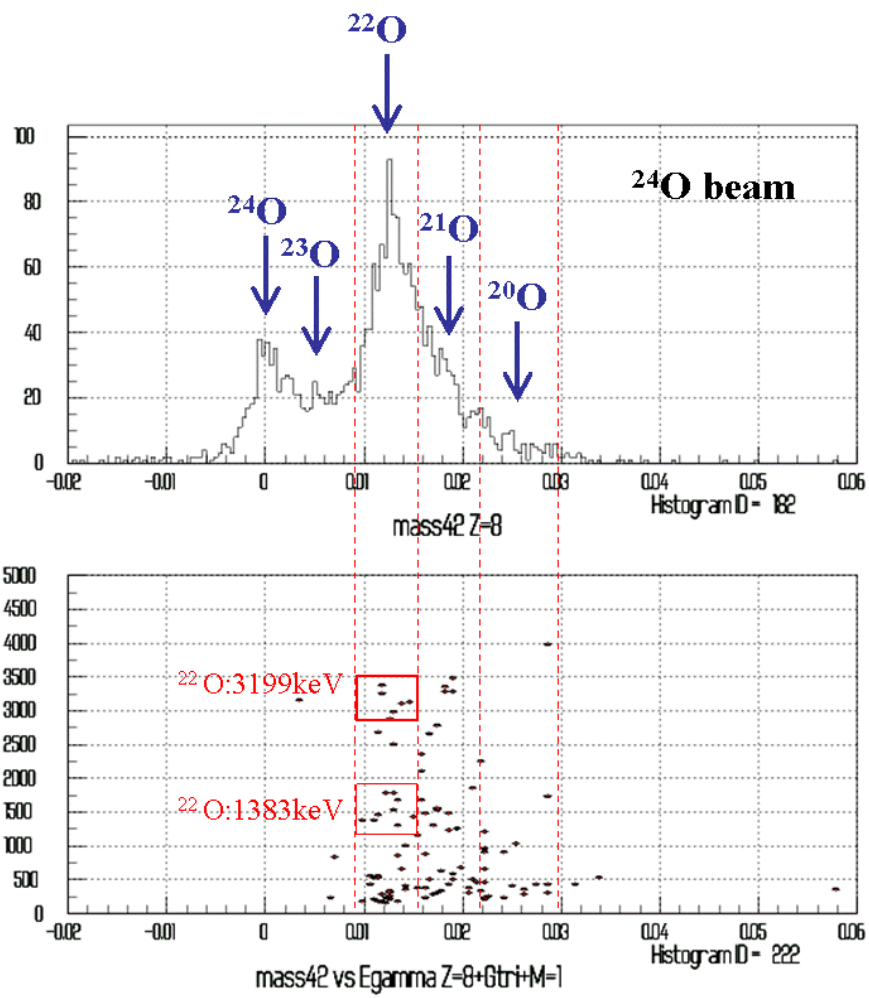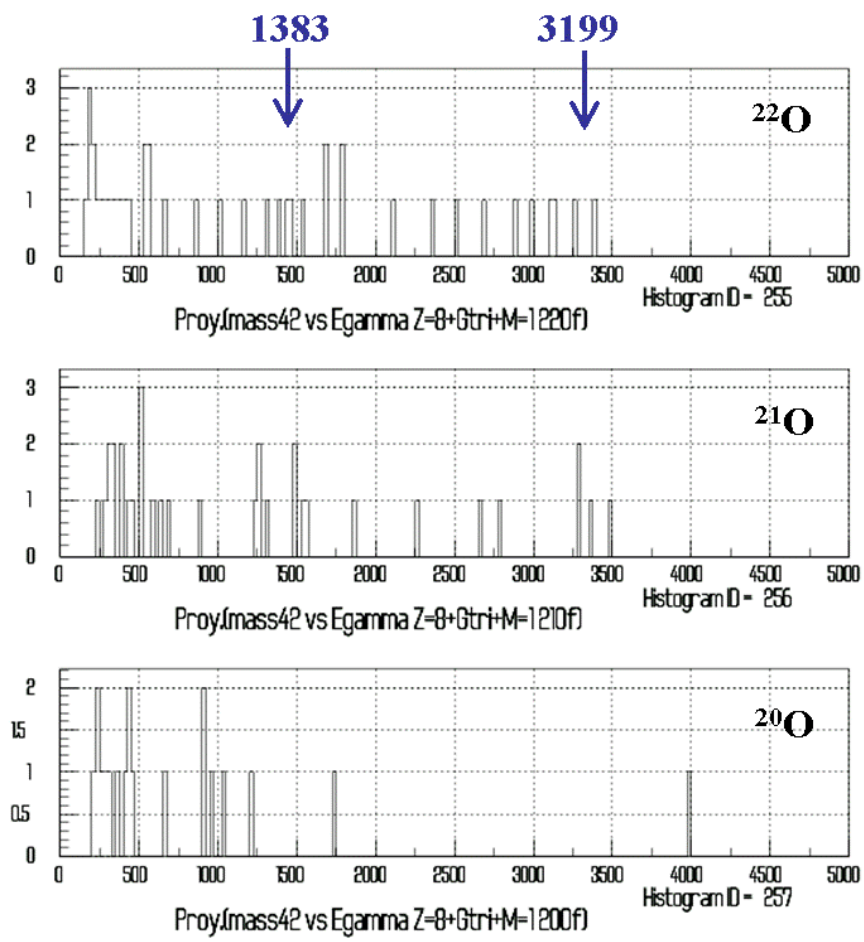
3: fragment PI in 24O beam run. We can see gamma ray corresponded 1383keV,3199keV gamma-ray from ^{22}O.

