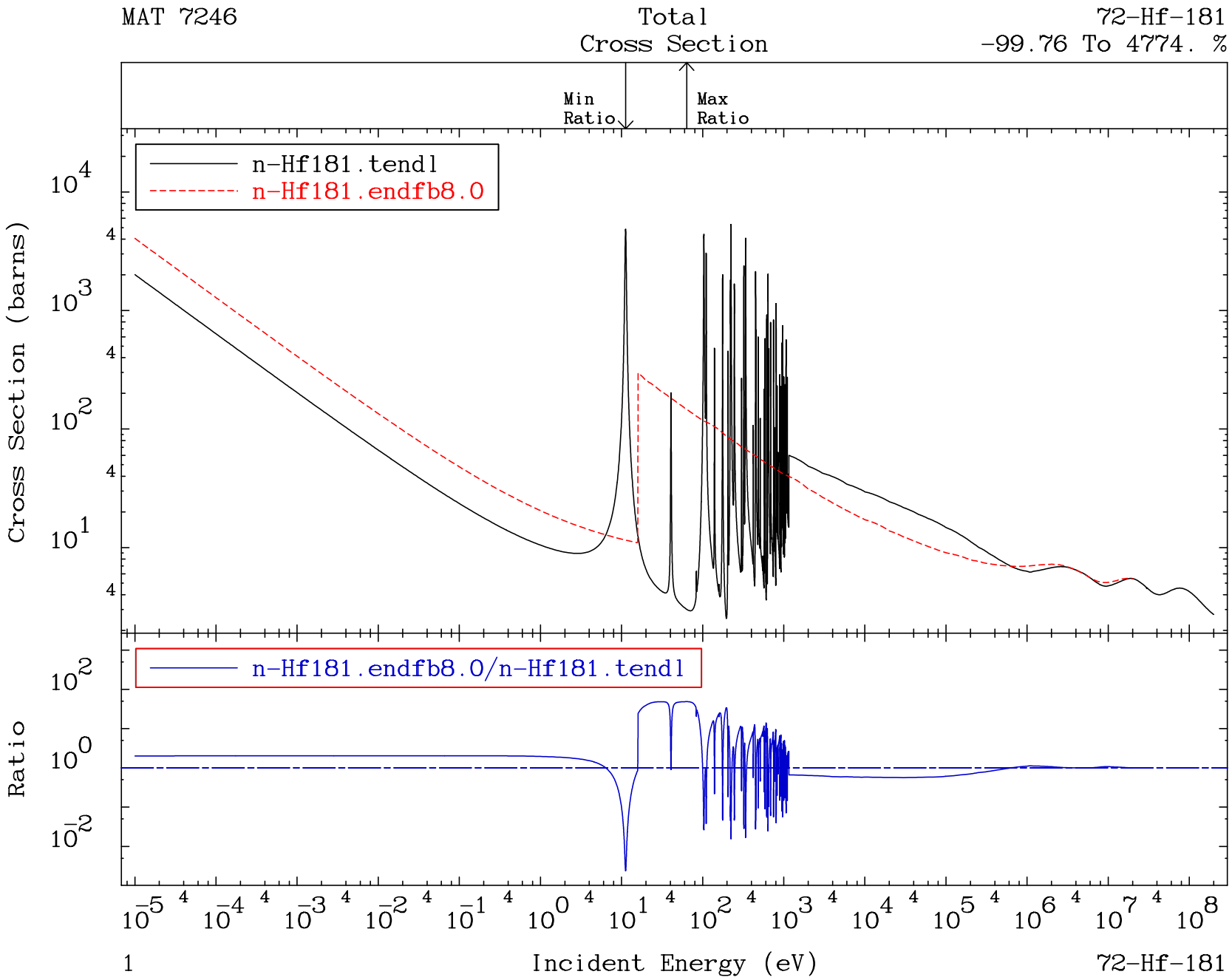
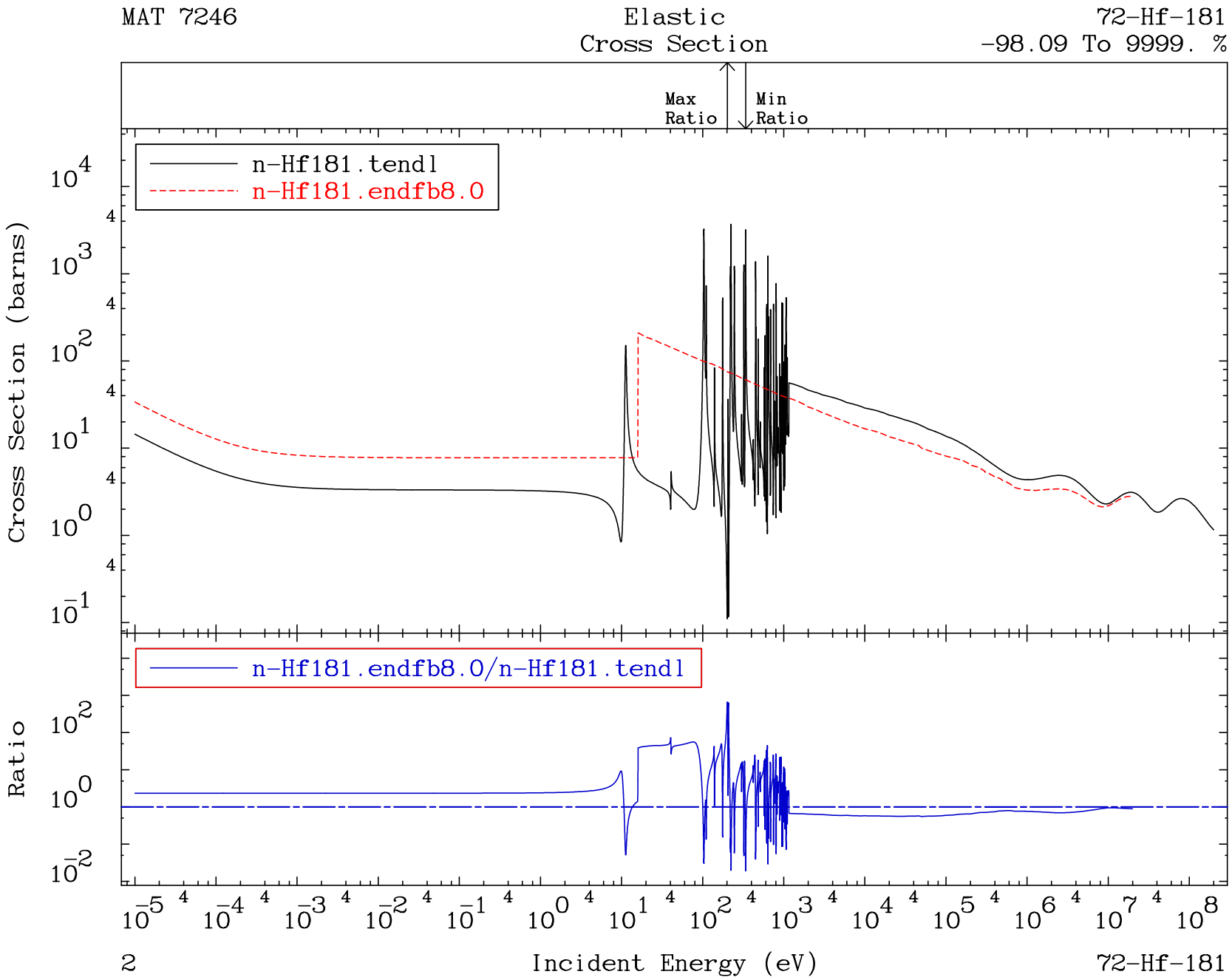
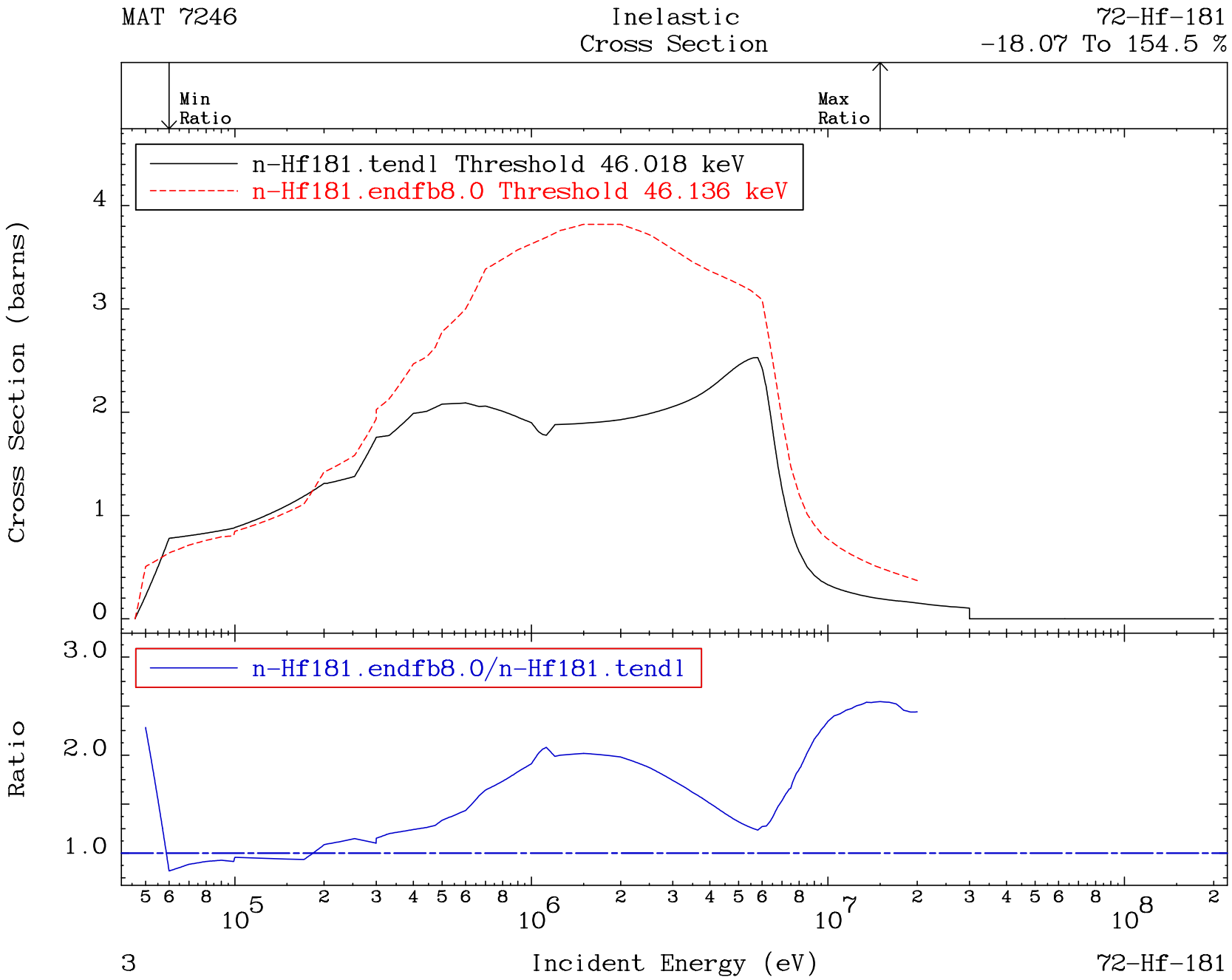
