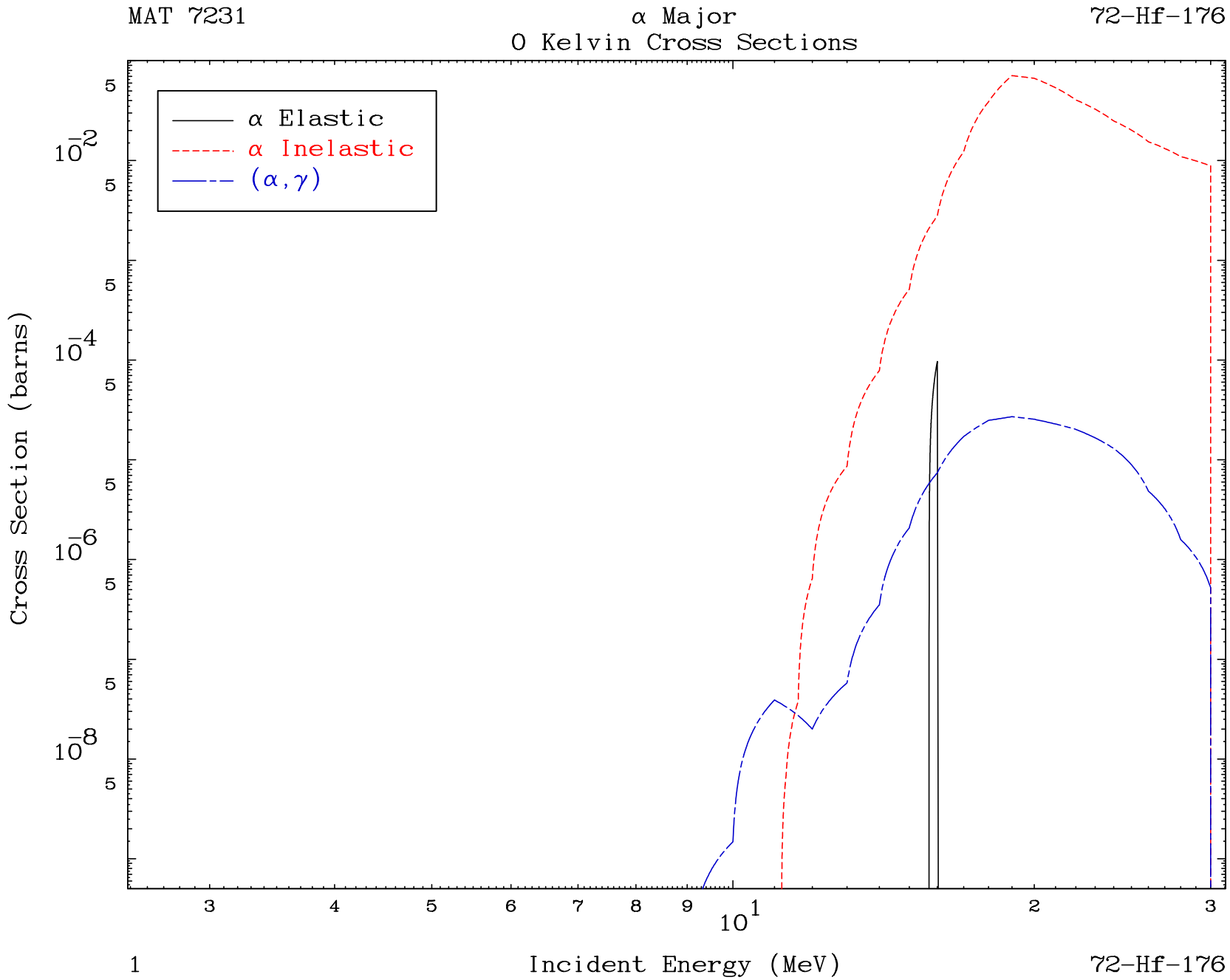
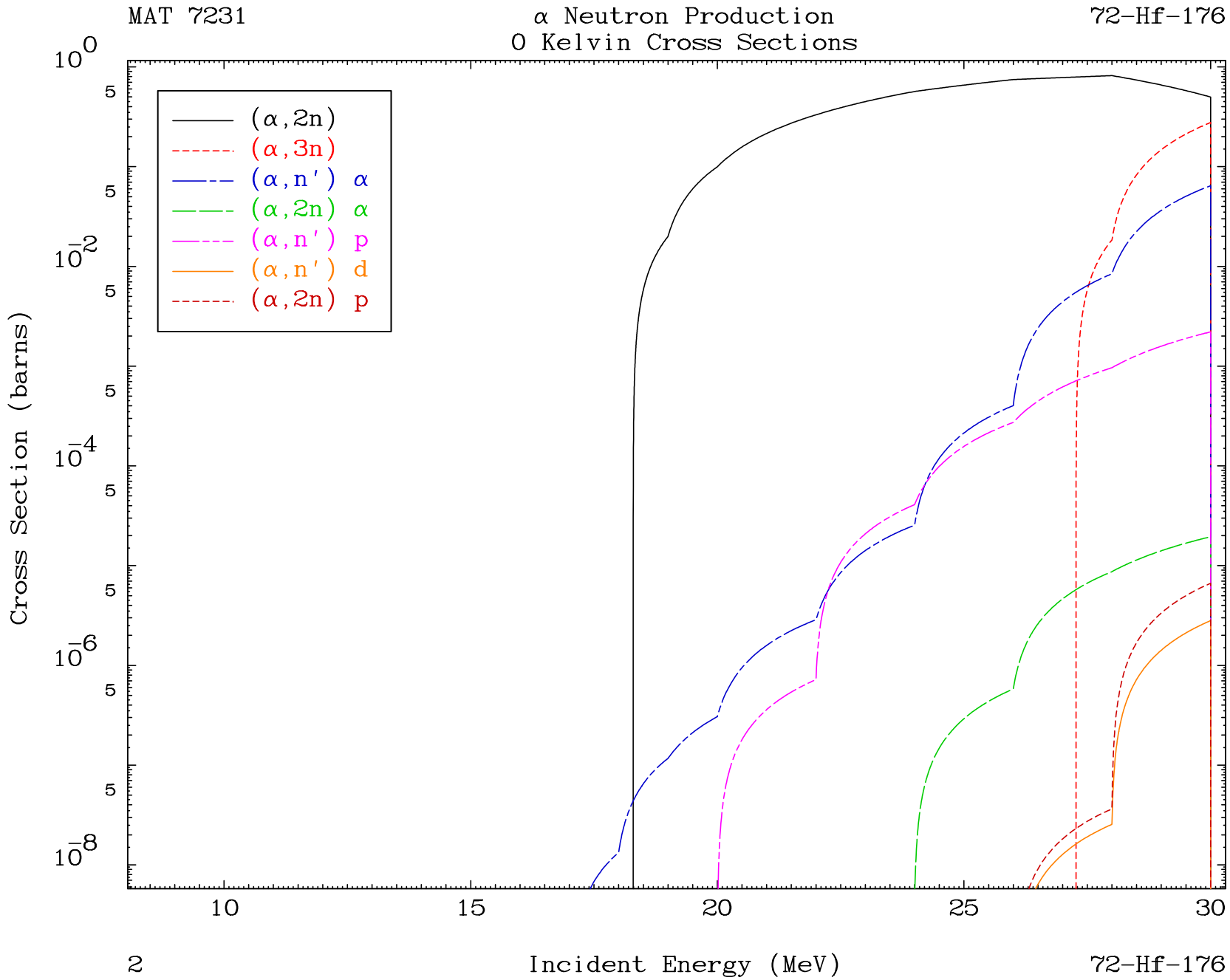
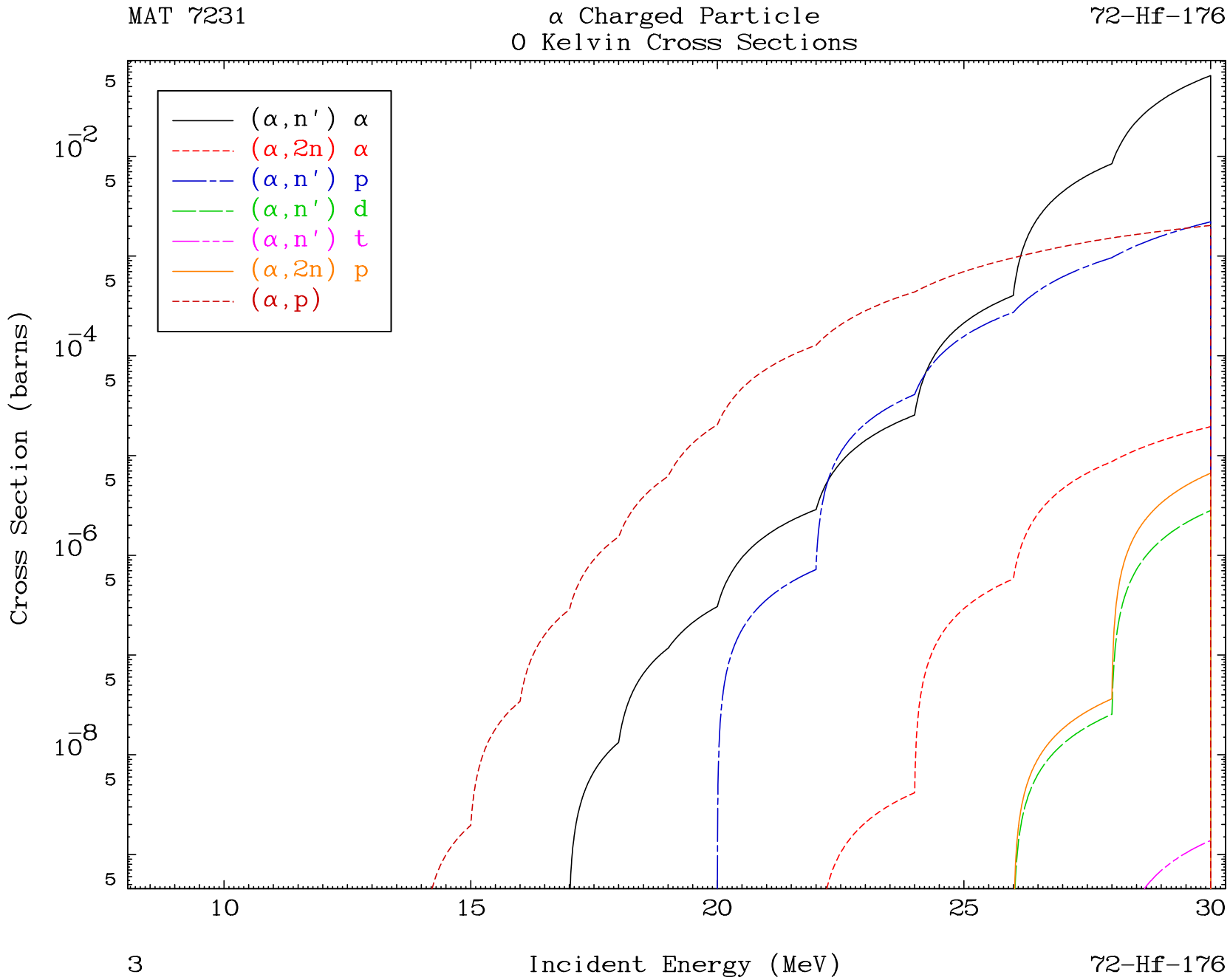
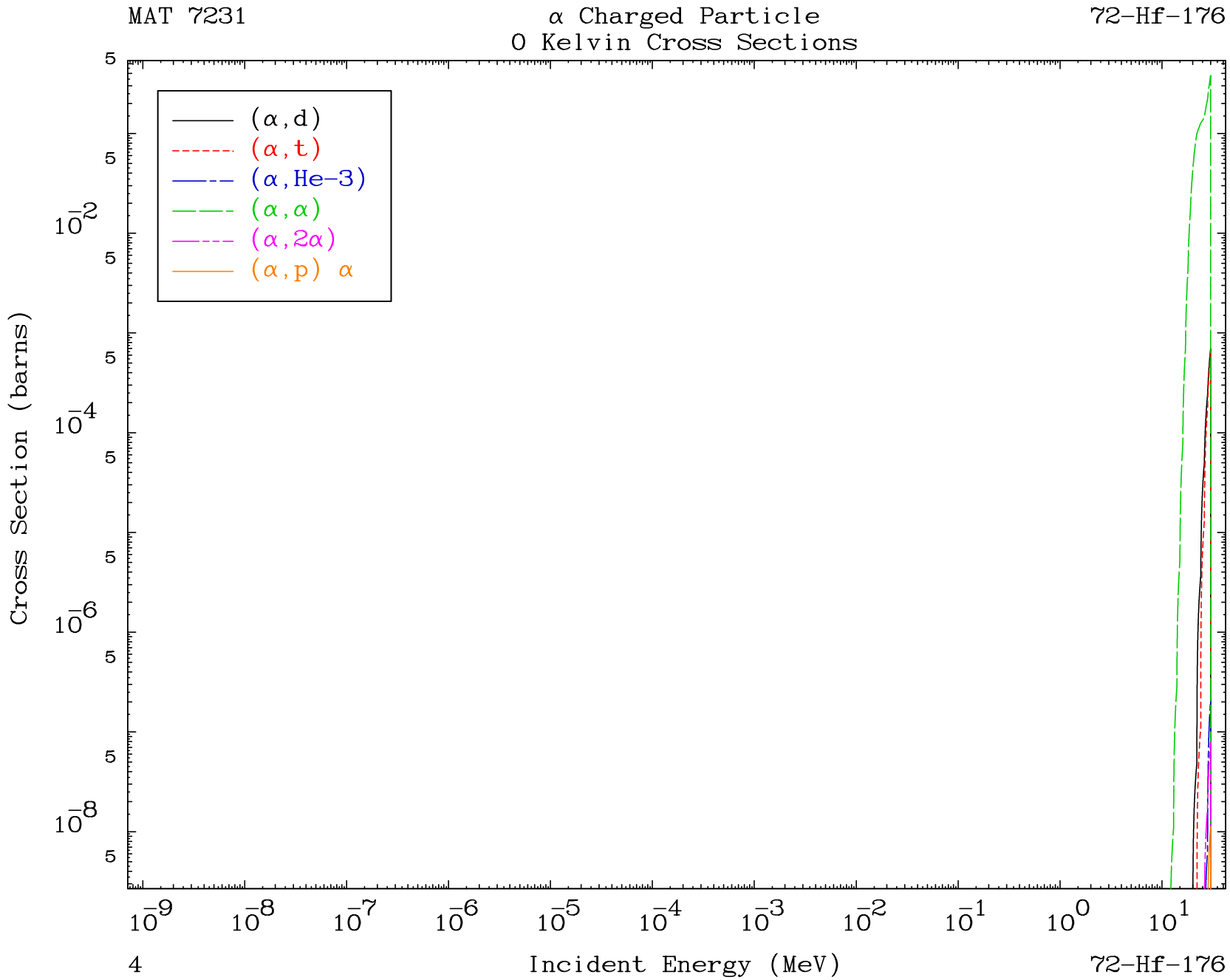
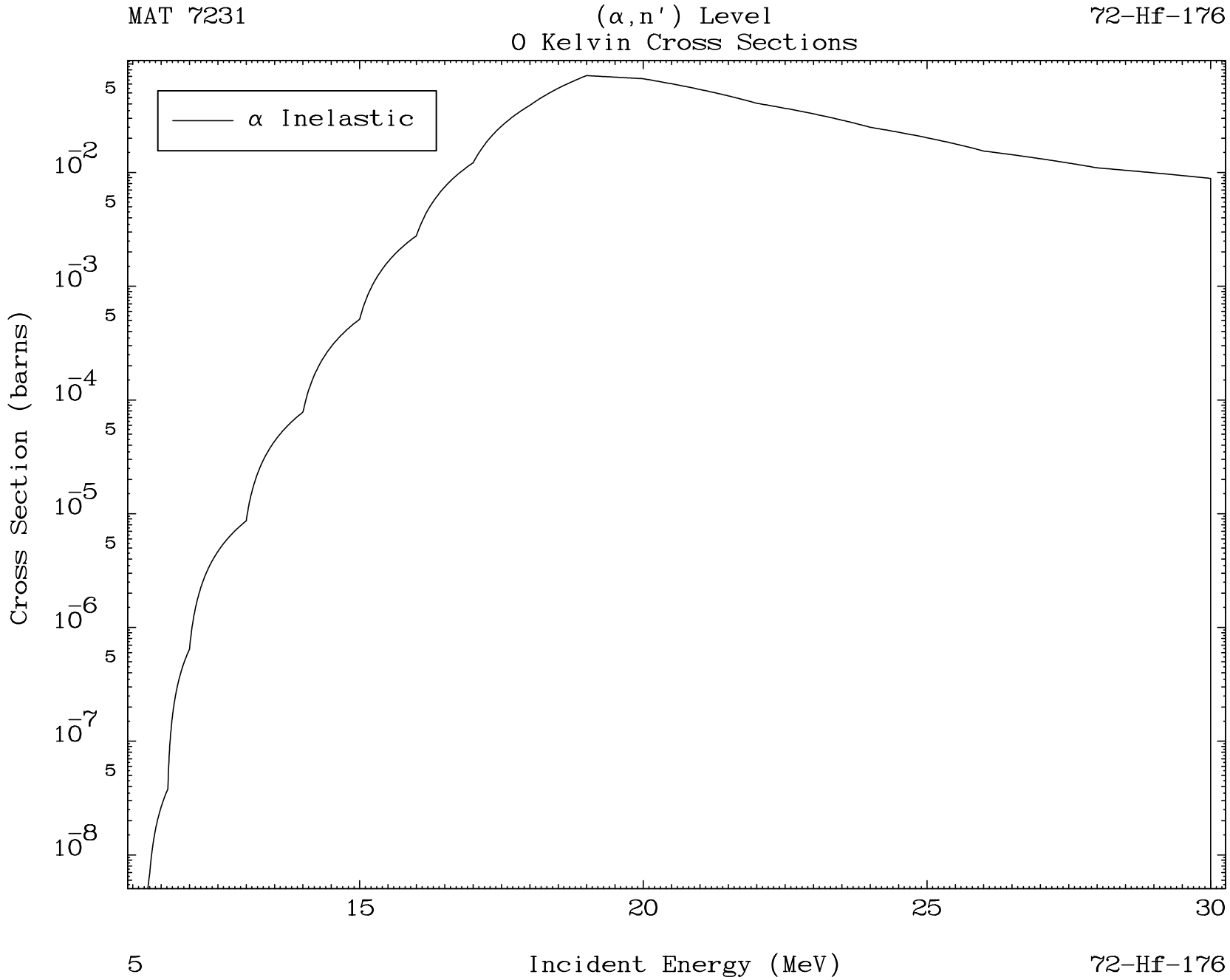