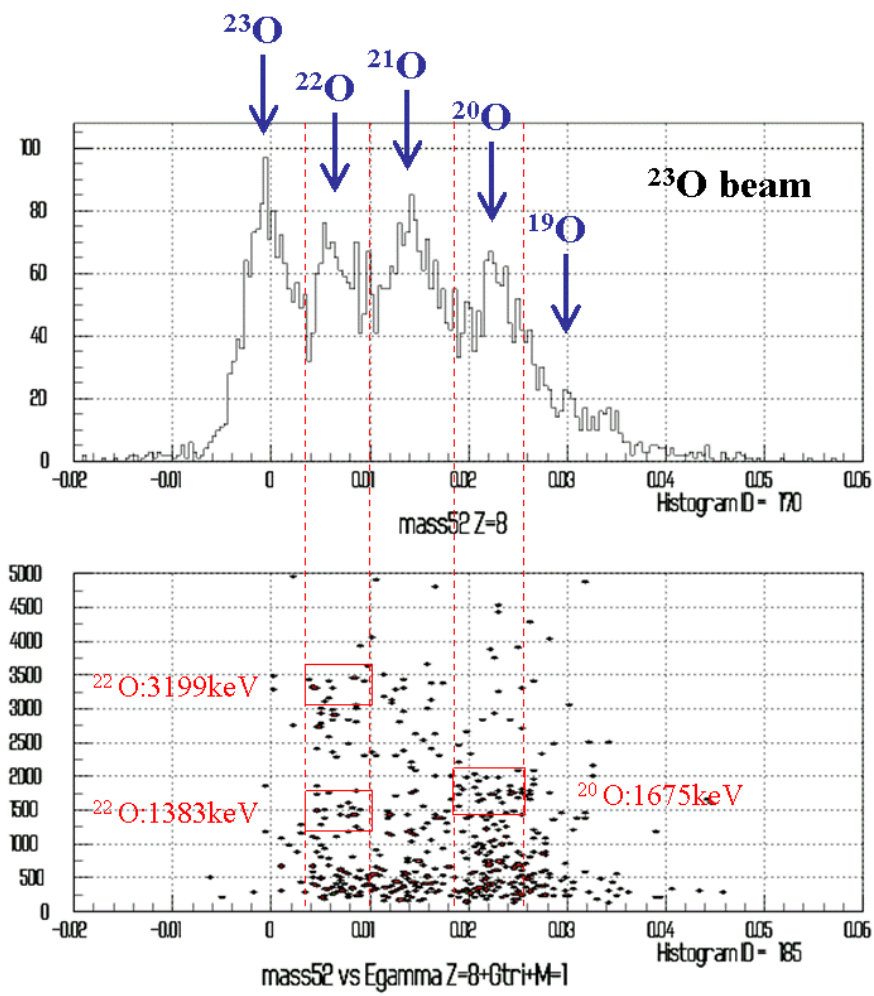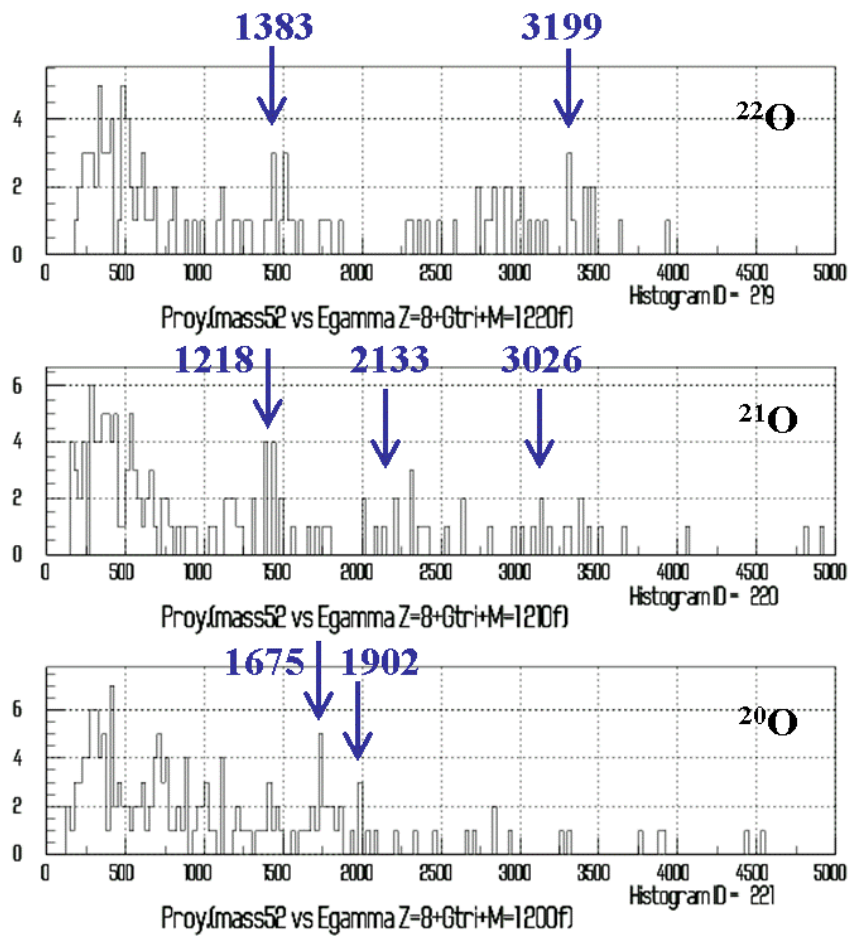