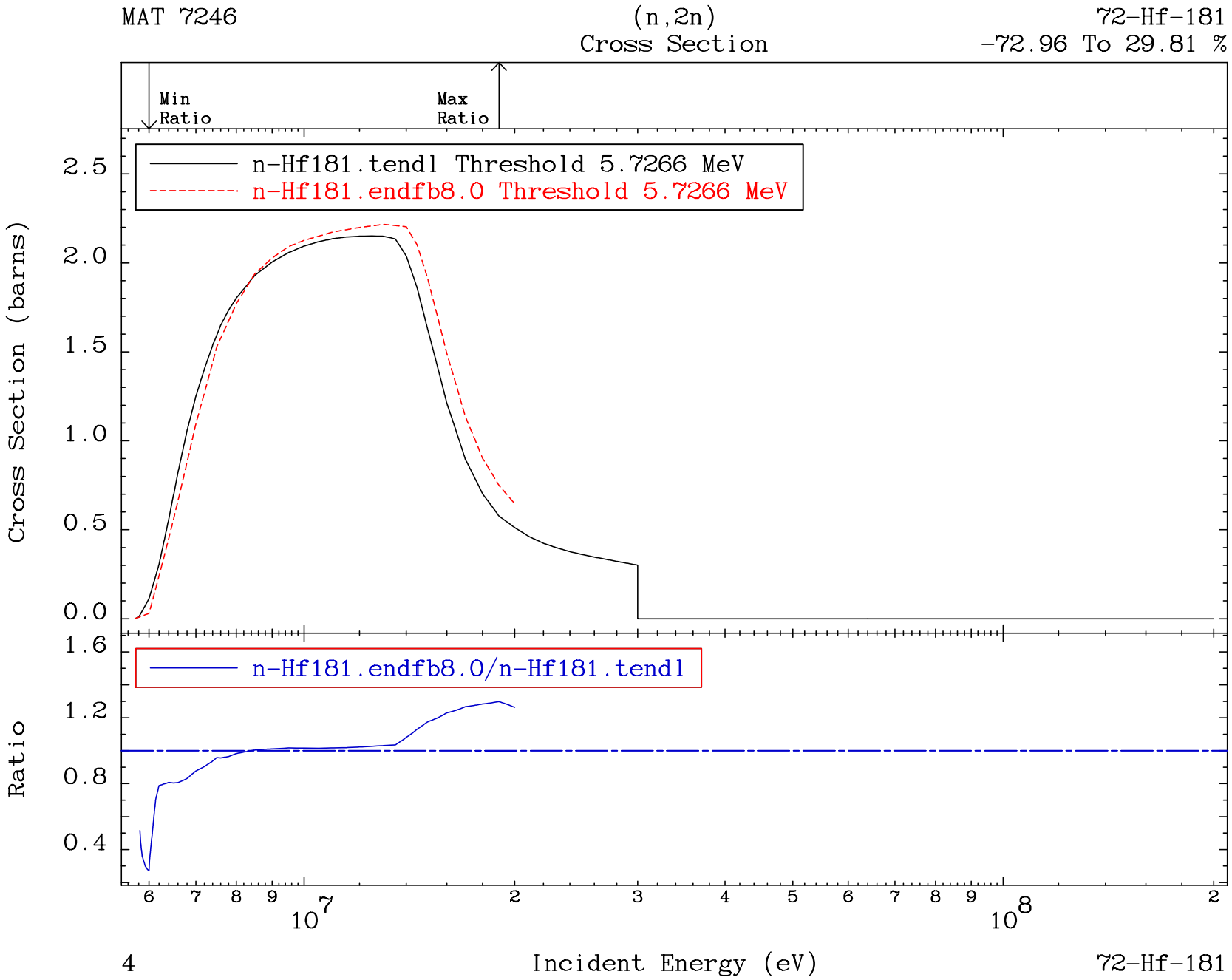
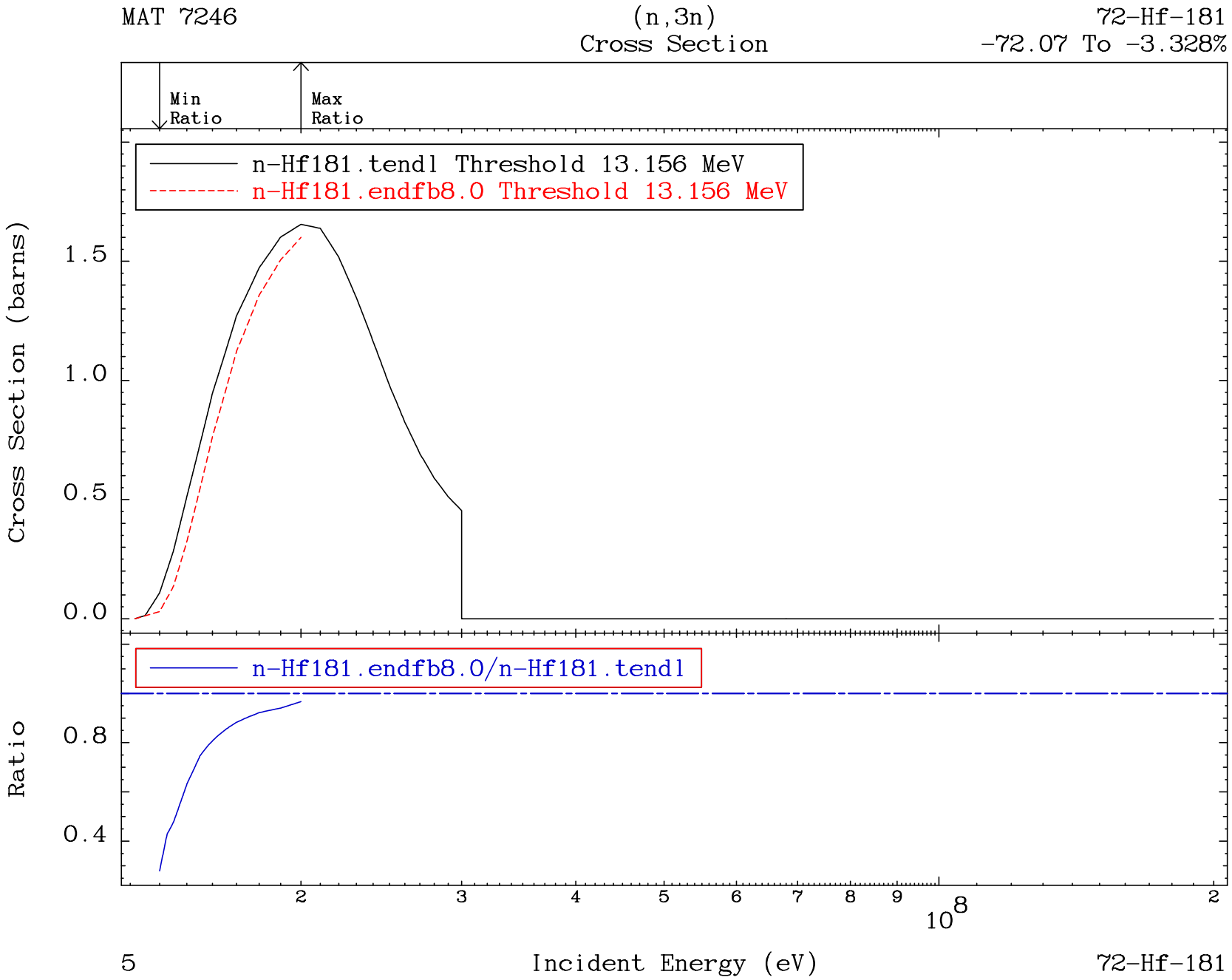
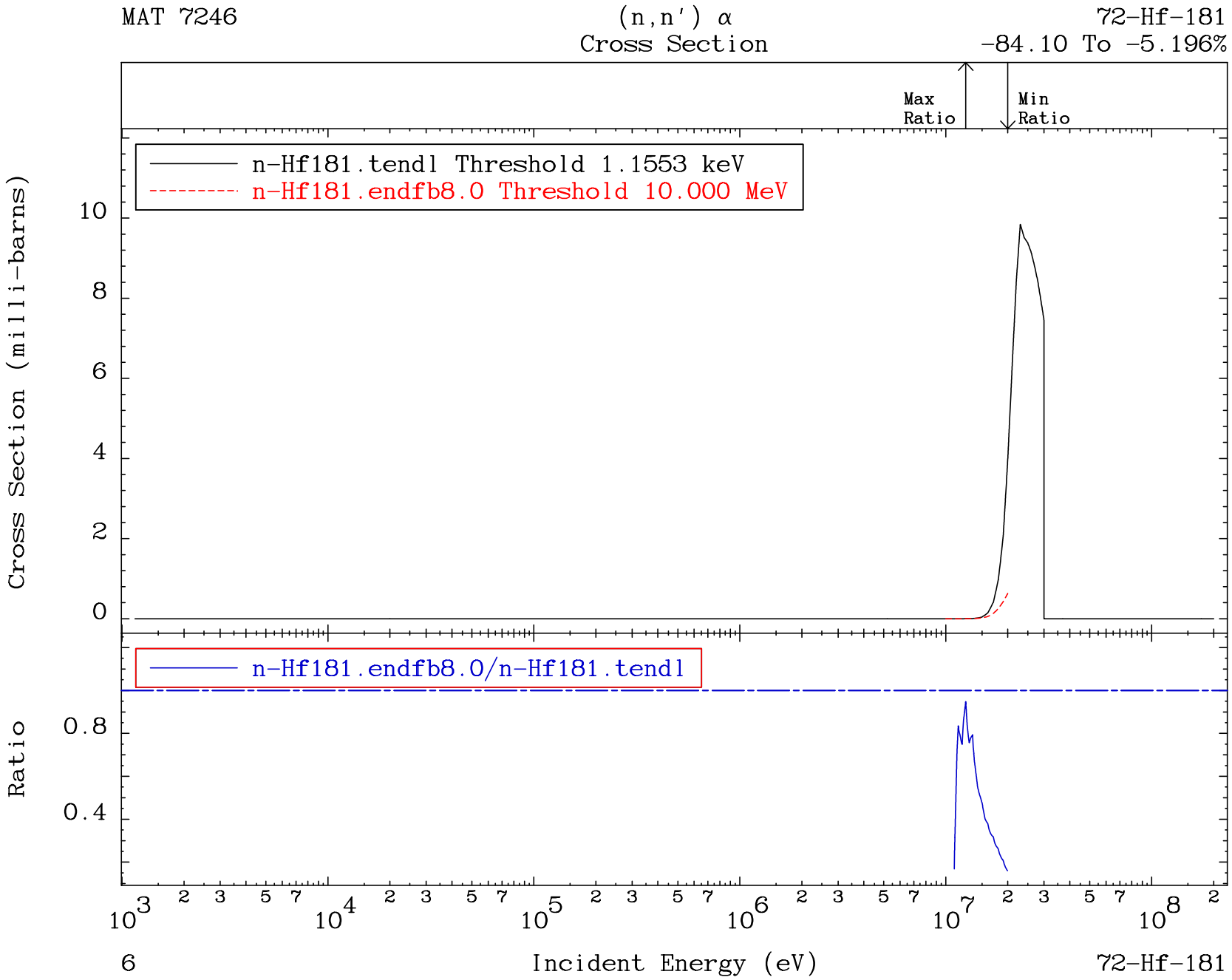