MAT 7231
α Major
0 Kelvin Cross Sections
72-Hf-176
α Elastic
α Inelastic
(α,γ)
Cross Section (barns)
Incident Energy (MeV)
72-Hf-176

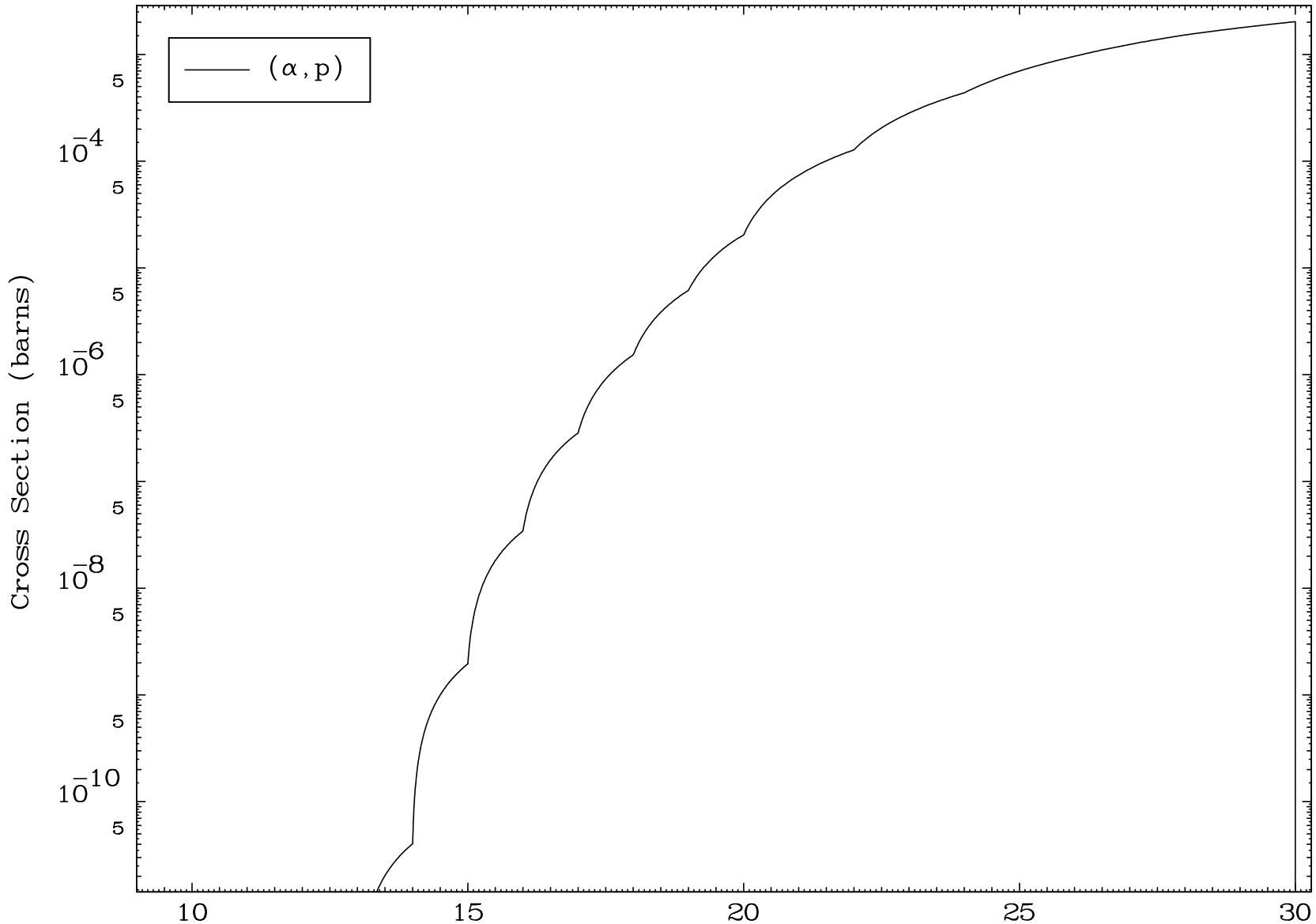

MAT 7231
α Neutron Production
0 Kelvin Cross Sections
72-Hf-176
(α,2n)
(α,3n)
(α,n') α
(α,2n) α
(α,n') p
(α,n') d
(α,2n) p
Cross Section (barns)
Incident Energy (MeV)
2
72-Hf-176


MAT 7231
α Charged Particle
0 Kelvin Cross Sections
72-Hf-176
(α,n') α
(α,2n) α
(α,n') p
(α,n') d
(α,n') t
(α,2n) p
(α,p)
Cross Section (barns)
Incident Energy (MeV)
3
72-Hf-176

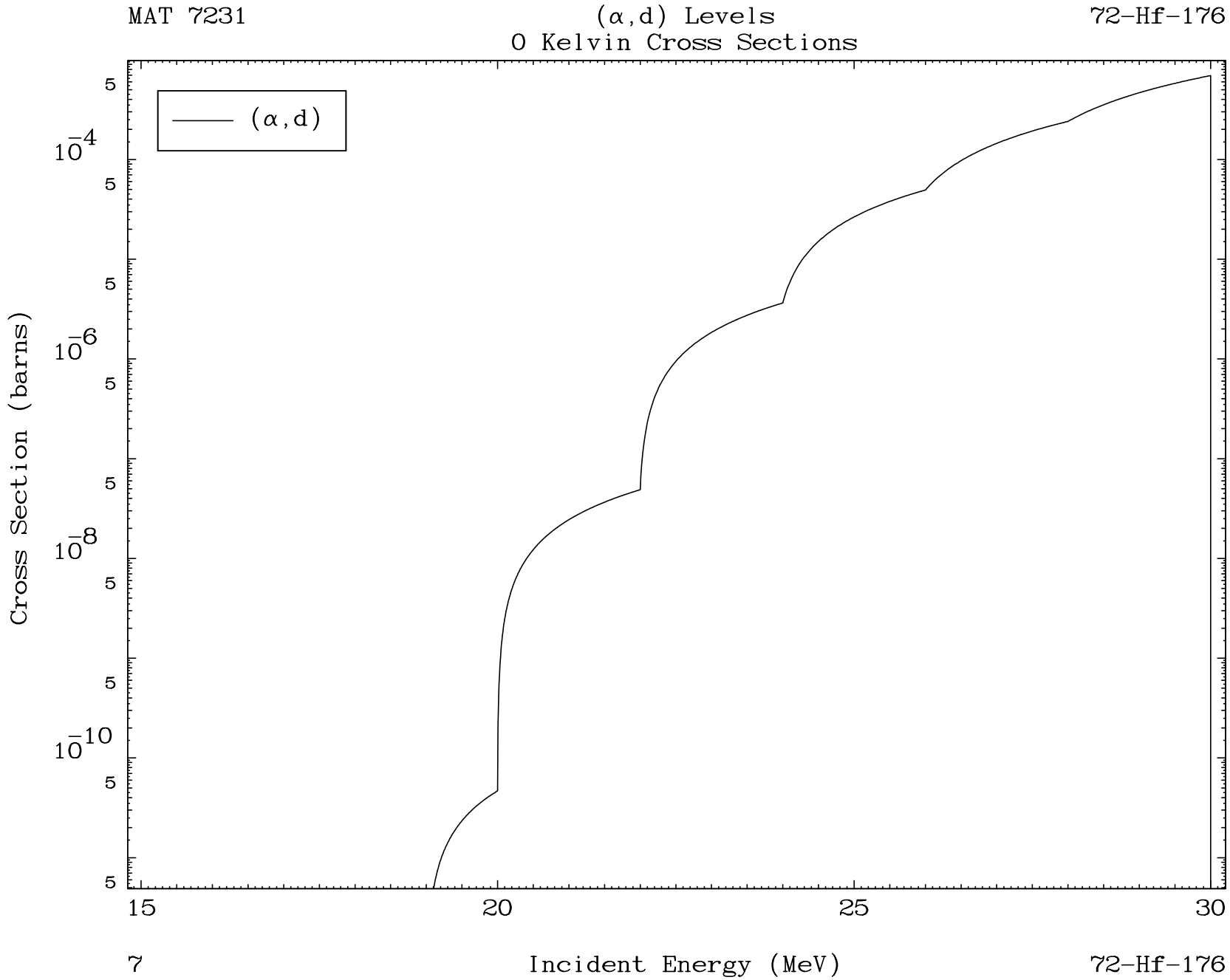

MAT 7231
α Charged Particle
0 Kelvin Cross Sections
72-Hf-176
(α,d)
(α,t)
(α,He-3)
(α,α)
(α,2α)
(α,p) α
Cross Section (barns)
Incident Energy (MeV)
4
72-Hf-176