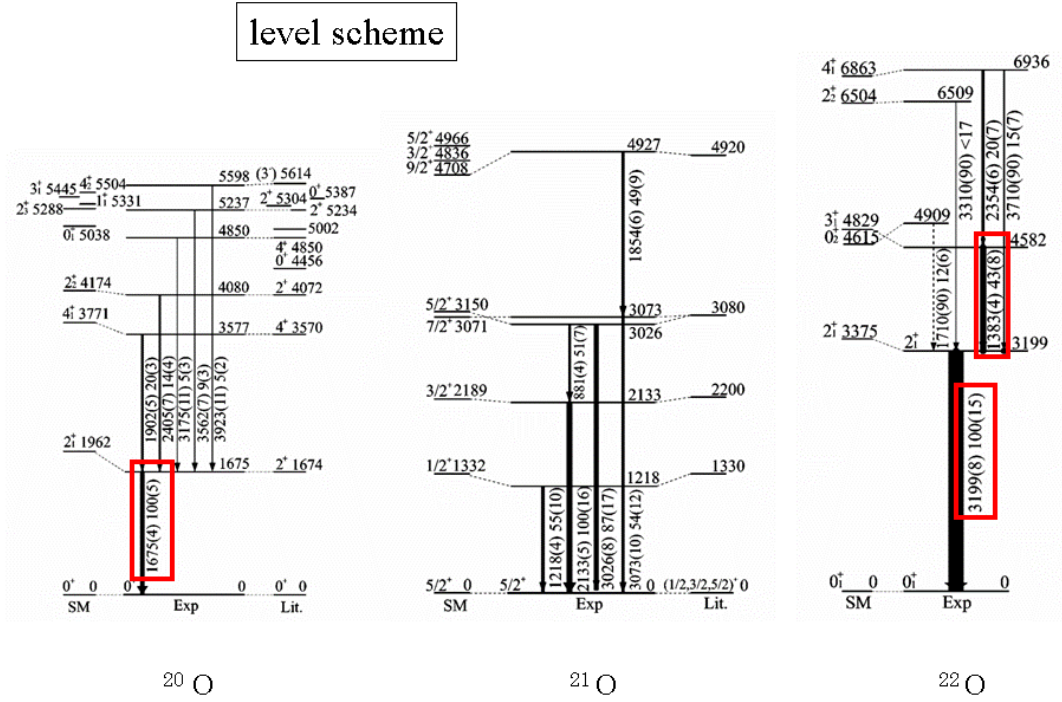4: Egamma spectrum in 24O beam run with ^{22}O,^{21}O,^{20}O gate.