MAT 7246
Total
Cross Section
72-Hf-181
-99.76 To 4774. %
Min
Ratio
Max
Ratio
n-Hf181.tendl
n-Hf181.endfb8.0
Cross Section (barns)
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
Incident Energy (eV)
1
72-Hf-181

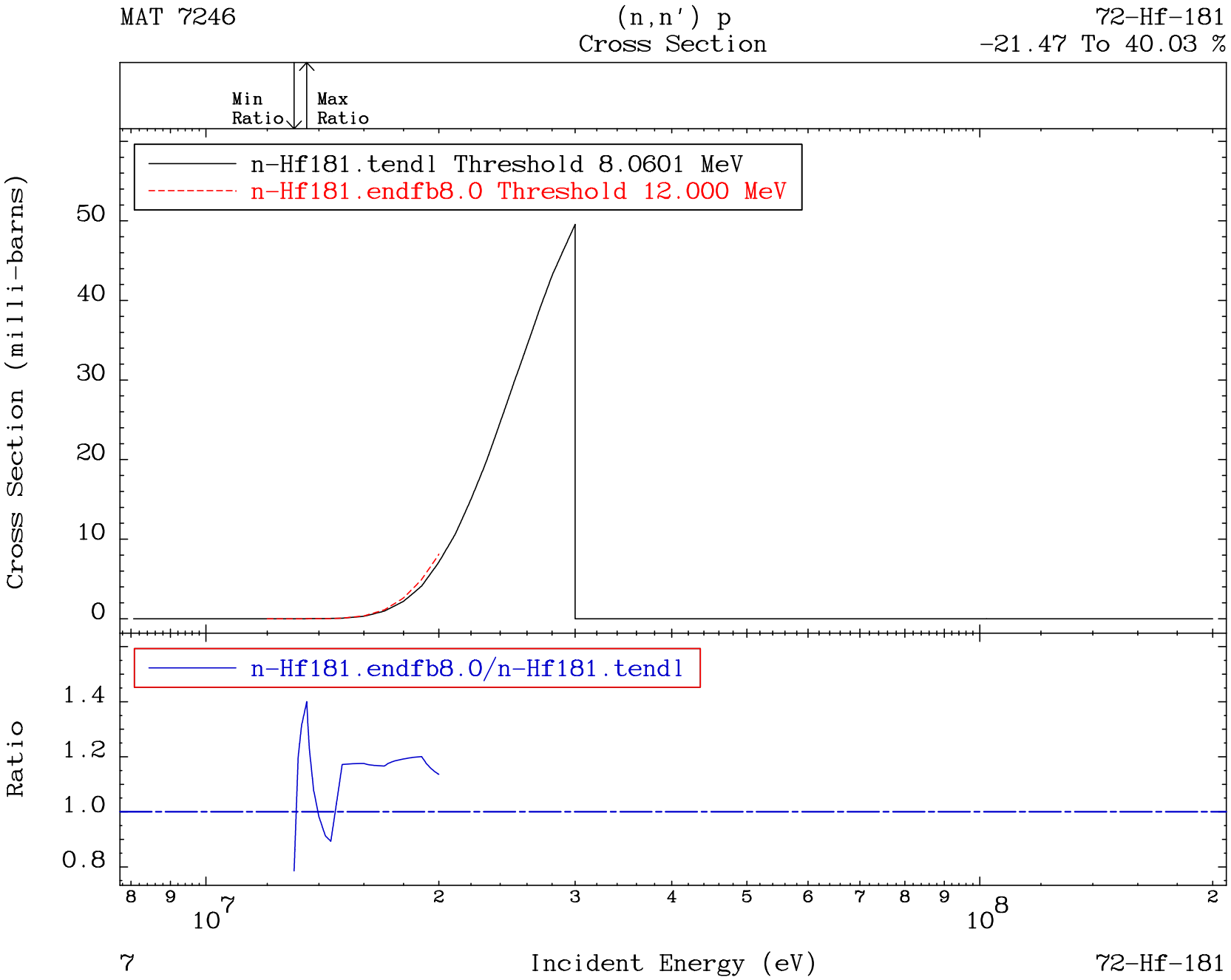

MAT 7246
Elastic
Cross Section
72-Hf-181
-98.09 To 9999. %
Max
Ratio
Min
Ratio
n-Hf181.tendl
n-Hf181.endfb8.0
Cross Section (barns)
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
Incident Energy (eV)
2
72-Hf-181

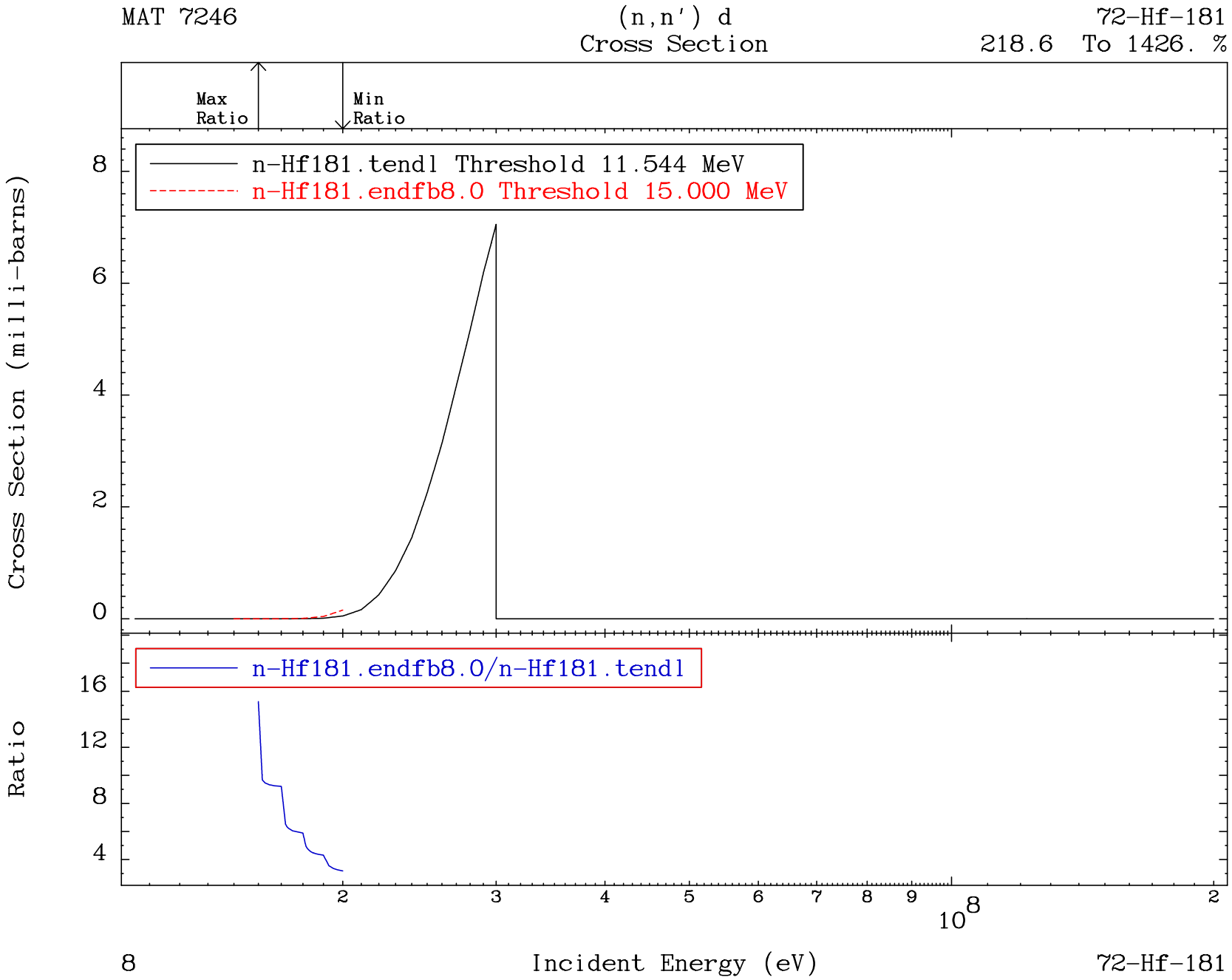

MAT 7246
Inelastic
Cross Section
72-Hf-181
-18.07 To 154.5 %
Min
Ratio
Max
Ratio
n-Hf181.tendl Threshold 46.018 keV
n-Hf181.endfb8.0 Threshold 46.136 keV
Cross Section (barns)
0
1
2
3
4
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
1.0
2.0
3.0
5 6 8 10^5 2 3 4 5 6 8 10^6 2 3 4 5 6 8 10^7 2 3 4 5 6 8 10^8 2
3
Incident Energy (eV)
72-Hf-181

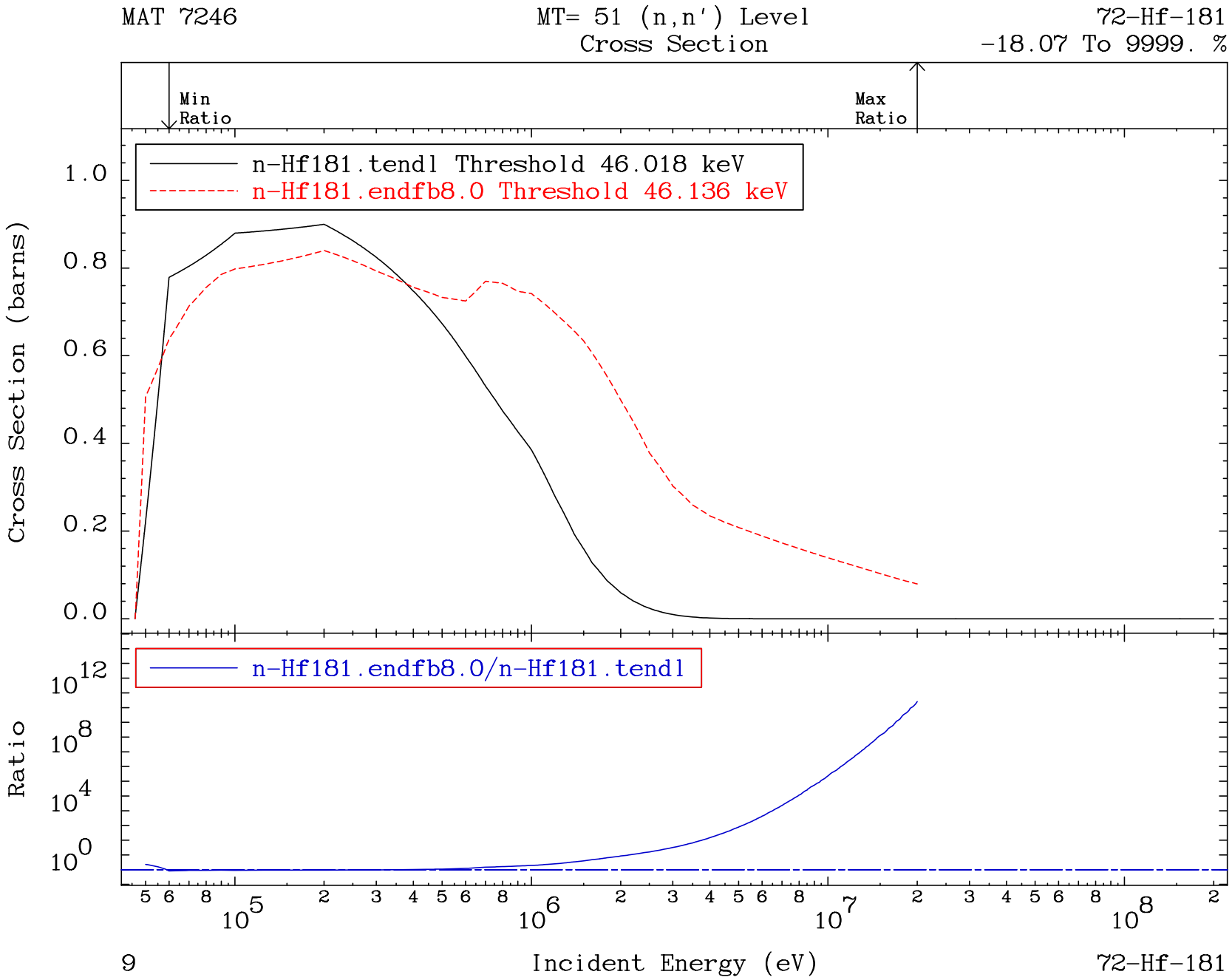

MAT 7246
(n,2n)
Cross Section
72-Hf-181
-72.96 To 29.81 %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 5.7266 MeV
n-Hf181.endfb8.0 Threshold 5.7266 MeV
Cross Section (barns)
2.5
2.0
1.5
1.0
0.5
0.0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
1.6
1.2
0.8
0.4
6 7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
4
Incident Energy (eV)
72-Hf-181