MAT 7231
(α,n') Level
72-Hf-176
0 Kelvin Cross Sections
α Inelastic
Cross Section (barns)
Incident Energy (MeV)
72-Hf-176
15
20
25
30

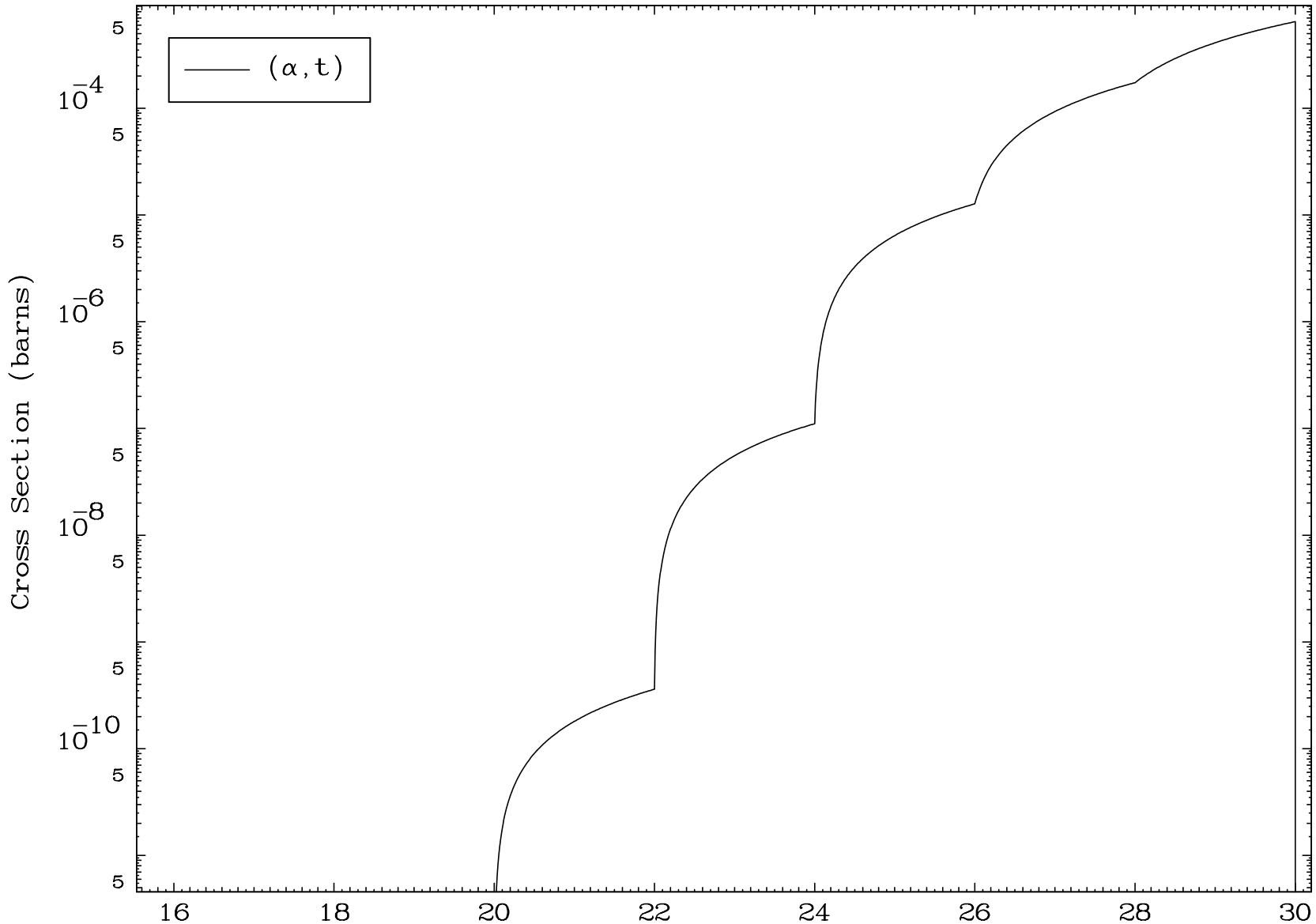
(α,p) Levels
0 Kelvin Cross Sections



Incident Energy (MeV)

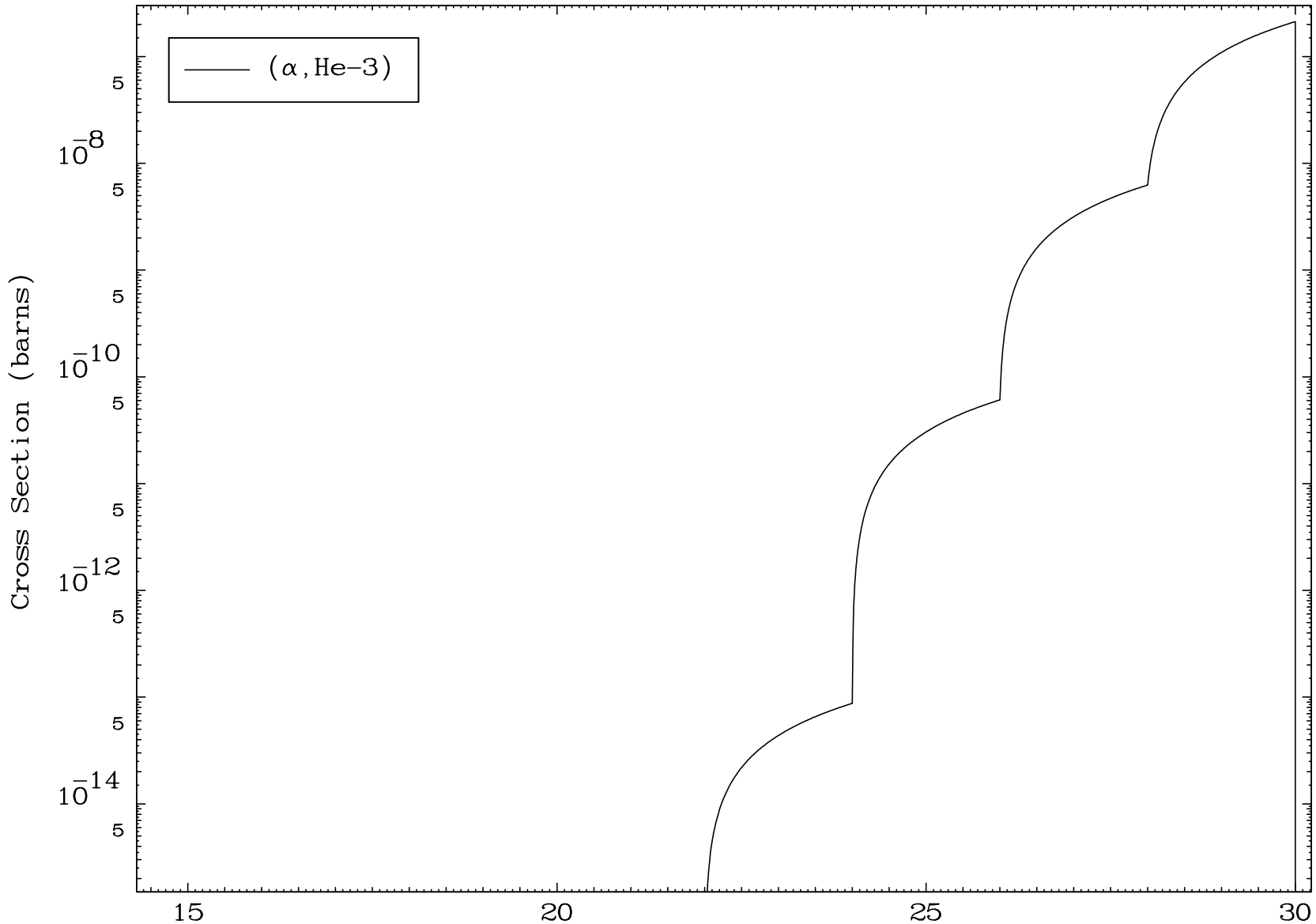

MAT 7231
(α,d) Levels
0 Kelvin Cross Sections
72-Hf-176
(α,d)
Cross Section (barns)
5
10⁻⁴
10⁻⁶
10⁻⁸
10⁻¹⁰
15
20
25
30
7
Incident Energy (MeV)
72-Hf-176