5: fragment PI in 23O beam run. We can see gamma ray corresponded 1383keV,3199keV gamma-ray from ^{22}O and 1675keV gamma-ray from ^{20}O.

6: Egamma spectrum in 23O beam run with ^{22}O,^{21}O,^{20}O gate.

3　level scheme of ^{20}O,^{21}O,^{22}O

ref : M.Stanoiu *et al.* , Phys. Rev. C **69**, 034312 (2004)

7: level scheme of ^{20}O,^{21}O,^{22}O.

reference : M.Stanoiu *et al.*, Phys.Rev.C **69**. 034312(2004)

4　Mass spectrum(^{24}O,^{23}O beam run)

I calibrated A/Z.

$$A/Z = P_1 * \mathrm{mass(a.u.)} + P_2 \tag{3}$$

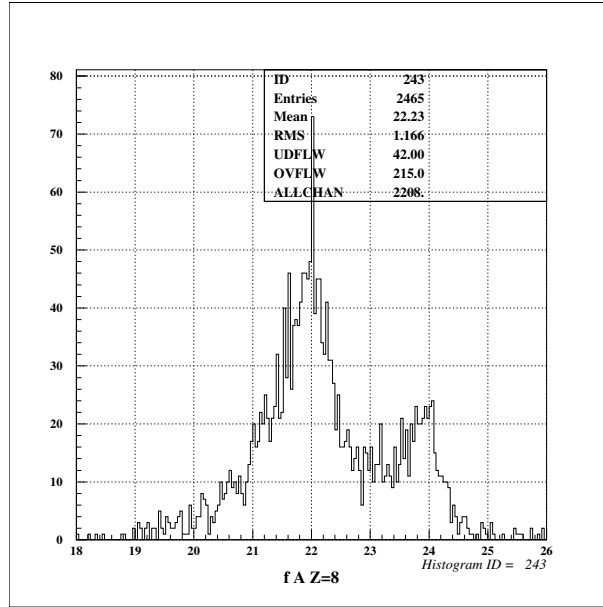And I got A.

$$A = A/Z * 8. \tag{4}$$

8: mass spectrum of fragment particles in ^{24}O beam run

fragment	A	ΔA(FWHM)	A/ΔA
^{24}O	23.86	0.7987	29.87
^{23}O			
^{22}O	21.94	1.000	21.94

1: mass resolution of fragment particles in ^{24}O beam run

9: mass spectrum of fragment particles in ^{23}O beam run

fragment	A	ΔA(FWHM)	A/ΔA
^{23}O	22.93	0.7594	30.19
^{22}O	22.03	0.8558	25.74
^{21}O	21.04	1.125	18.70
^{20}O	19.88	0.8842	22.48

2: mass resolution of fragment particles in ^{23}O beam run

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fragment momentum(^{24}O,^{23}O beam run)