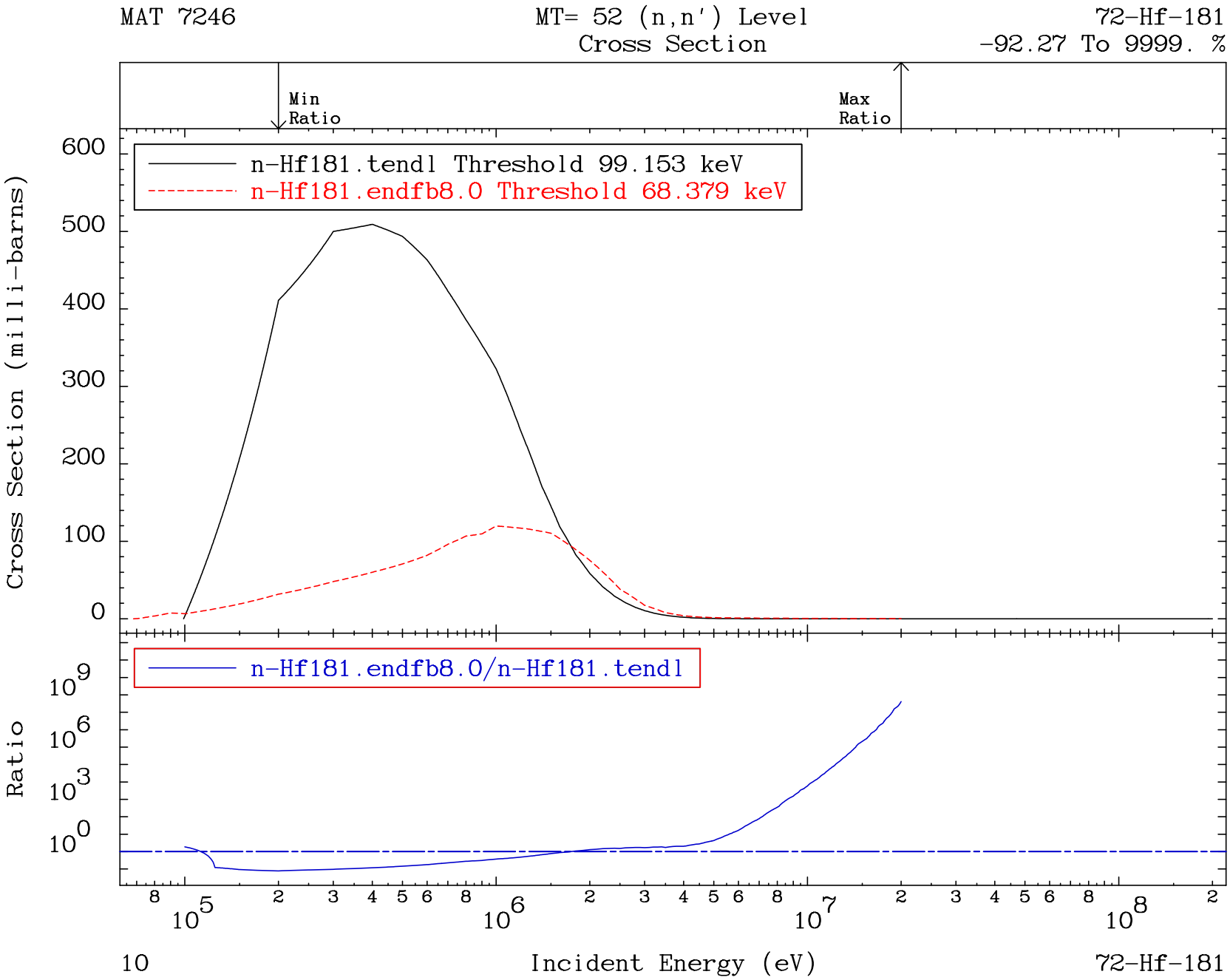

MAT 7246
(n,3n)
Cross Section
72-Hf-181
-72.07 To -3.328%
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 13.156 MeV
n-Hf181.endfb8.0 Threshold 13.156 MeV
Cross Section (barns)
1.5
1.0
0.5
0.0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
0.8
0.4
2
3
4
5
6
7
8
9
10^8
2
5
Incident Energy (eV)
72-Hf-181

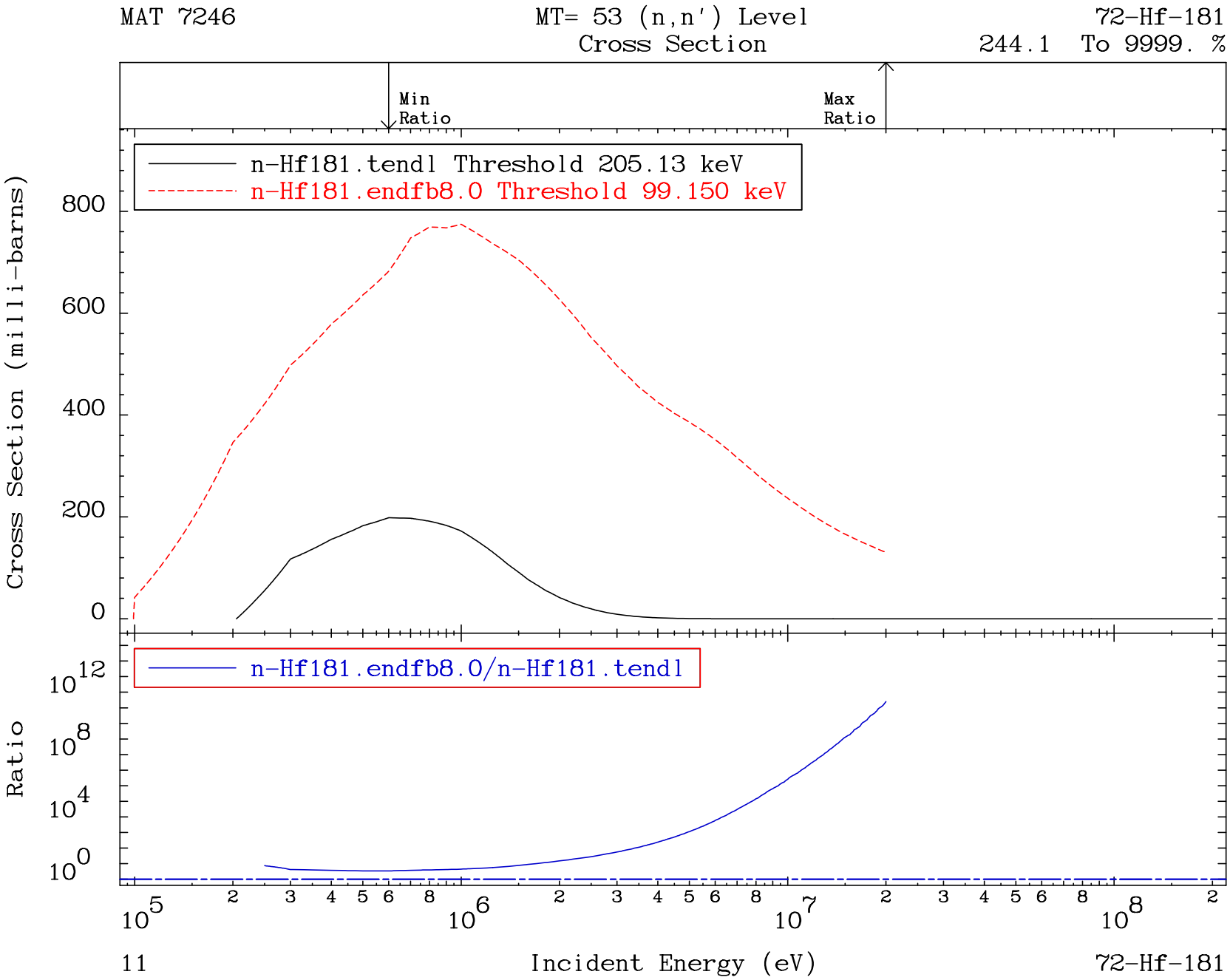

MAT 7246
(n,n') α
Cross Section
72-Hf-181
-84.10 To -5.196%
Max Ratio
Min Ratio
n-Hf181.tendl Threshold 1.1553 keV
n-Hf181.endfb8.0 Threshold 10.000 MeV
Cross Section (milli-barns)
10
8
6
4
2
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
0.8
0.4
10^3
10^4
10^5
10^6
10^7
10^8
Incident Energy (eV)
6
72-Hf-181

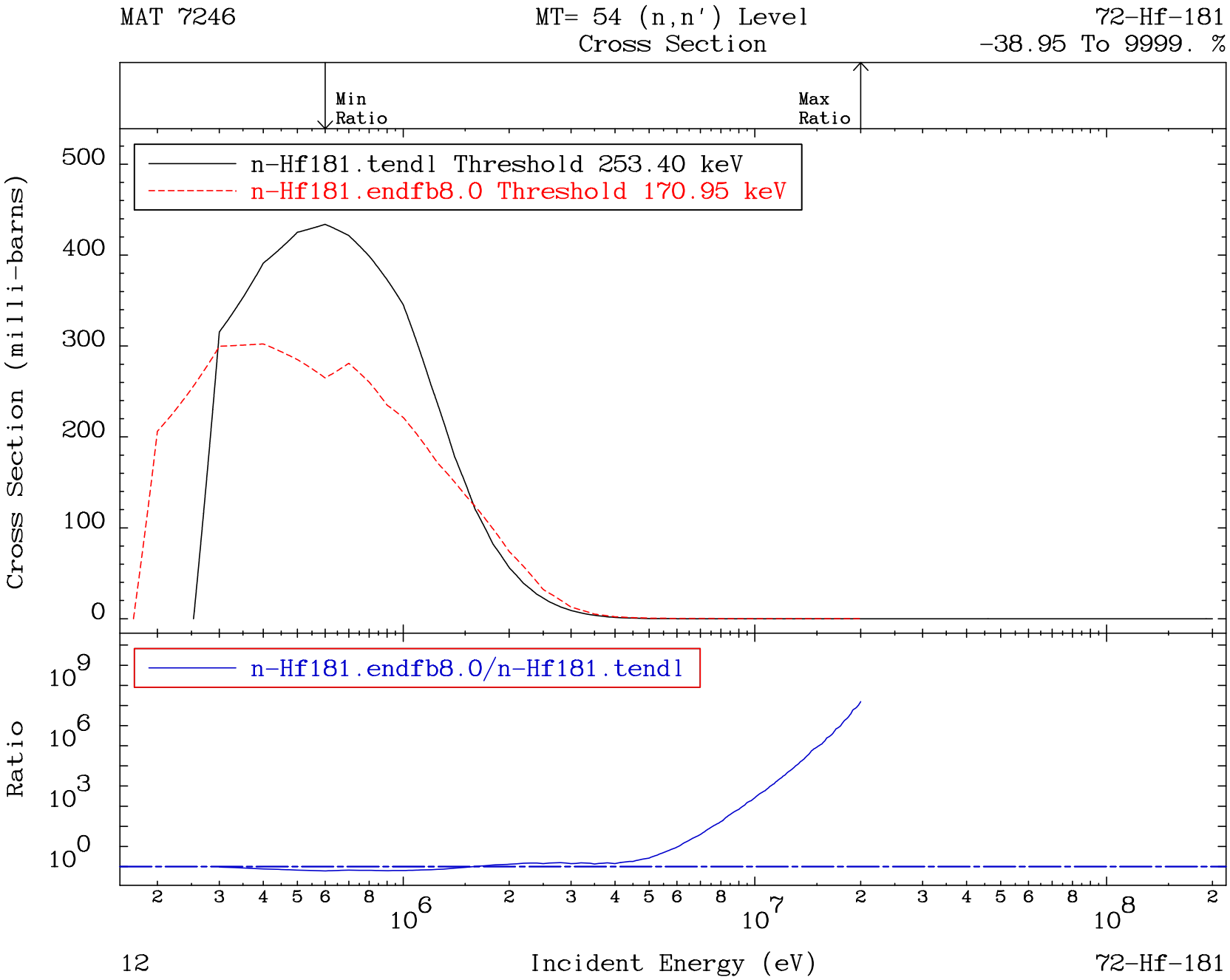

MAT 7246
(n,n') p
Cross Section
72-Hf-181
-21.47 To 40.03 %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 8.0601 MeV
n-Hf181.endfb8.0 Threshold 12.000 MeV
Cross Section (milli-barns)
50
40
30
20
10
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
1.4
1.2
1.0
0.8
8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
7
Incident Energy (eV)
72-Hf-181