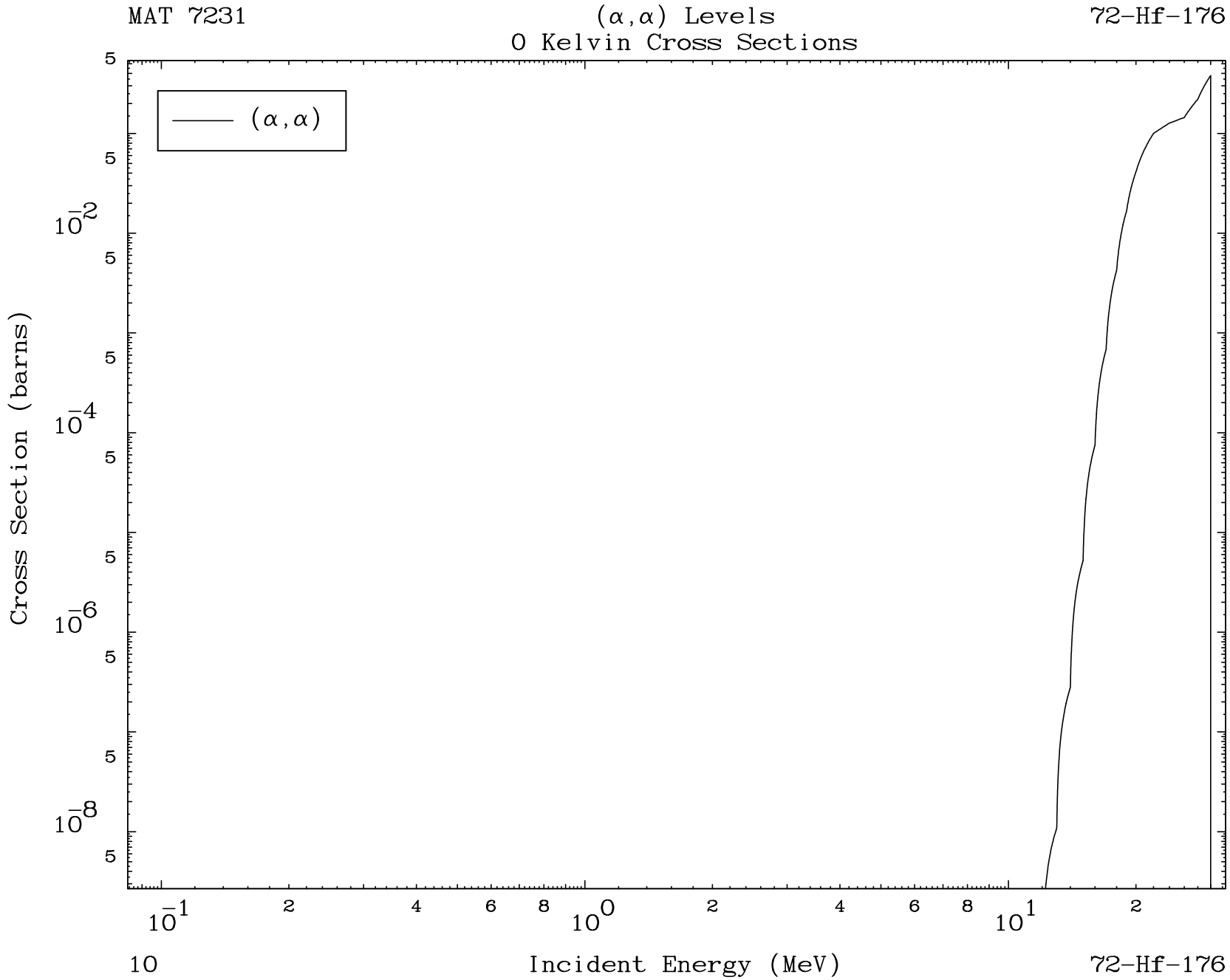
(α,t) Levels
0 Kelvin Cross Sections

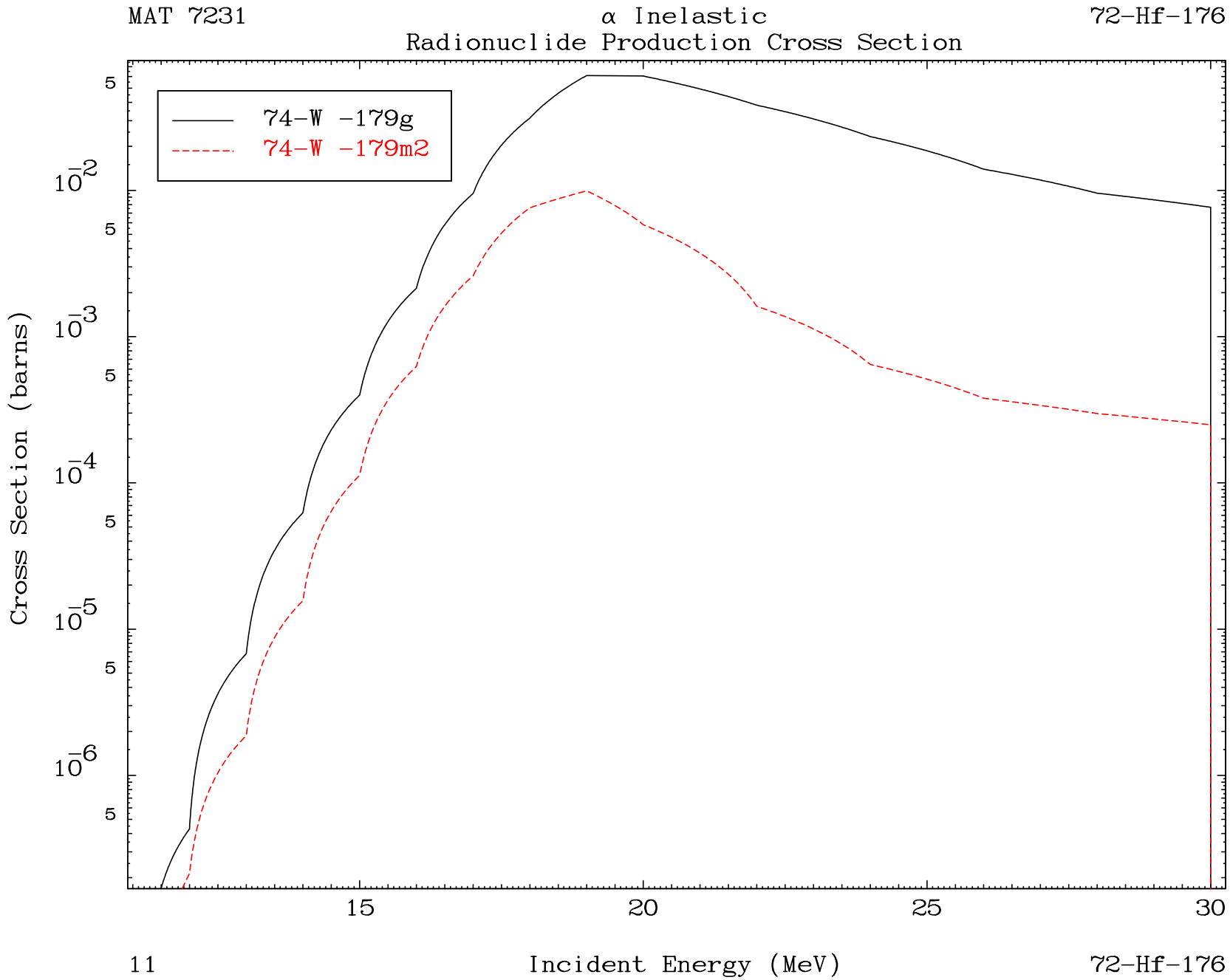


Incident Energy (MeV)

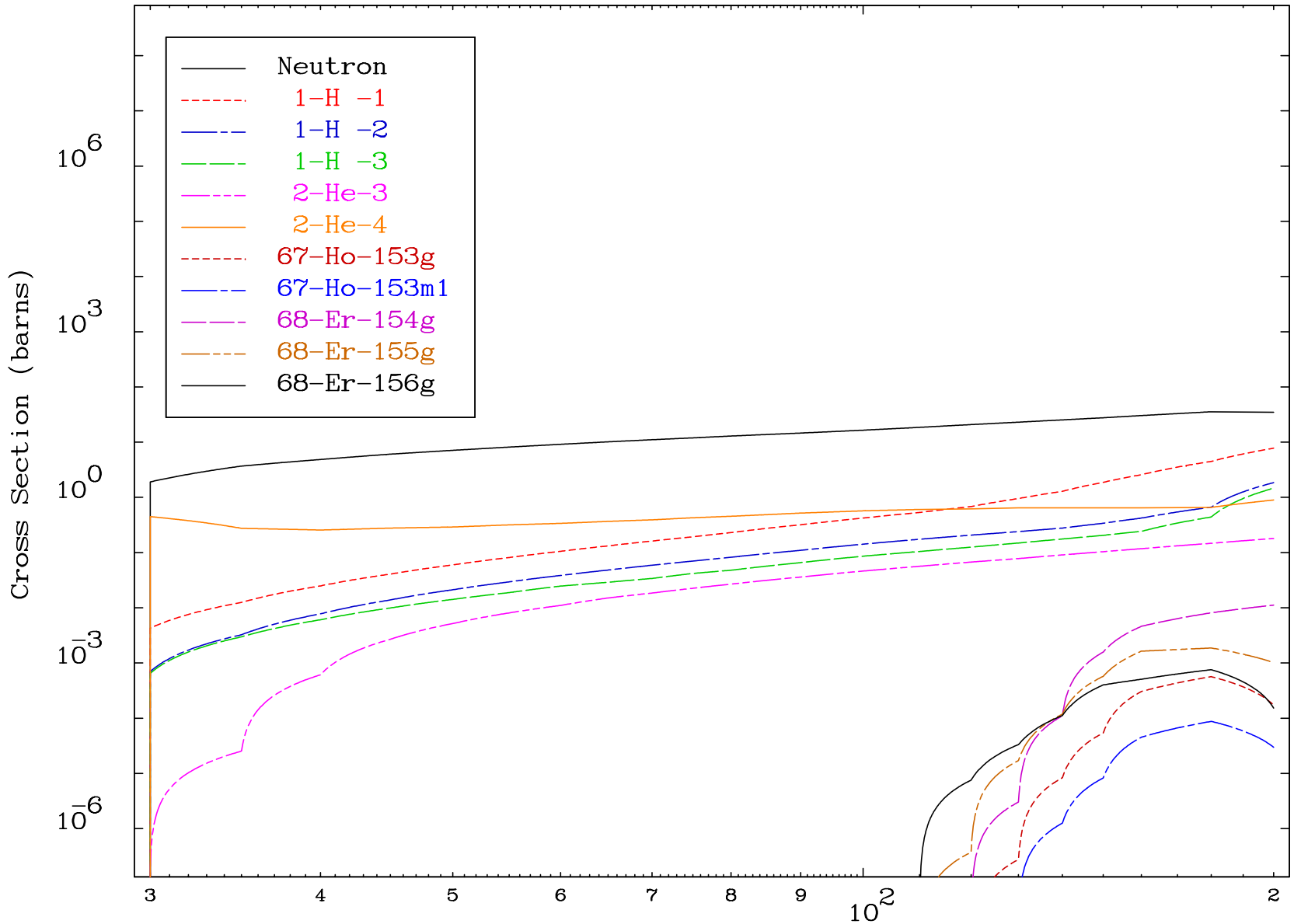
0 Kelvin Cross Sections

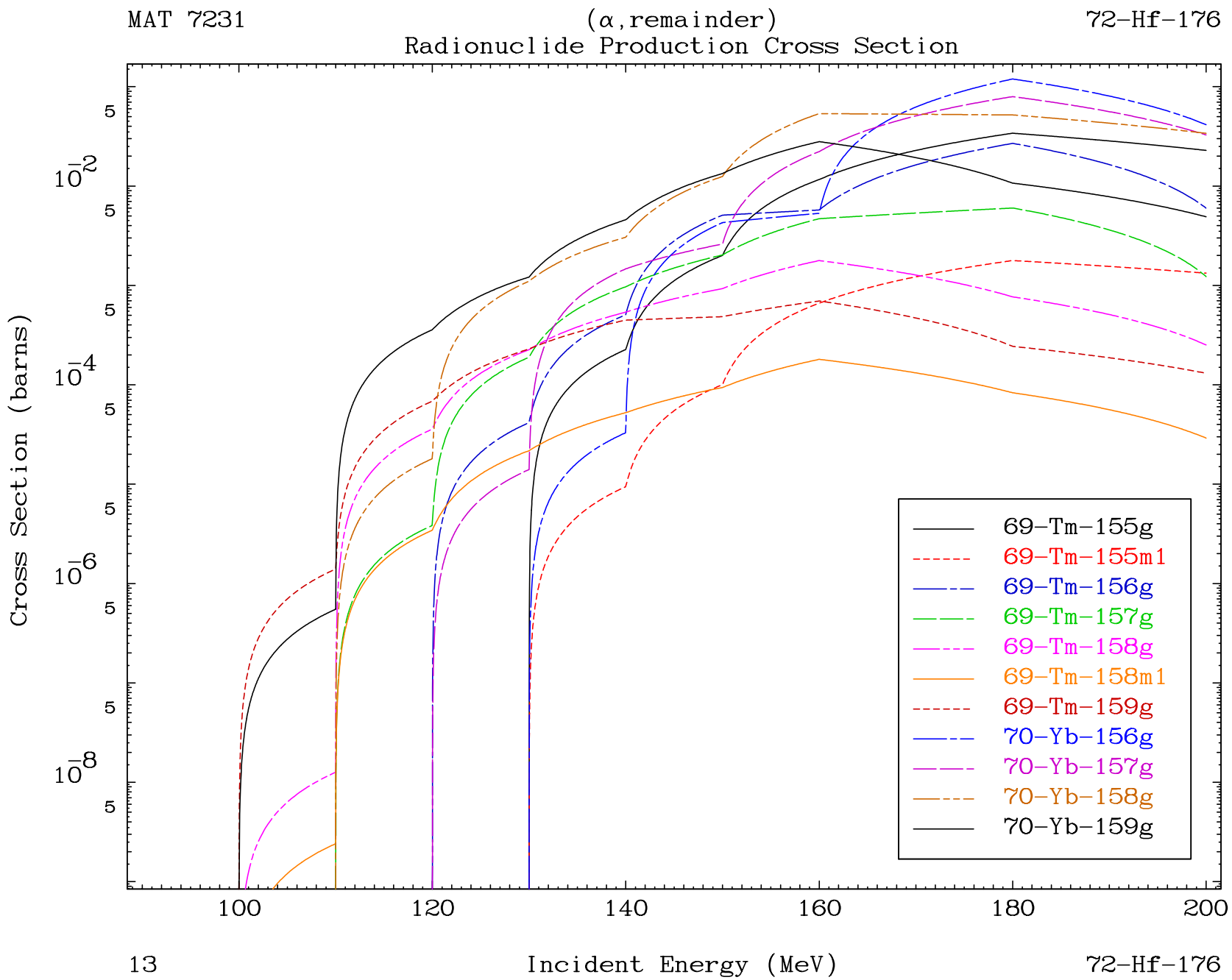


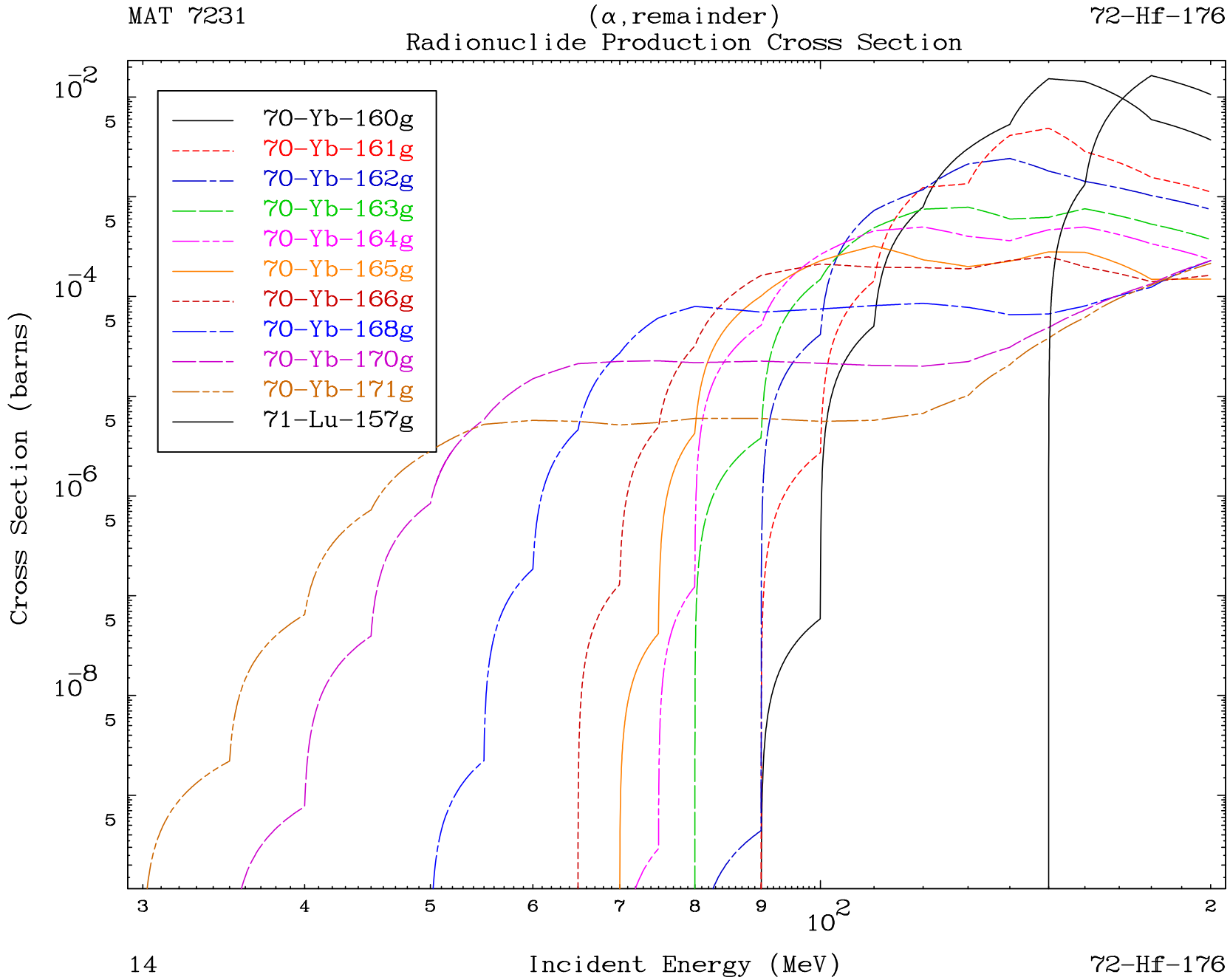

MAT 7231
(α,α) Levels
0 Kelvin Cross Sections
72-Hf-176
(α,α)
Cross Section (barns)
Incident Energy (MeV)
72-Hf-176
10