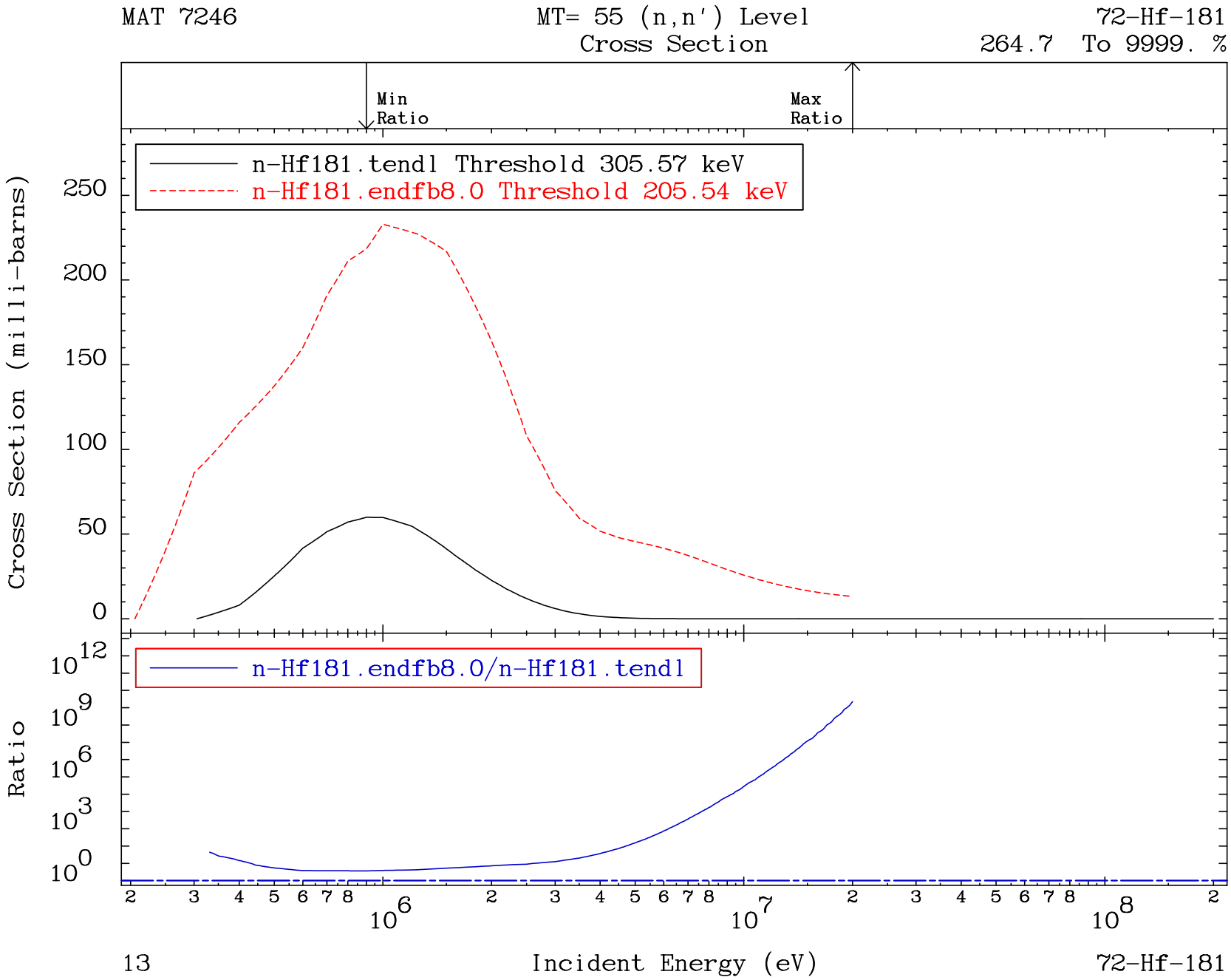

MAT 7246
(n,n') d
Cross Section
72-Hf-181
218.6 To 1426. %
Max Ratio
Min Ratio
n-Hf181.tendl Threshold 11.544 MeV
n-Hf181.endfb8.0 Threshold 15.000 MeV
Cross Section (milli-barns)
0
2
4
6
8
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
4
8
12
16
2
3
4
5
6
7
8
9
10^8
2
8
Incident Energy (eV)
72-Hf-181

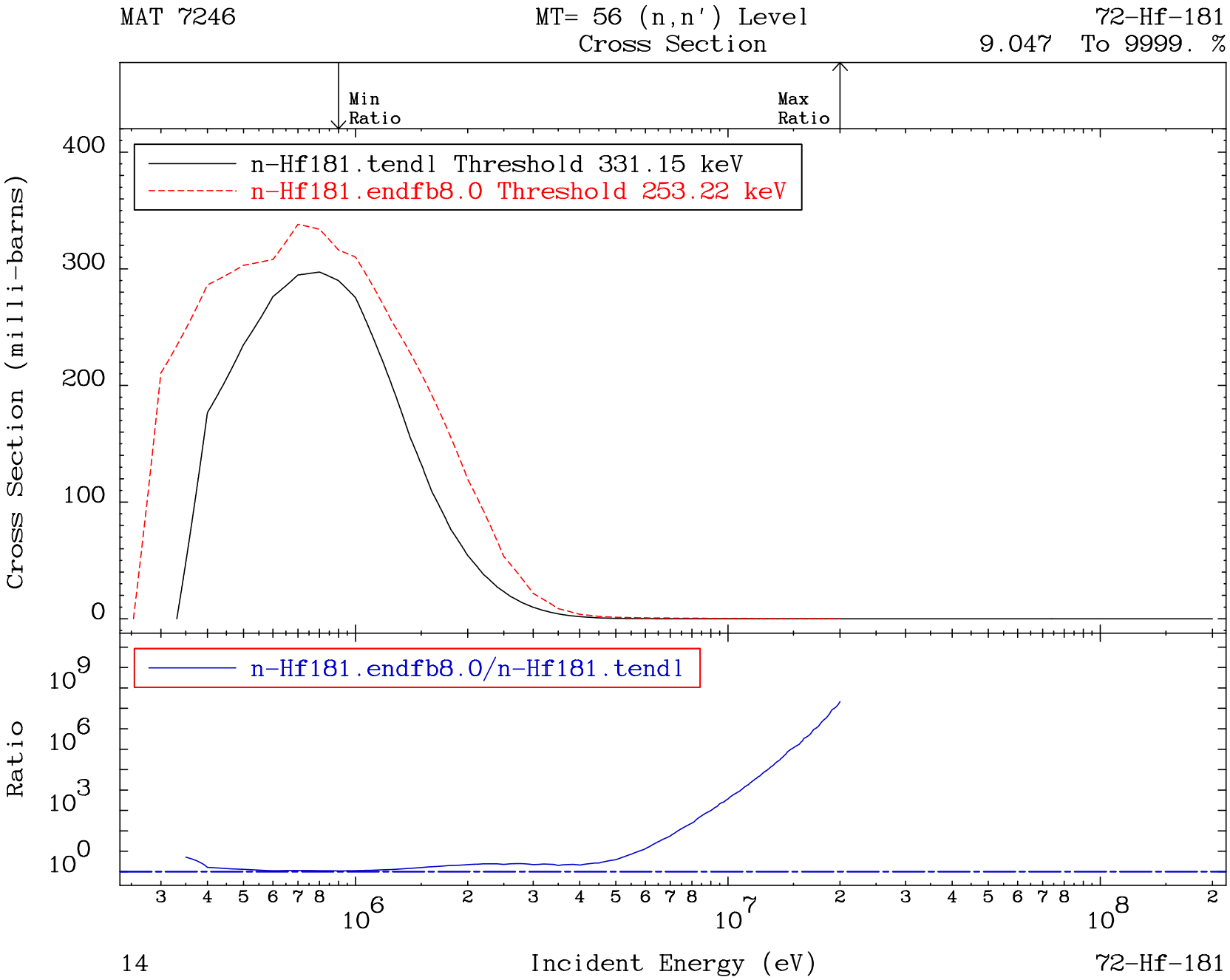

MAT 7246
MT= 51 (n,n') Level
Cross Section
72-Hf-181
-18.07 To 9999. %
Min
Ratio
Max
Ratio
n-Hf181.tendl Threshold 46.018 keV
n-Hf181.endfb8.0 Threshold 46.136 keV
Cross Section (barns)
1.0
0.8
0.6
0.4
0.2
0.0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^12
10^8
10^4
10^0
5 6 8 10^5 2 3 4 5 6 8 10^6 2 3 4 5 6 8 10^7 2 3 4 5 6 8 10^8 2
9
Incident Energy (eV)
72-Hf-181

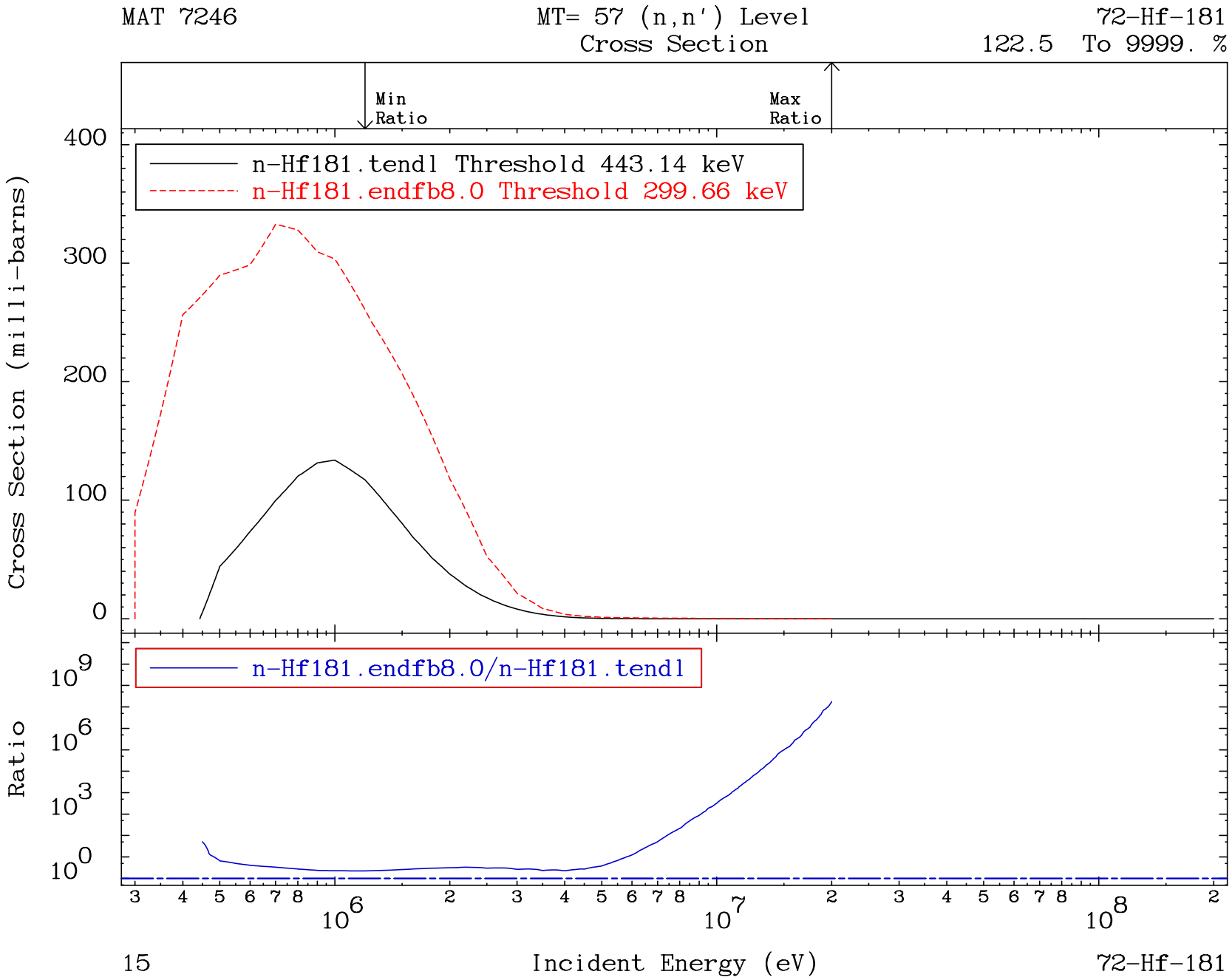

MAT 7246
MT= 52 (n,n') Level
Cross Section
72-Hf-181
-92.27 To 9999. %
Min
Ratio
Max
Ratio
n-Hf181.tendl Threshold 99.153 keV
n-Hf181.endfb8.0 Threshold 68.379 keV
Cross Section (milli-barns)
600
500
400
300
200
100
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^9
10^6
10^3
10^0
8
10^5
2
3
4
5
6
8
10^6
2
3
4
5
6
8
10^7
2
3
4
5
6
8
10^8
2
10
Incident Energy (eV)
72-Hf-181