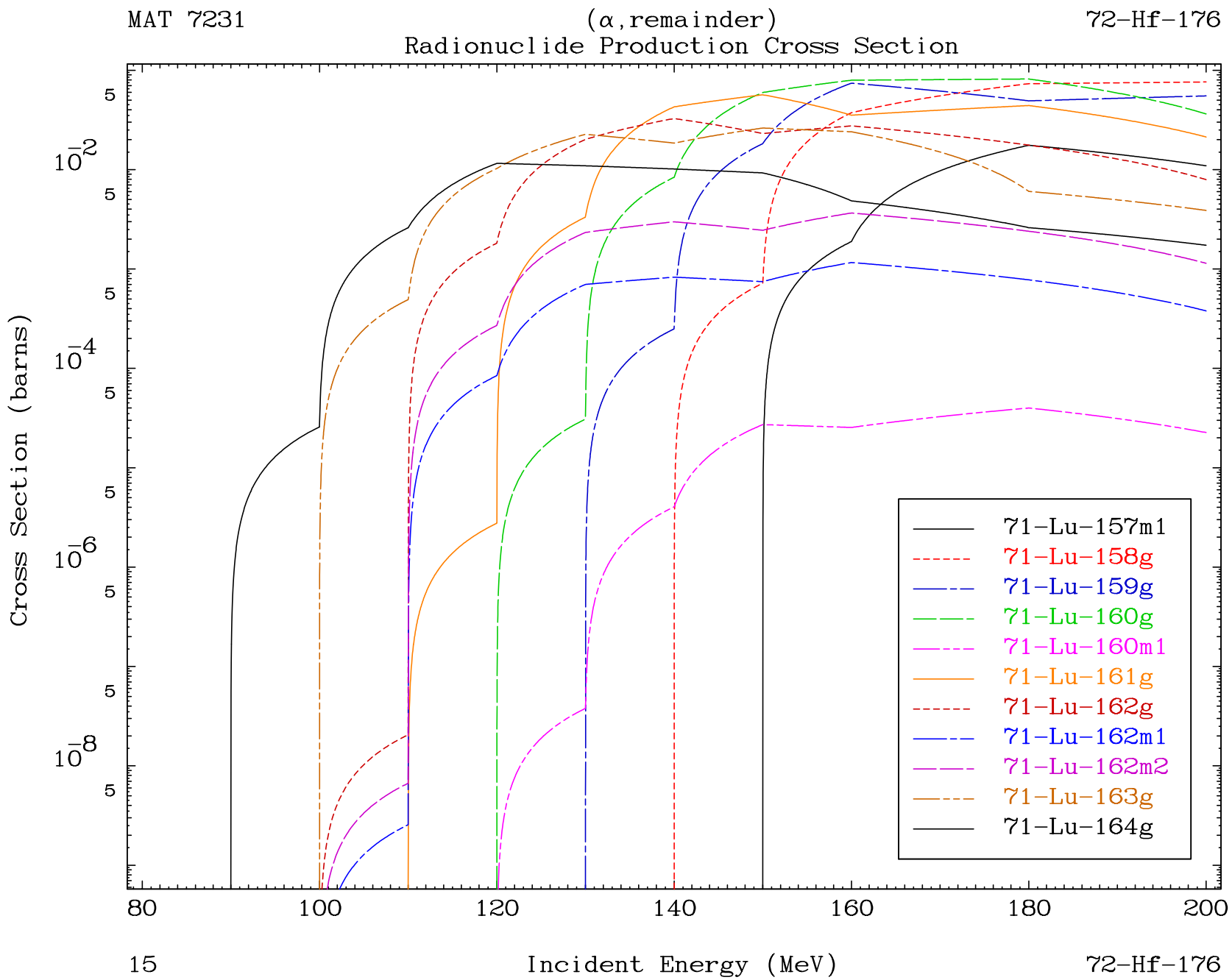

MAT 7231
α Inelastic
Radionuclide Production Cross Section
72-Hf-176
74-W -179g
74-W -179m2
Cross Section (barns)
Incident Energy (MeV)
11
72-Hf-176
15
20
25
30
10⁻²
10⁻³
10⁻⁴
10⁻⁵
10⁻⁶