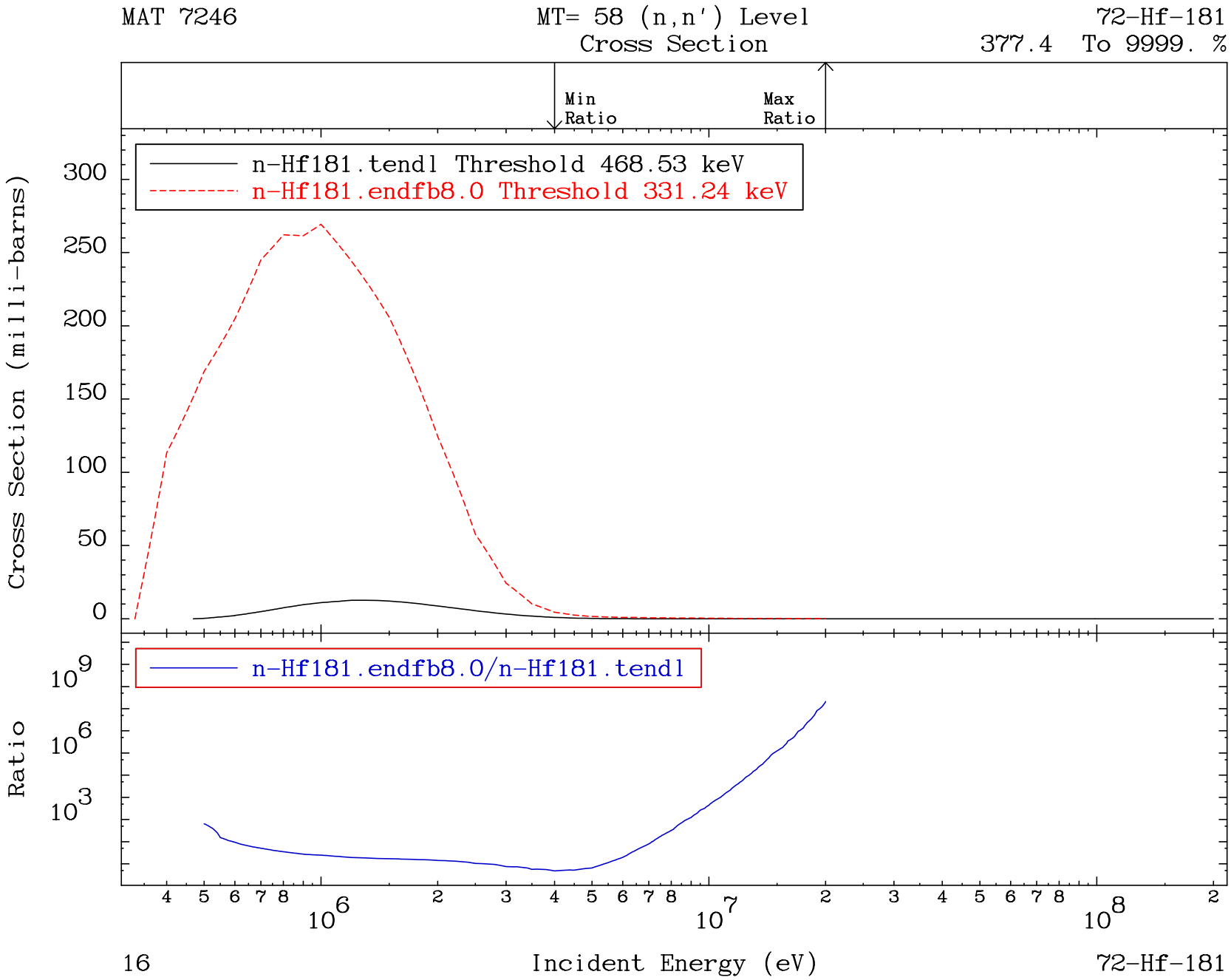

MAT 7246
MT= 53 (n,n') Level
Cross Section
72-Hf-181
244.1 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 205.13 keV
n-Hf181.endfb8.0 Threshold 99.150 keV
Cross Section (milli-barns)
800
600
400
200
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^12
10^8
10^4
10^0
10^5
2 3 4 5 6 8
10^6
2 3 4 5 6 8
10^7
2 3 4 5 6 8
10^8
2
11
Incident Energy (eV)
72-Hf-181

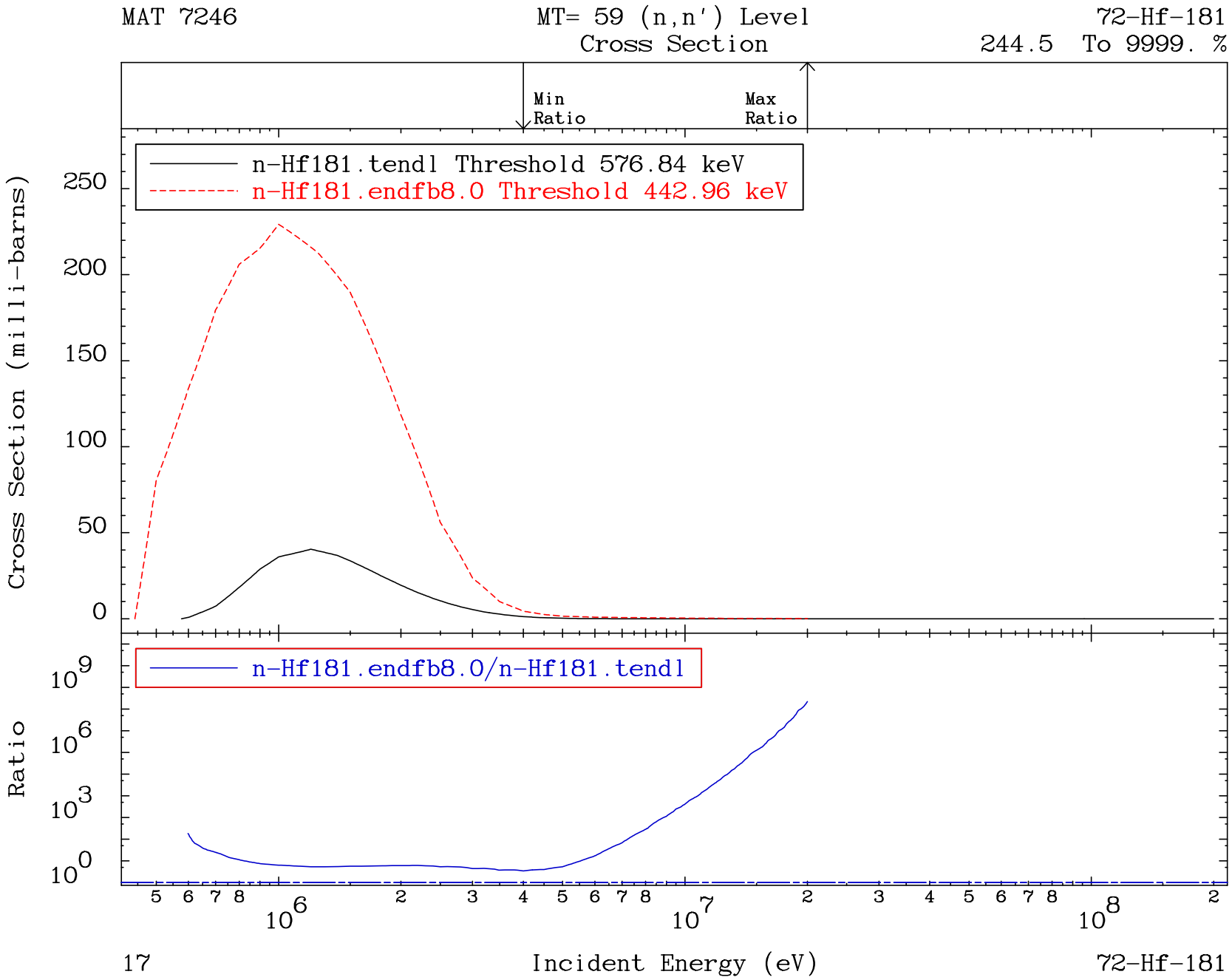

MAT 7246
MT= 54 (n,n') Level
Cross Section
72-Hf-181
-38.95 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 253.40 keV
n-Hf181.endfb8.0 Threshold 170.95 keV
Cross Section (milli-barns)
500
400
300
200
100
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^9
10^6
10^3
10^0
2 3 4 5 6 8 10^6 2 3 4 5 6 8 10^7 2 3 4 5 6 8 10^8 2
12
Incident Energy (eV)
72-Hf-181

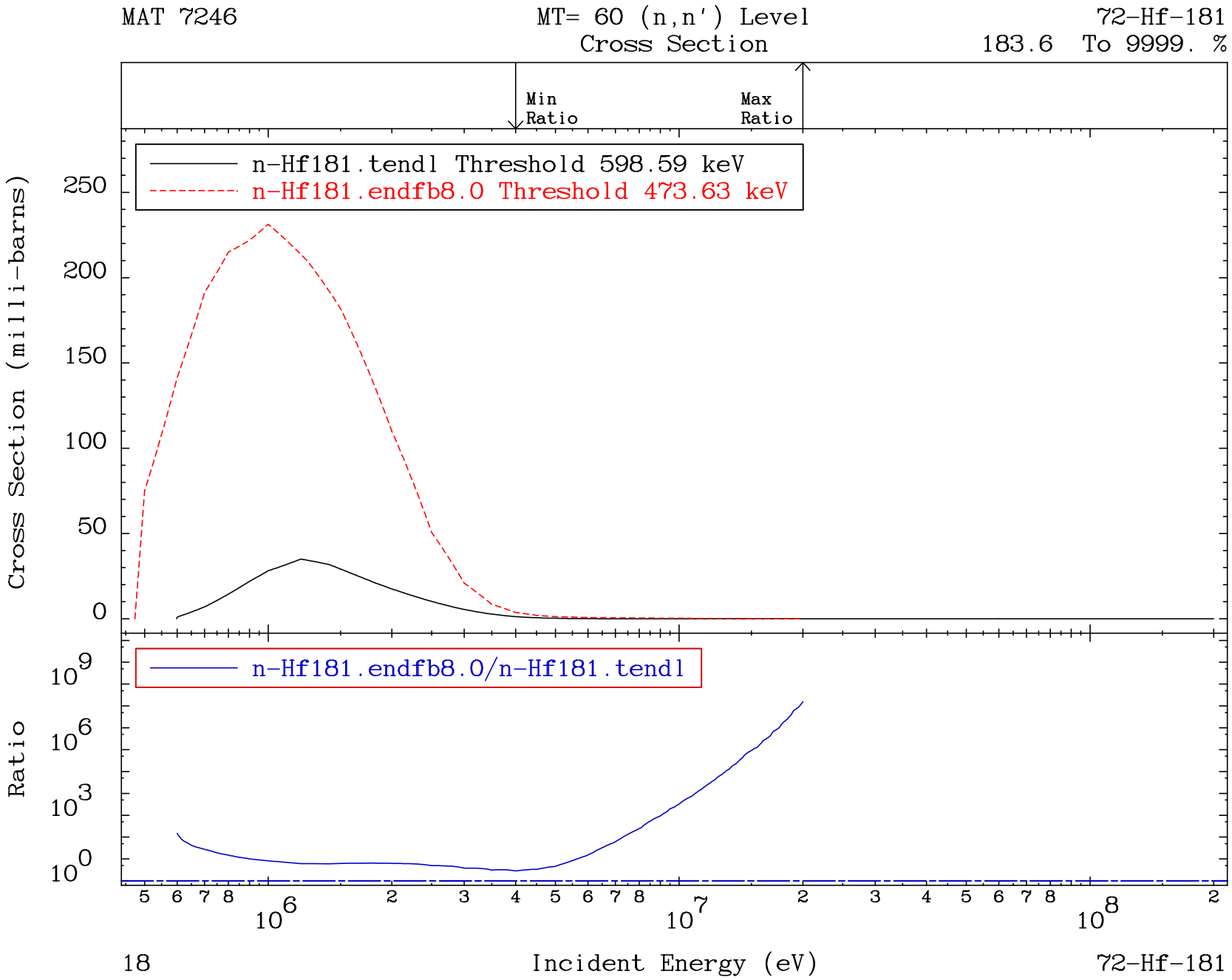

MAT 7246
MT= 55 (n,n') Level
Cross Section
72-Hf-181
264.7 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 305.57 keV
n-Hf181.endfb8.0 Threshold 205.54 keV
Cross Section (milli-barns)
250
200
150
100
50
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^12
10^9
10^6
10^3
10^0
2 3 4 5 6 7 8 10^6 2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
13
Incident Energy (eV)
72-Hf-181

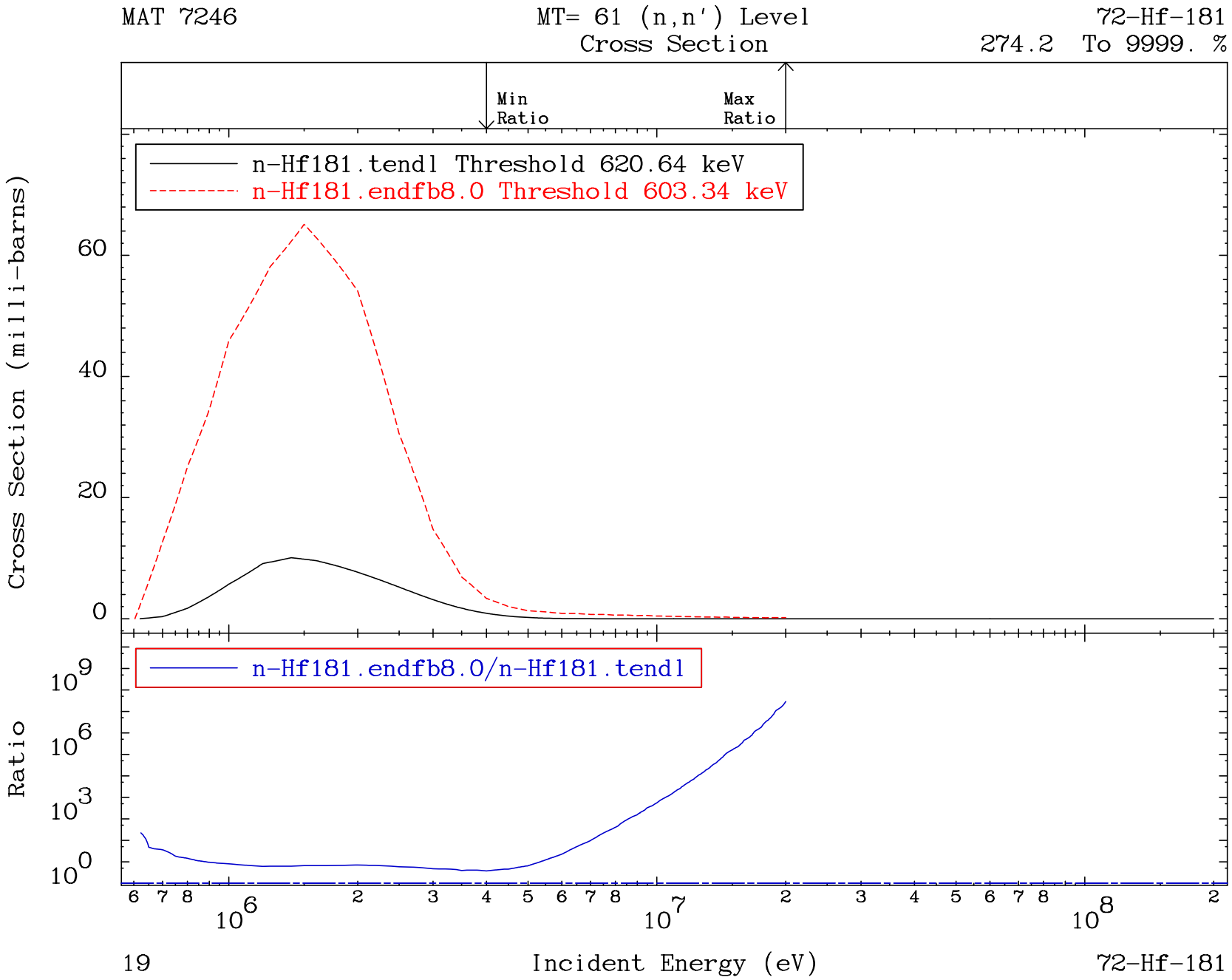

MAT 7246
MT= 56 (n,n') Level
Cross Section
72-Hf-181
9.047 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 331.15 keV
n-Hf181.endfb8.0 Threshold 253.22 keV
Cross Section (milli-barns)
400
300
200
100
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^9
10^6
10^3
10^0
3 4 5 6 7 8 10^6 2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
14
Incident Energy (eV)
72-Hf-181

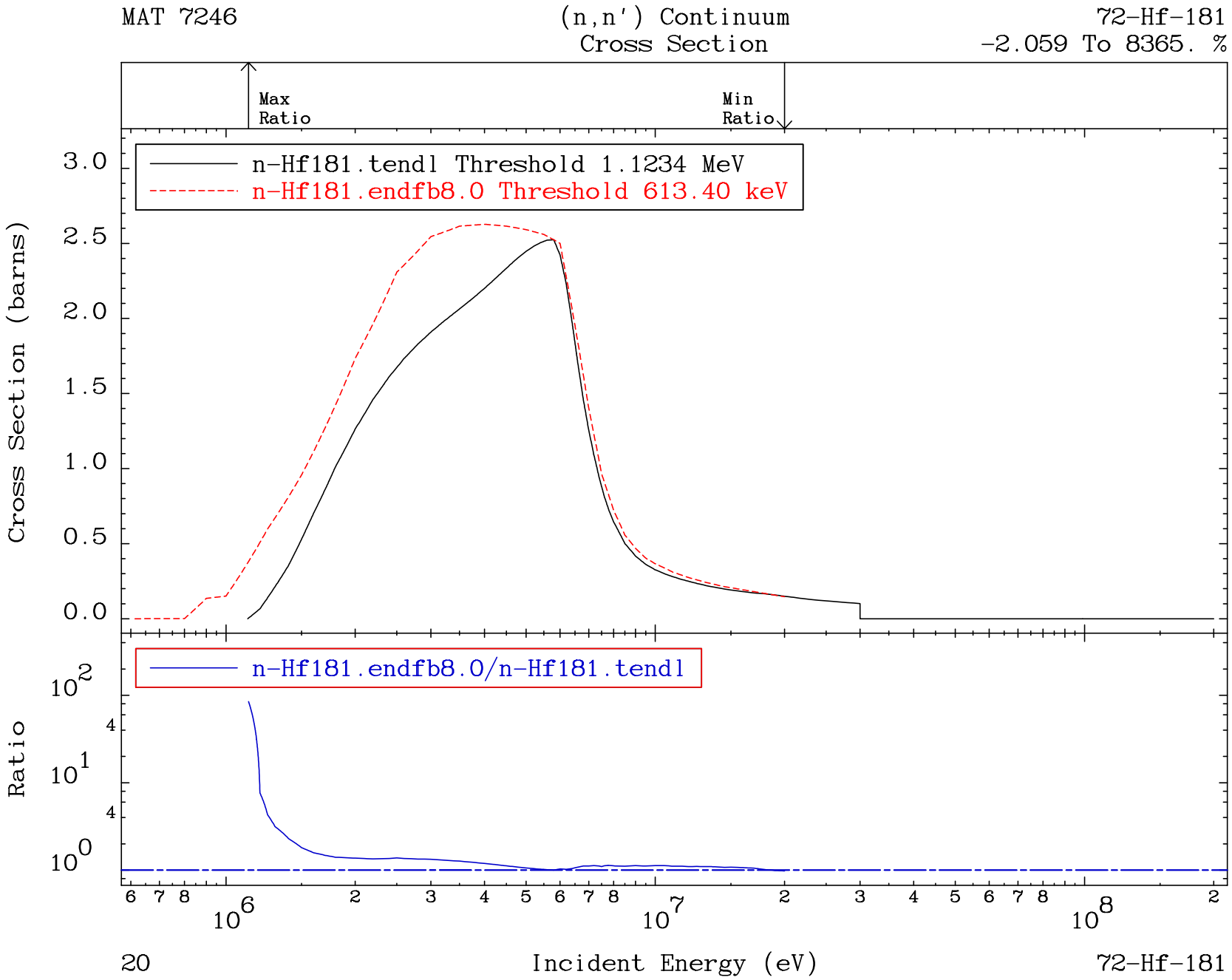

MAT 7246
MT= 57 (n,n') Level
Cross Section
72-Hf-181
122.5 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 443.14 keV
n-Hf181.endfb8.0 Threshold 299.66 keV
Cross Section (milli-barns)
400
300
200
100
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^9
10^6
10^3
10^0
3 4 5 6 7 8 10^6 2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
15
Incident Energy (eV)
72-Hf-181

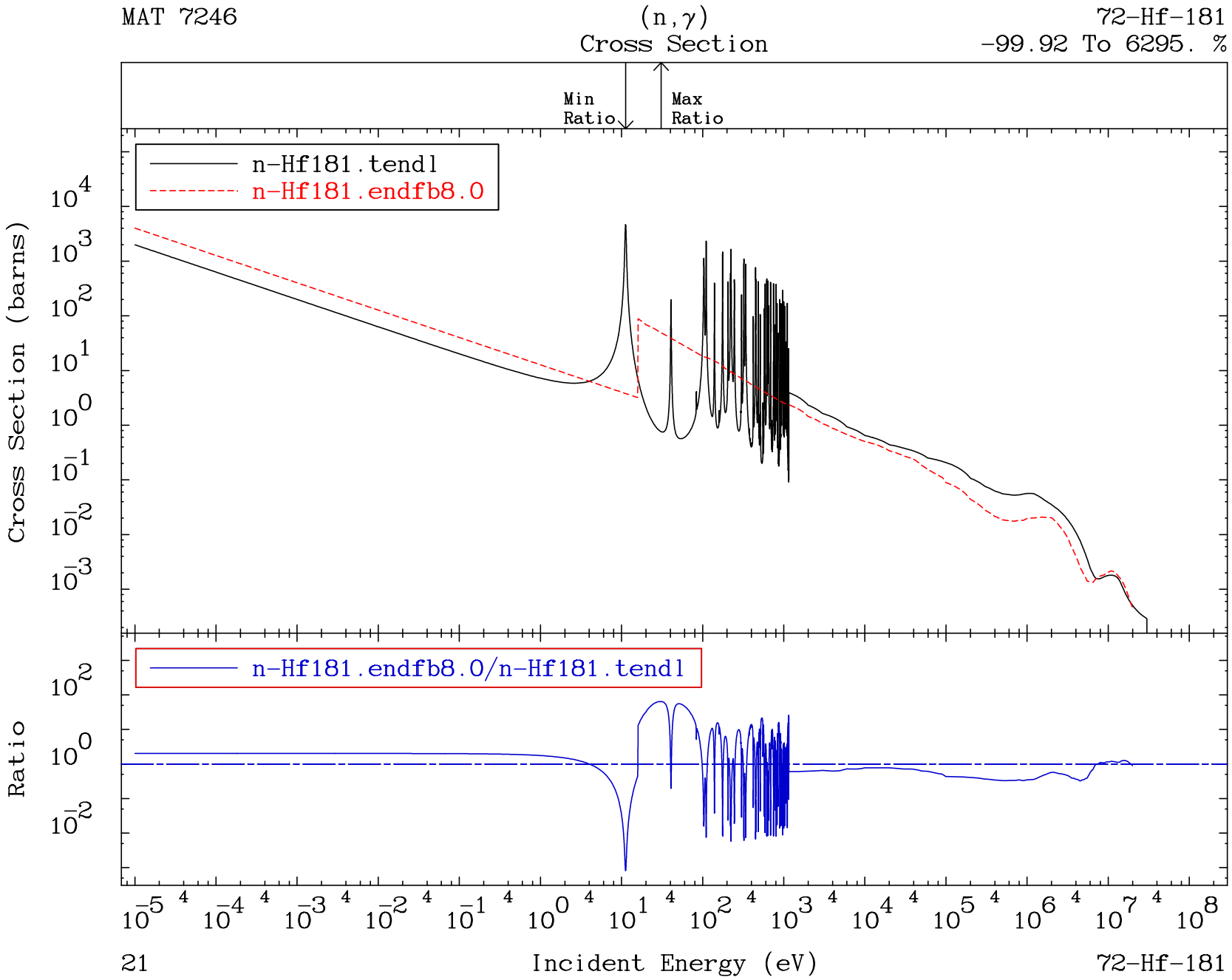

MAT 7246
MT= 58 (n,n') Level
Cross Section
72-Hf-181
377.4 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 468.53 keV
n-Hf181.endfb8.0 Threshold 331.24 keV
Cross Section (milli-barns)
300
250
200
150
100
50
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^9
10^6
10^3
4 5 6 7 8
10^6
2 3 4 5 6 7 8
10^7
2 3 4 5 6 7 8
10^8
2
16
Incident Energy (eV)
72-Hf-181