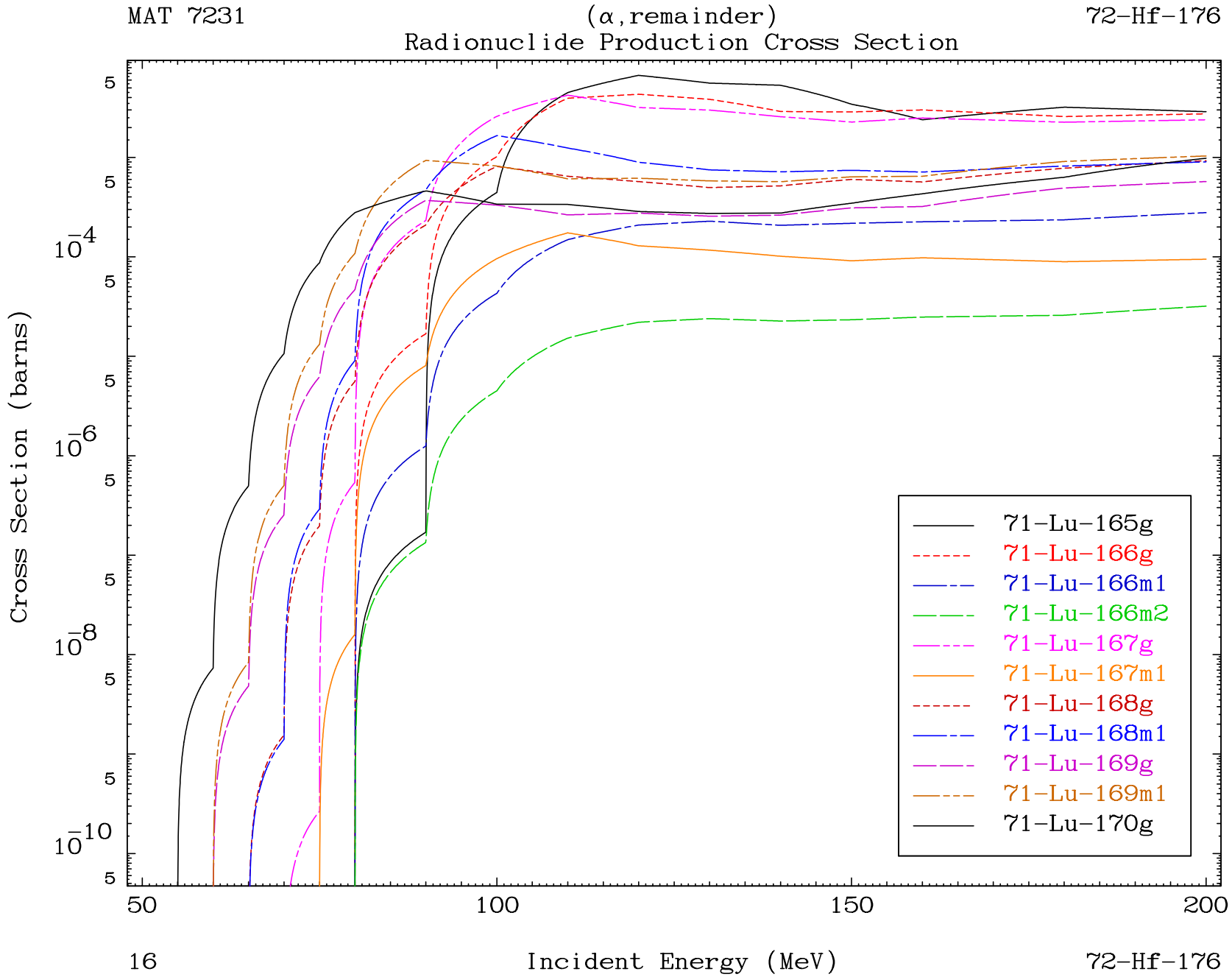
Radionuclide Production Cross Section

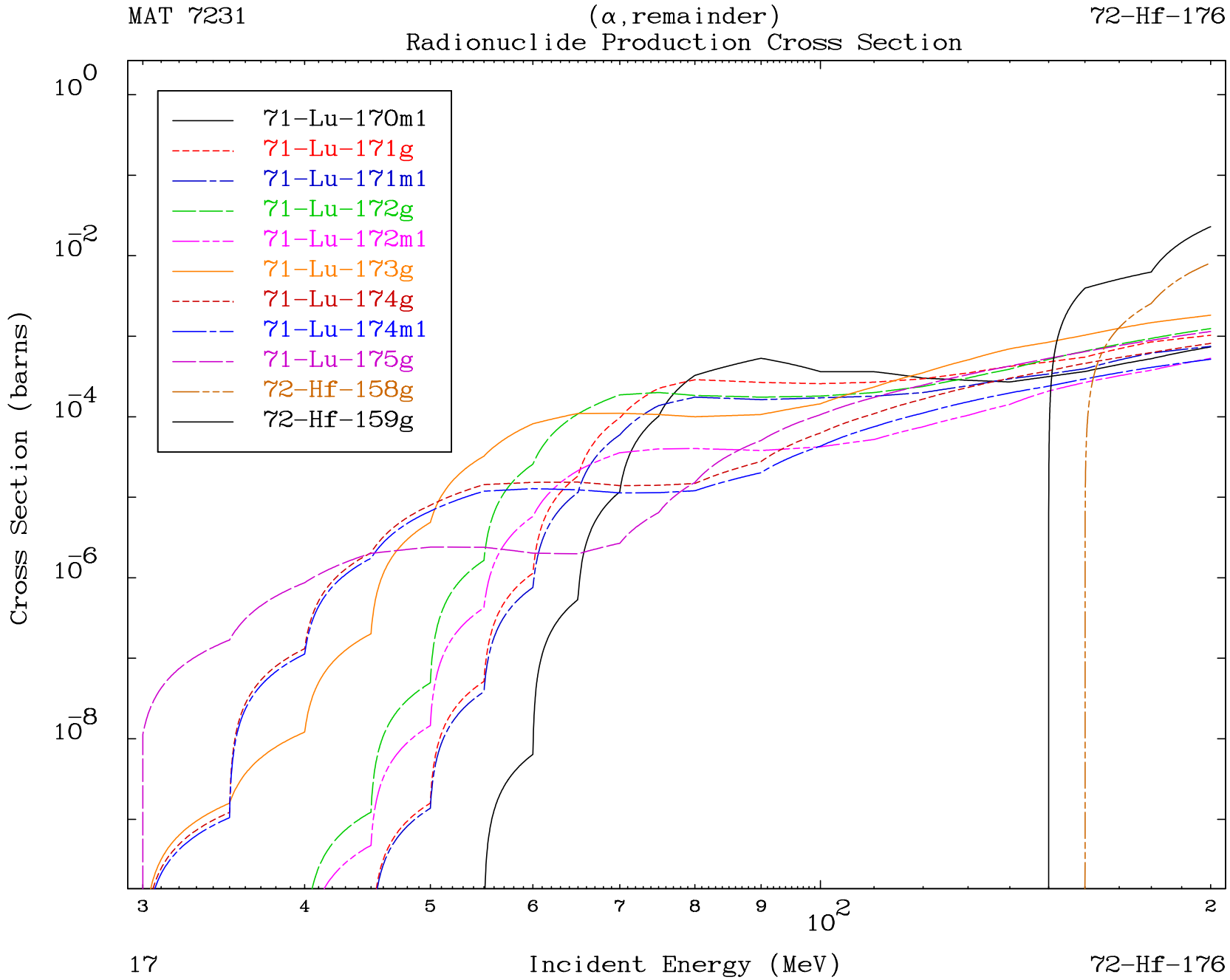


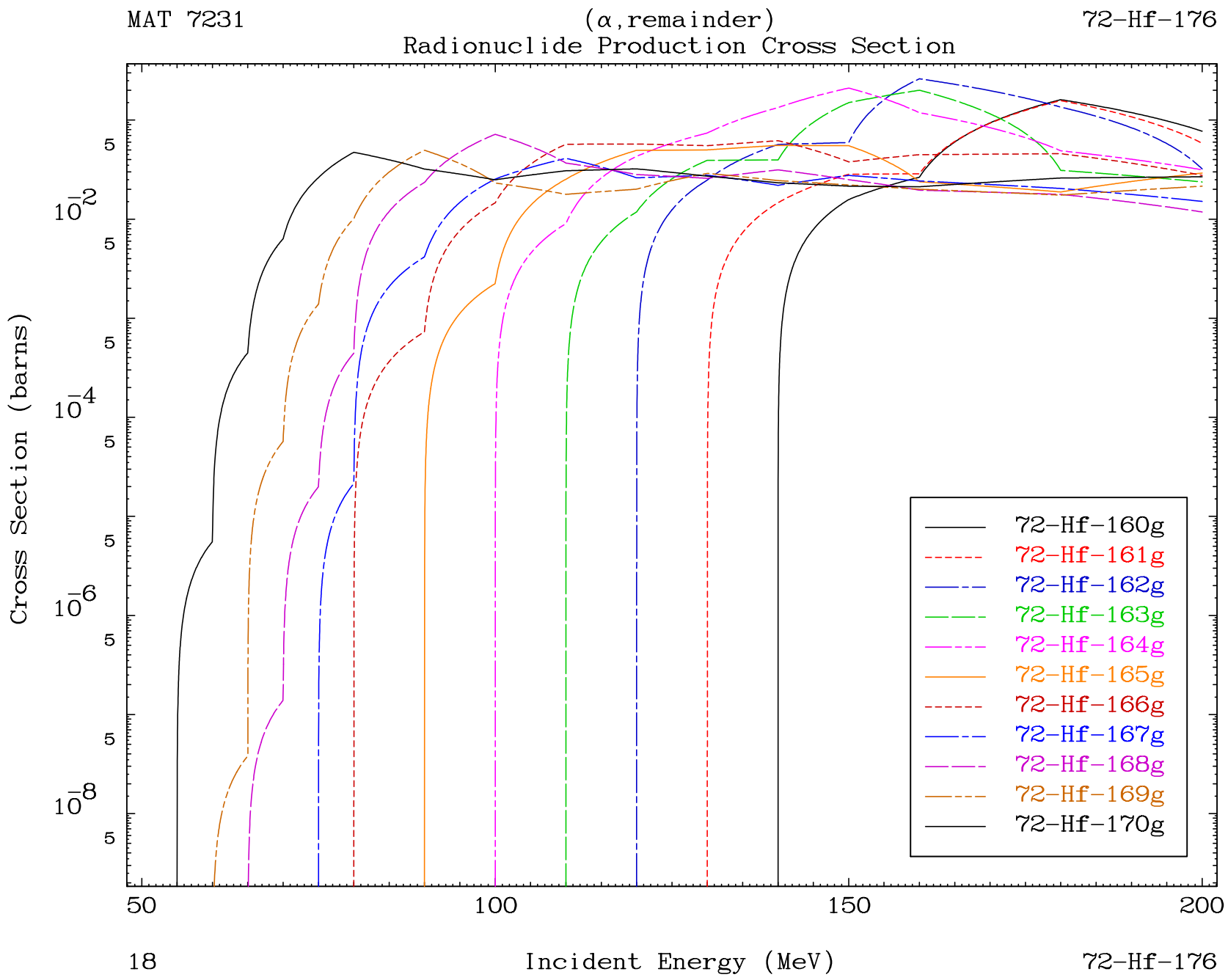

MAT 7231
(α,remainder)
72-Hf-176
Radionuclide Production Cross Section
Cross Section (barns)
Incident Energy (MeV)
100
120
140
160
180
200
69-Tm-155g
69-Tm-155m1
69-Tm-156g
69-Tm-157g
69-Tm-158g
69-Tm-158m1
69-Tm-159g
70-Yb-156g
70-Yb-157g
70-Yb-158g
70-Yb-159g
13
72-Hf-176

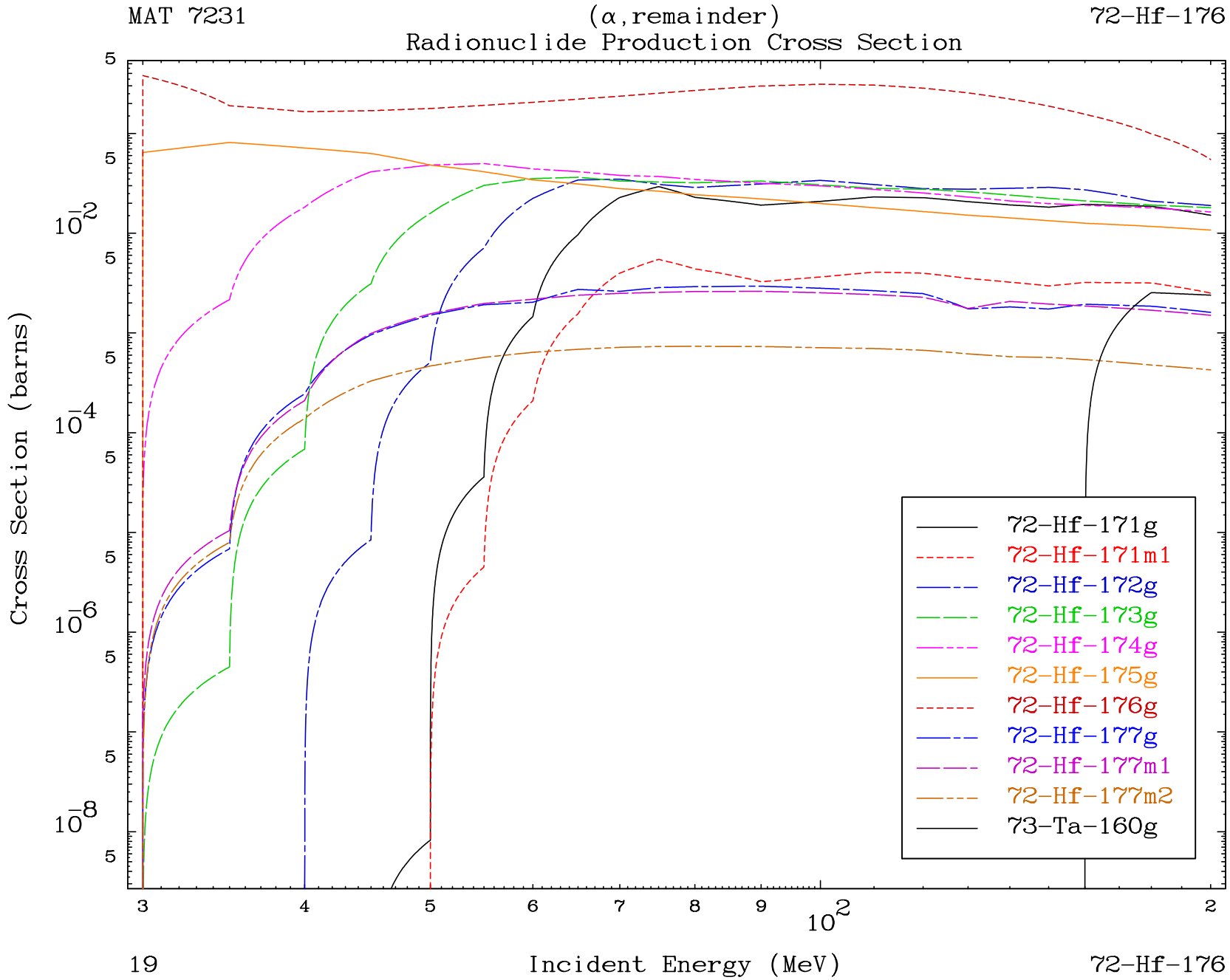

MAT 7231
(α,remainder)
72-Hf-176
Radionuclide Production Cross Section
70-Yb-160g
70-Yb-161g
70-Yb-162g
70-Yb-163g
70-Yb-164g
70-Yb-165g
70-Yb-166g
70-Yb-168g
70-Yb-170g
70-Yb-171g
71-Lu-157g
Cross Section (barns)
Incident Energy (MeV)
14
72-Hf-176

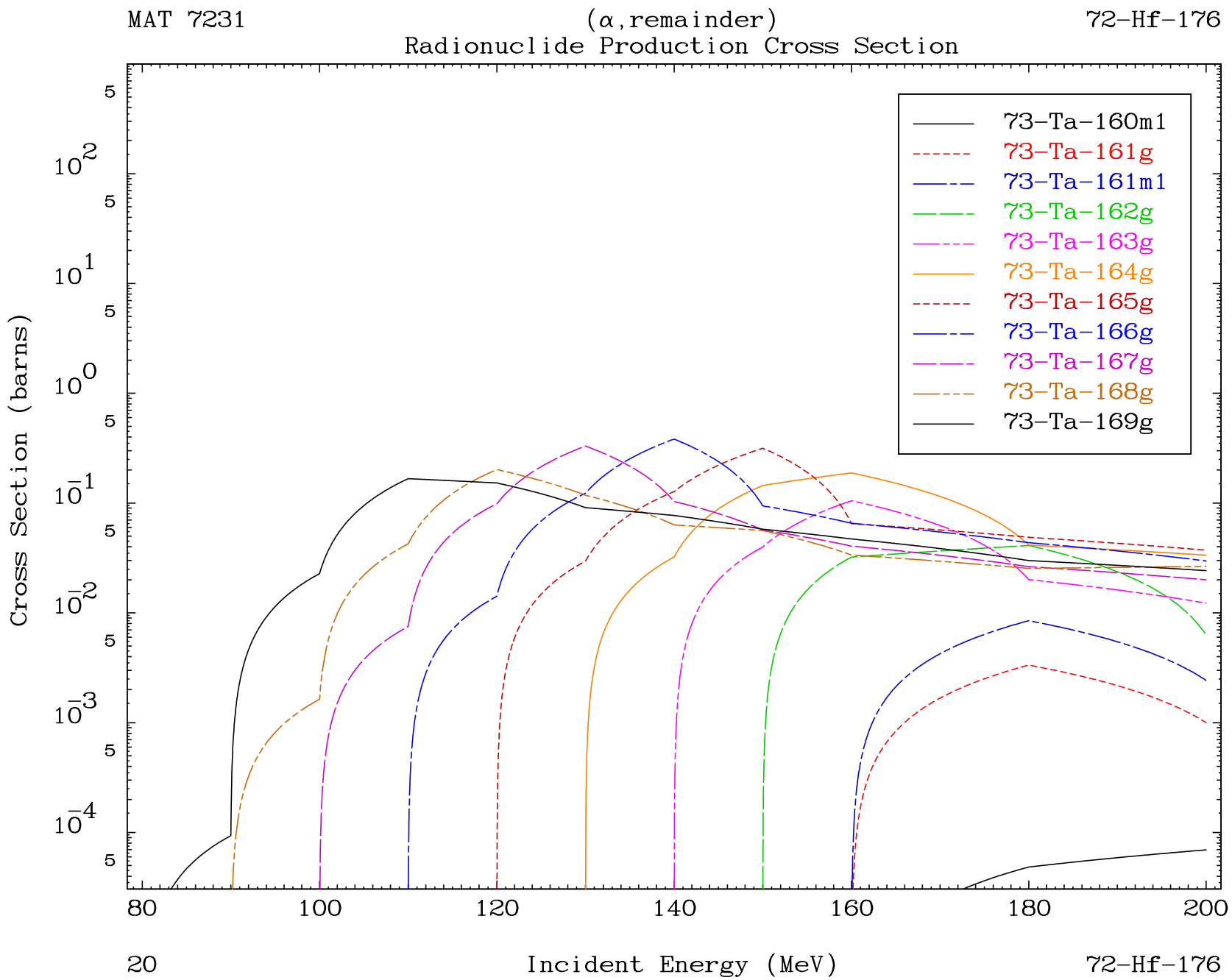

MAT 7231
(α,remainder)
72-Hf-176
Radionuclide Production Cross Section
Cross Section (barns)
Incident Energy (MeV)
15
72-Hf-176
71-Lu-157m1
71-Lu-158g
71-Lu-159g
71-Lu-160g
71-Lu-160m1
71-Lu-161g
71-Lu-162g
71-Lu-162m1
71-Lu-162m2
71-Lu-163g
71-Lu-164g

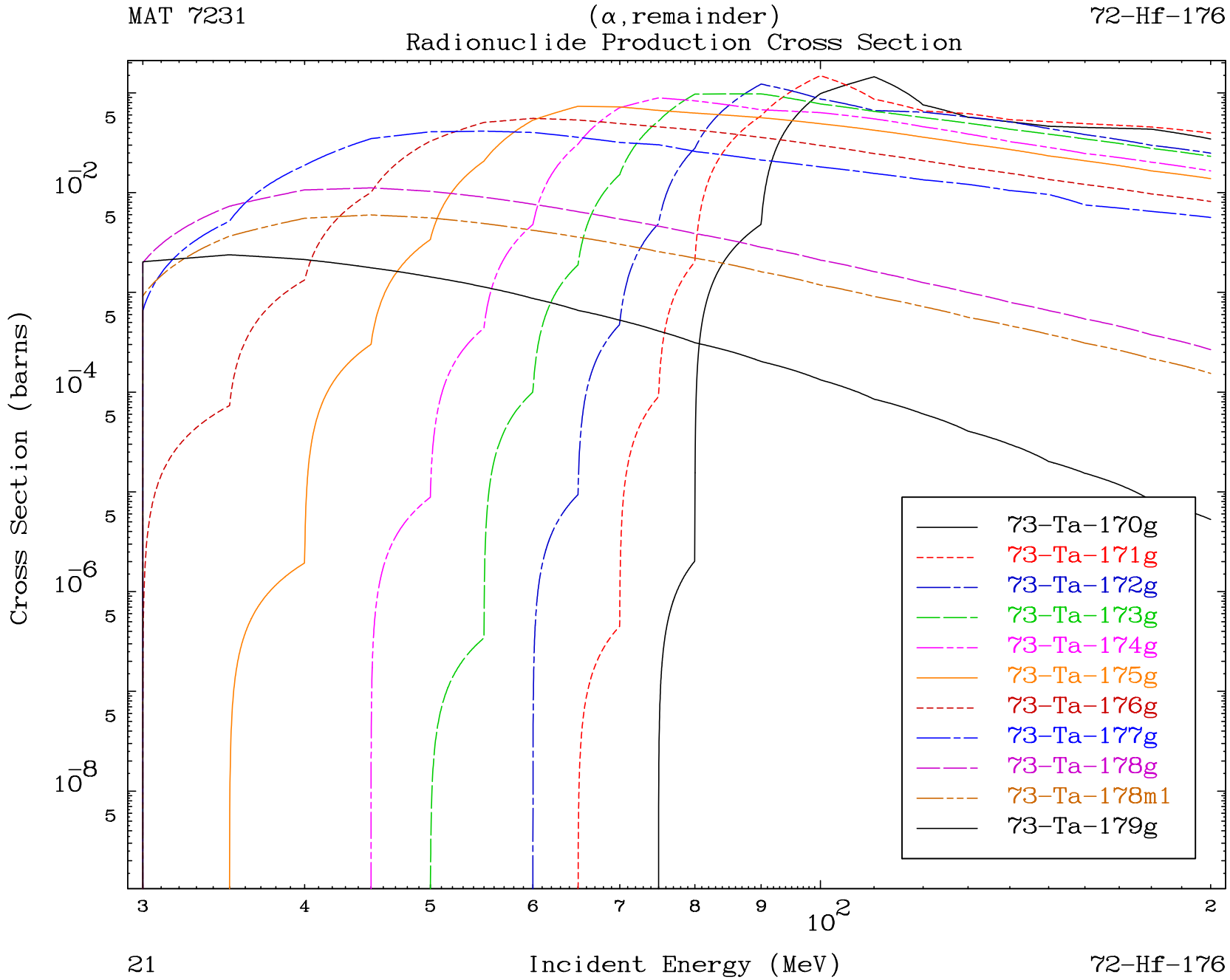

MAT 7231
(α,remainder)
72-Hf-176
Radionuclide Production Cross Section
Cross Section (barns)
Incident Energy (MeV)
16
72-Hf-176
71-Lu-165g
71-Lu-166g
71-Lu-166m1
71-Lu-166m2
71-Lu-167g
71-Lu-167m1
71-Lu-168g
71-Lu-168m1
71-Lu-169g
71-Lu-169m1
71-Lu-170g

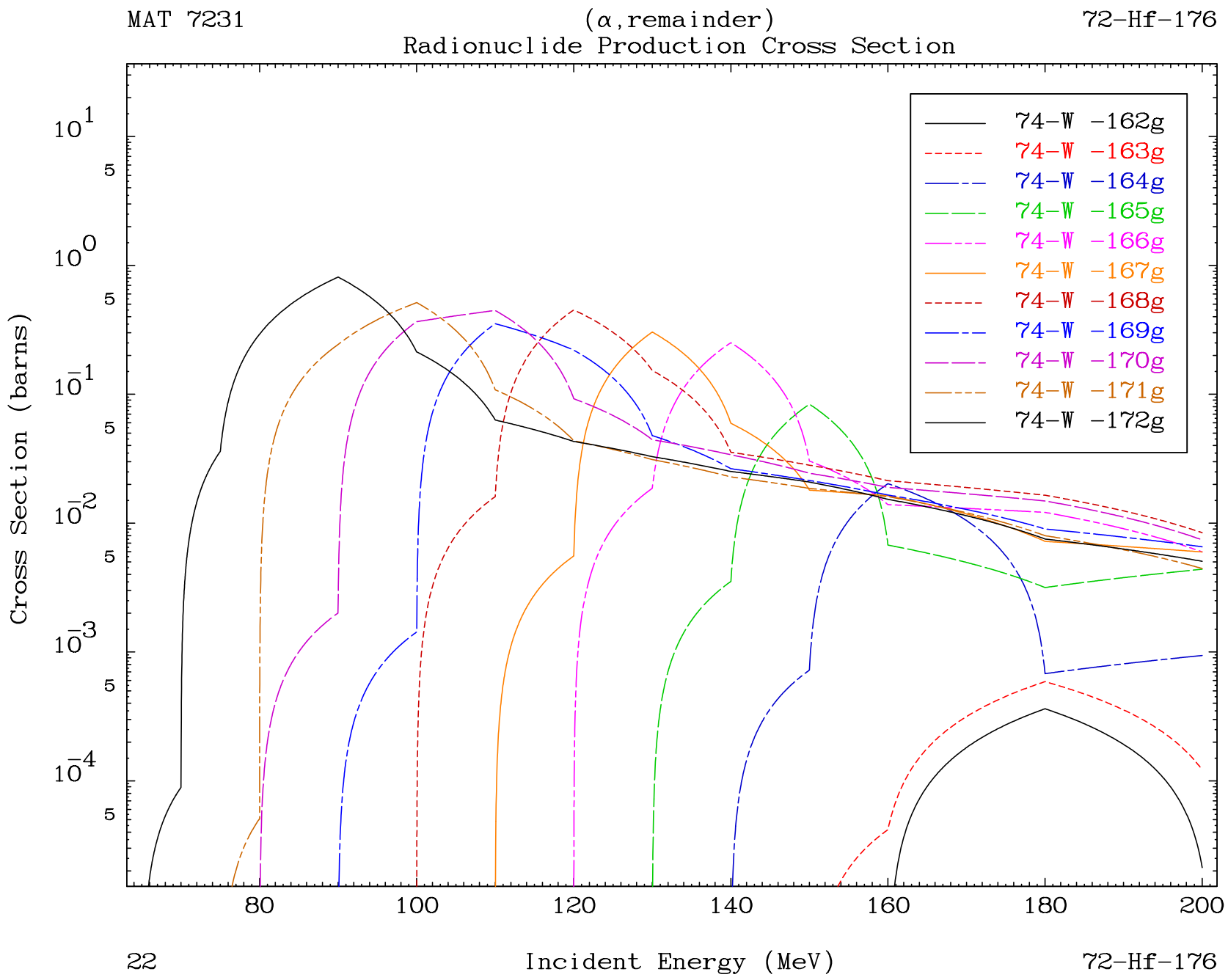

MAT 7231
(α,remainder)
72-Hf-176
Radionuclide Production Cross Section
71-Lu-170m1
71-Lu-171g
71-Lu-171m1
71-Lu-172g
71-Lu-172m1
71-Lu-173g
71-Lu-174g
71-Lu-174m1
71-Lu-175g
72-Hf-158g
72-Hf-159g
Cross Section (barns)
Incident Energy (MeV)
17
72-Hf-176

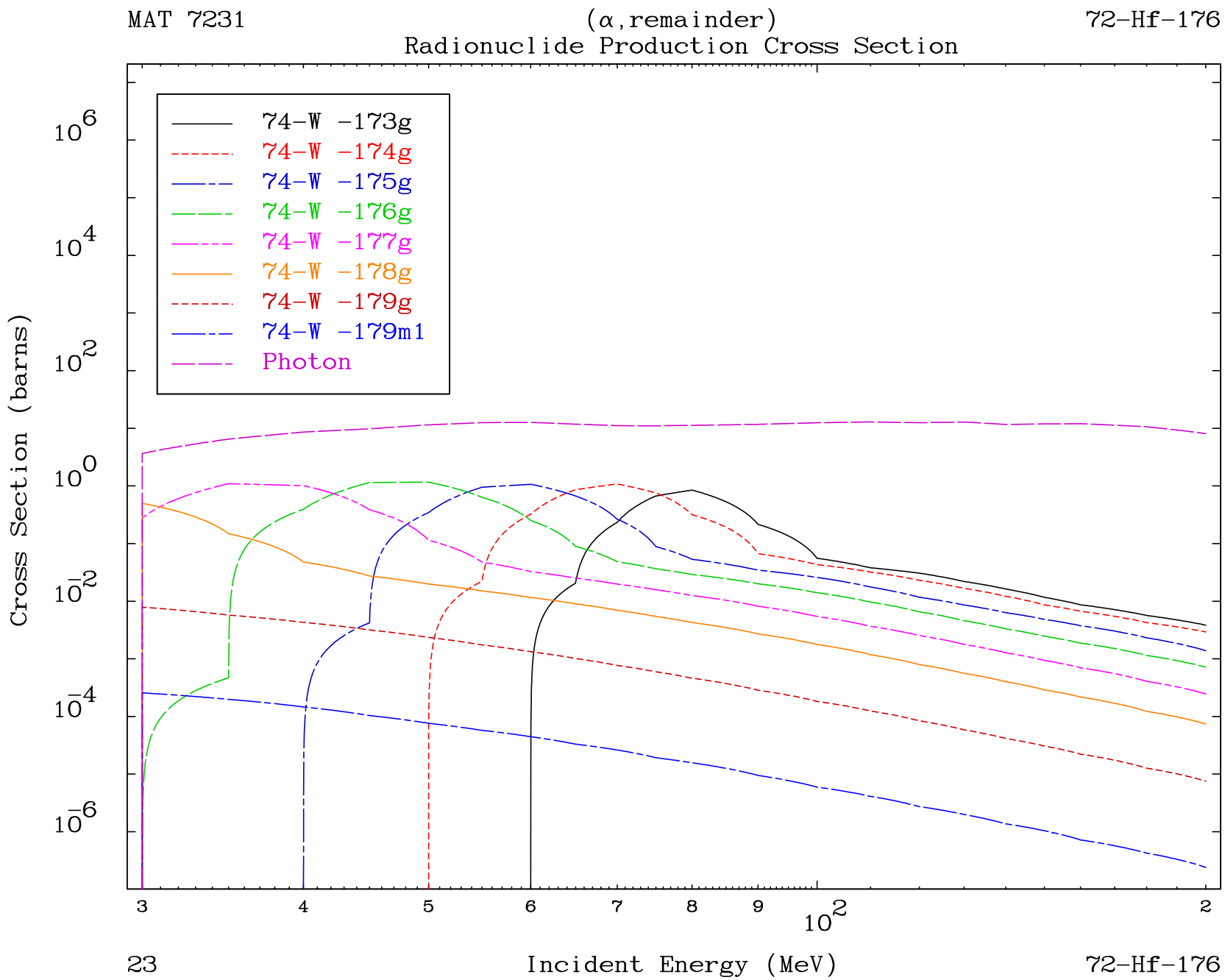

MAT 7231
(α,remainder)
72-Hf-176
Radionuclide Production Cross Section
Cross Section (barns)
Incident Energy (MeV)
50
100
150
200
18
72-Hf-160g
72-Hf-161g
72-Hf-162g
72-Hf-163g
72-Hf-164g
72-Hf-165g
72-Hf-166g
72-Hf-167g
72-Hf-168g
72-Hf-169g
72-Hf-170g

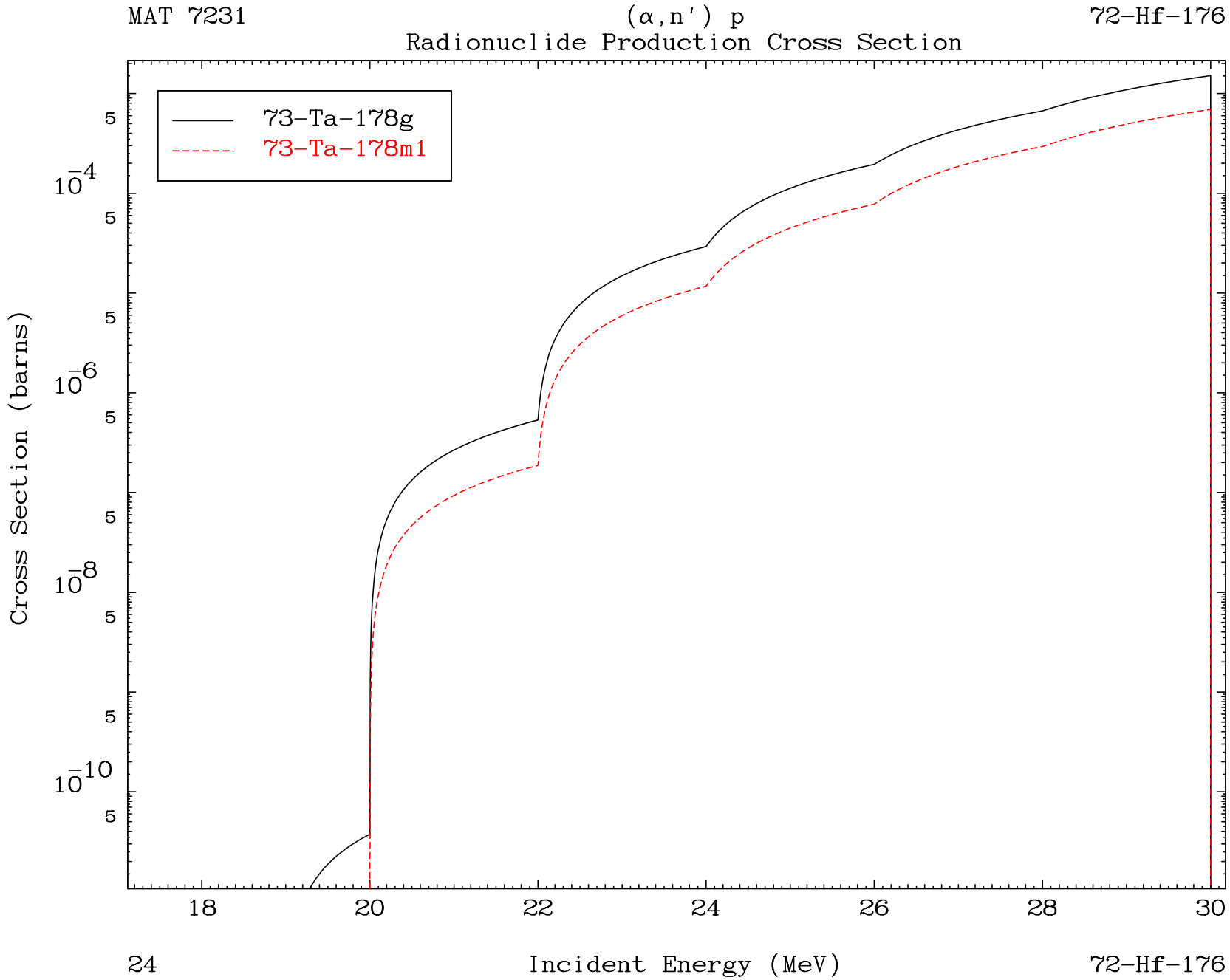

MAT 7231
(α,remainder)
Radionuclide Production Cross Section
72-Hf-176
Cross Section (barns)
Incident Energy (MeV)
19
72-Hf-176
72-Hf-171g
72-Hf-171m1
72-Hf-172g
72-Hf-173g
72-Hf-174g
72-Hf-175g
72-Hf-176g
72-Hf-177g
72-Hf-177m1
72-Hf-177m2
73-Ta-160g

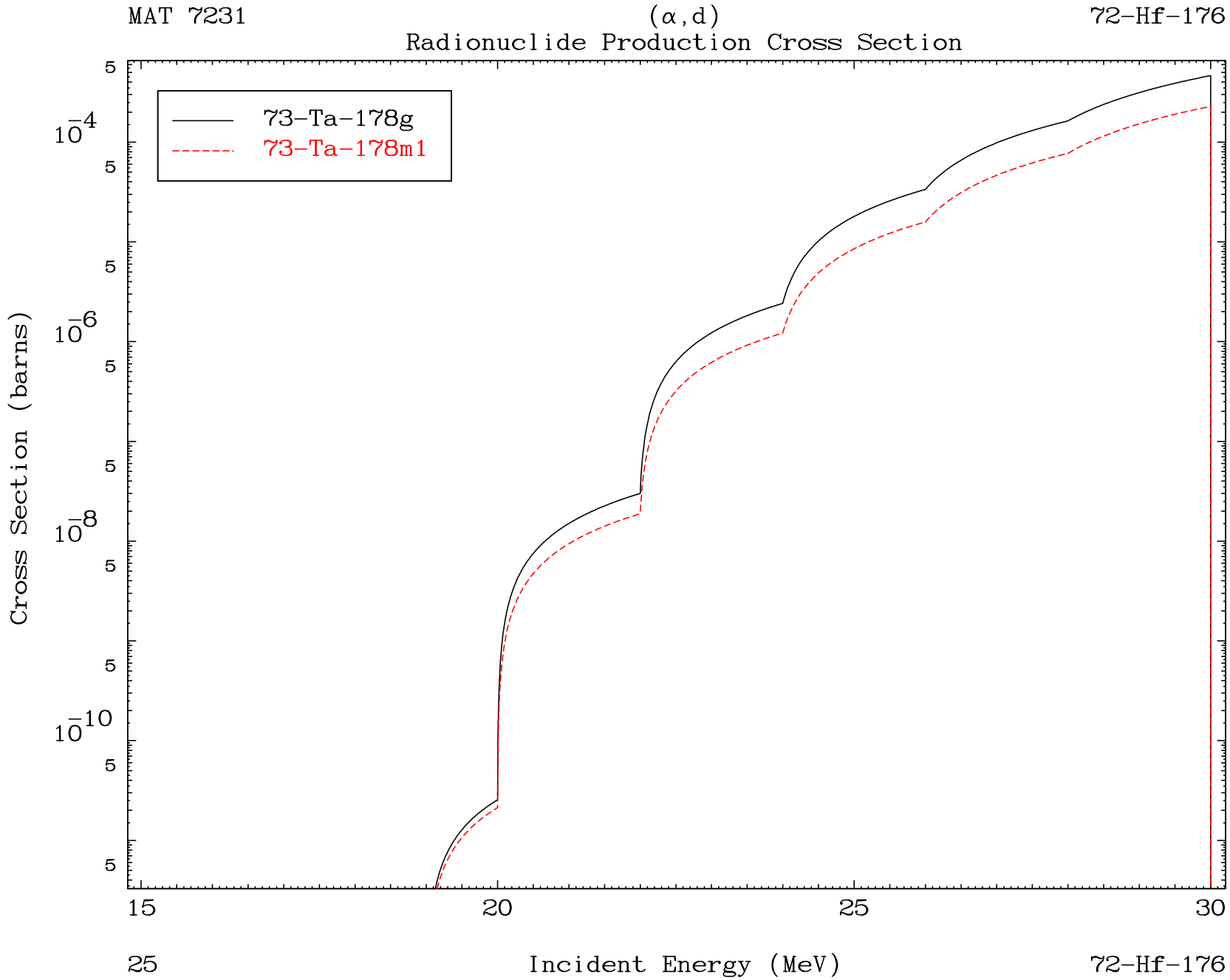

MAT 7231
(α,remainder)
72-Hf-176
Radionuclide Production Cross Section
73-Ta-160m1
73-Ta-161g
73-Ta-161m1
73-Ta-162g
73-Ta-163g
73-Ta-164g
73-Ta-165g
73-Ta-166g
73-Ta-167g
73-Ta-168g
73-Ta-169g
Cross Section (barns)
Incident Energy (MeV)
20
72-Hf-176

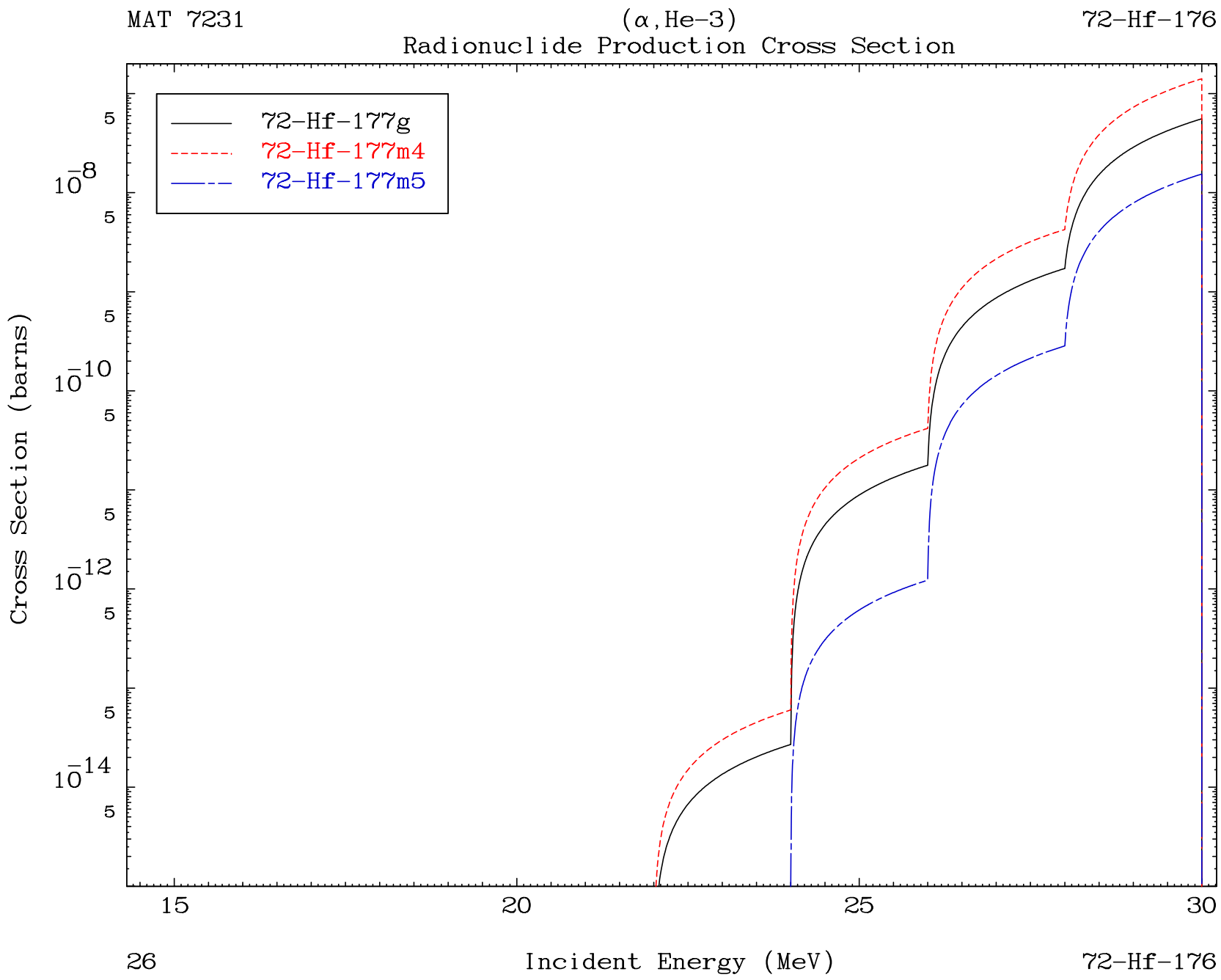

MAT 7231
(α,remainder)
72-Hf-176
Radionuclide Production Cross Section
Cross Section (barns)
Incident Energy (MeV)
21
72-Hf-176
73-Ta-170g
73-Ta-171g
73-Ta-172g
73-Ta-173g
73-Ta-174g
73-Ta-175g
73-Ta-176g
73-Ta-177g
73-Ta-178g
73-Ta-178m1
73-Ta-179g


MAT 7231
(α,remainder)
72-Hf-176
Radionuclide Production Cross Section
74-W -162g
74-W -163g
74-W -164g
74-W -165g
74-W -166g
74-W -167g
74-W -168g
74-W -169g
74-W -170g
74-W -171g
74-W -172g
Cross Section (barns)
Incident Energy (MeV)
22
72-Hf-176


MAT 7231
(α,remainder)
72-Hf-176
Radionuclide Production Cross Section
74-W -173g
74-W -174g
74-W -175g
74-W -176g
74-W -177g
74-W -178g
74-W -179g
74-W -179m1
Photon
Cross Section (barns)
10^6
10^4
10^2
10^0
10^-2
10^-4
10^-6
3
4
5
6
7
8
9
10^2
2
23
Incident Energy (MeV)
72-Hf-176


MAT 7231
(α,n') p
72-Hf-176
Radionuclide Production Cross Section
73-Ta-178g
73-Ta-178m1
Cross Section (barns)
10^-4
10^-6
10^-8
10^-10
5
18
20
22
24
26
28
30
24
Incident Energy (MeV)
72-Hf-176


MAT 7231
(α,d)
72-Hf-176
Radionuclide Production Cross Section
73-Ta-178g
73-Ta-178m1
Cross Section (barns)
Incident Energy (MeV)
25
72-Hf-176
15
20
25
30
10^-4
10^-6
10^-8
10^-10


MAT 7231
(α,He-3)
72-Hf-176
Radionuclide Production Cross Section
72-Hf-177g
72-Hf-177m4
72-Hf-177m5
Cross Section (barns)
5
10^-8
5
5
10^-10
5
5
10^-12
5
5
10^-14
5
15
20
25
30
26
Incident Energy (MeV)
72-Hf-176