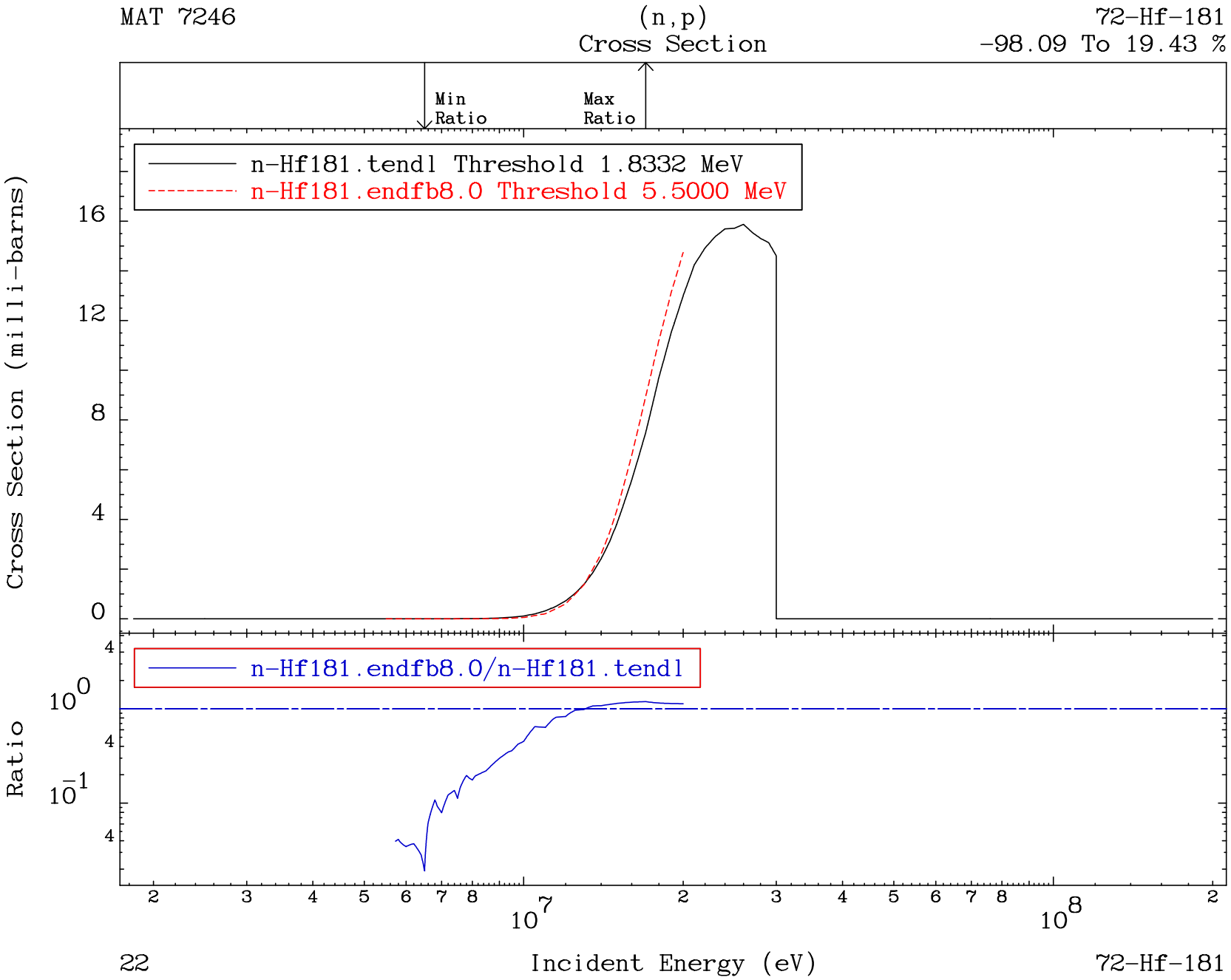

MAT 7246
MT= 59 (n,n') Level
Cross Section
72-Hf-181
244.5 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 576.84 keV
n-Hf181.endfb8.0 Threshold 442.96 keV
Cross Section (milli-barns)
250
200
150
100
50
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^9
10^6
10^3
10^0
5 6 7 8 10^6 2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
17
Incident Energy (eV)
72-Hf-181

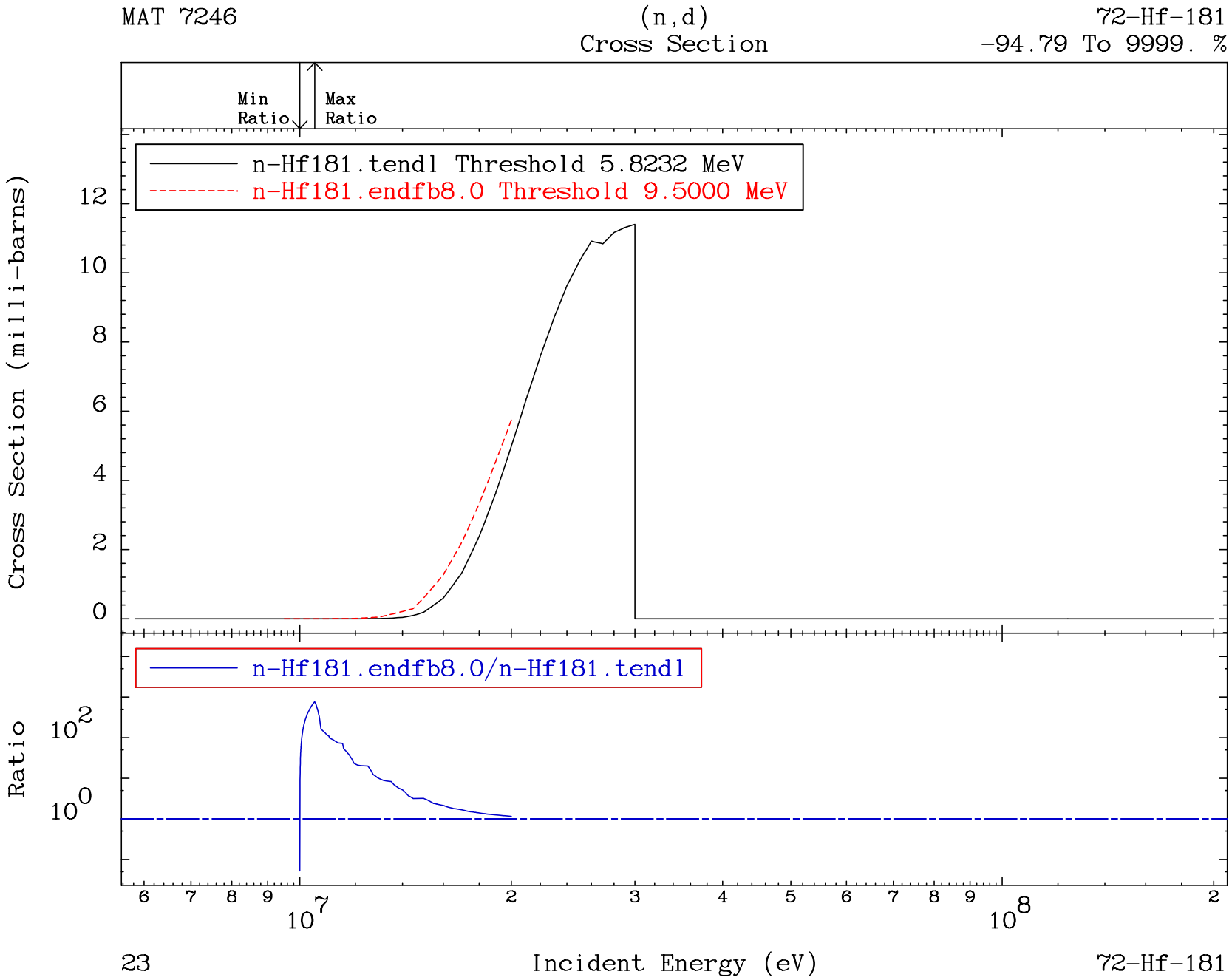

MAT 7246
MT= 60 (n,n') Level
Cross Section
72-Hf-181
183.6 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 598.59 keV
n-Hf181.endfb8.0 Threshold 473.63 keV
Cross Section (milli-barns)
250
200
150
100
50
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^9
10^6
10^3
10^0
5 6 7 8 10^6 2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
18
Incident Energy (eV)
72-Hf-181

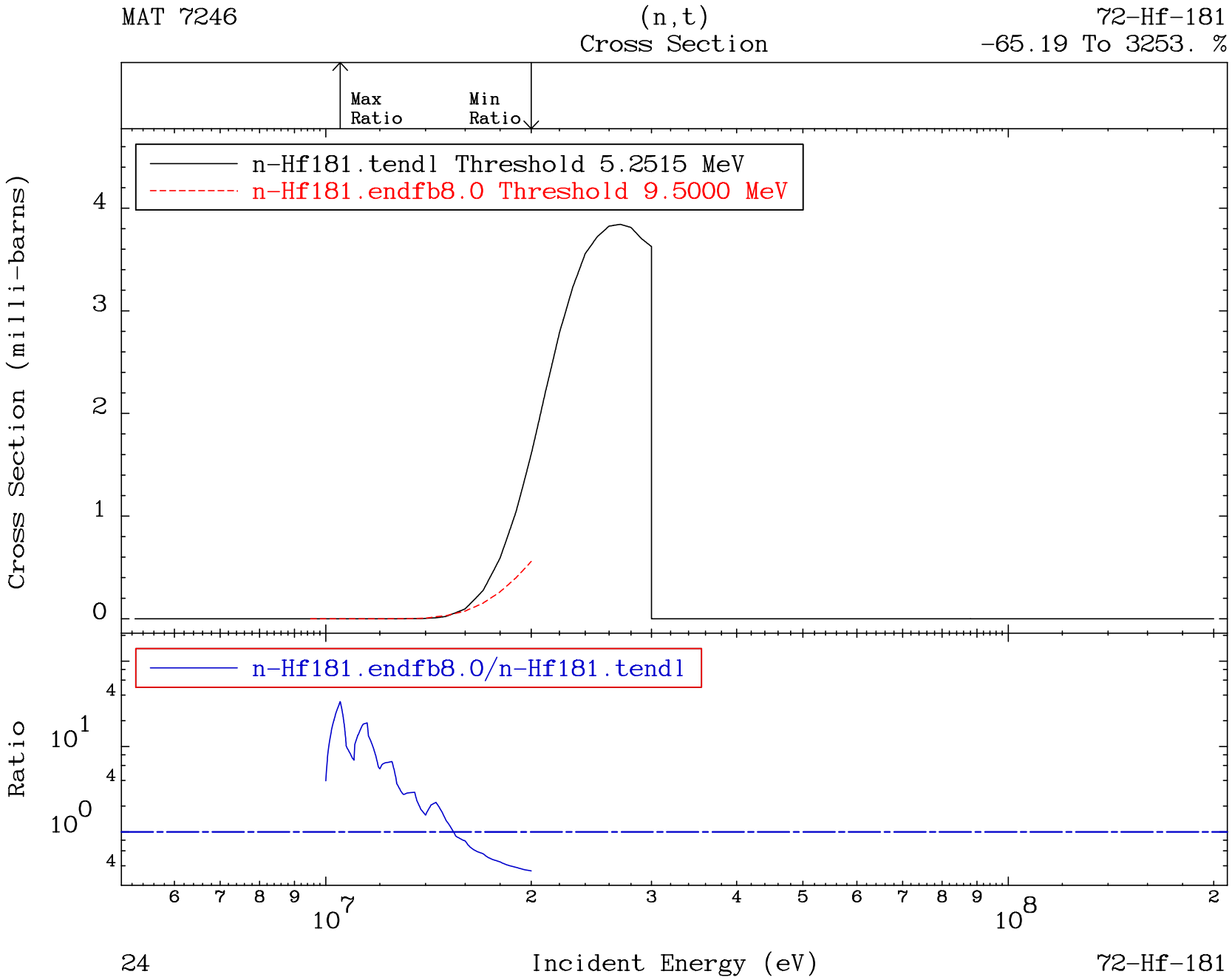

MAT 7246
MT= 61 (n,n') Level
Cross Section
72-Hf-181
274.2 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 620.64 keV
n-Hf181.endfb8.0 Threshold 603.34 keV
Cross Section (milli-barns)
0
20
40
60
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^0
10^3
10^6
10^9
6 7 8 10^6 2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
19
Incident Energy (eV)
72-Hf-181

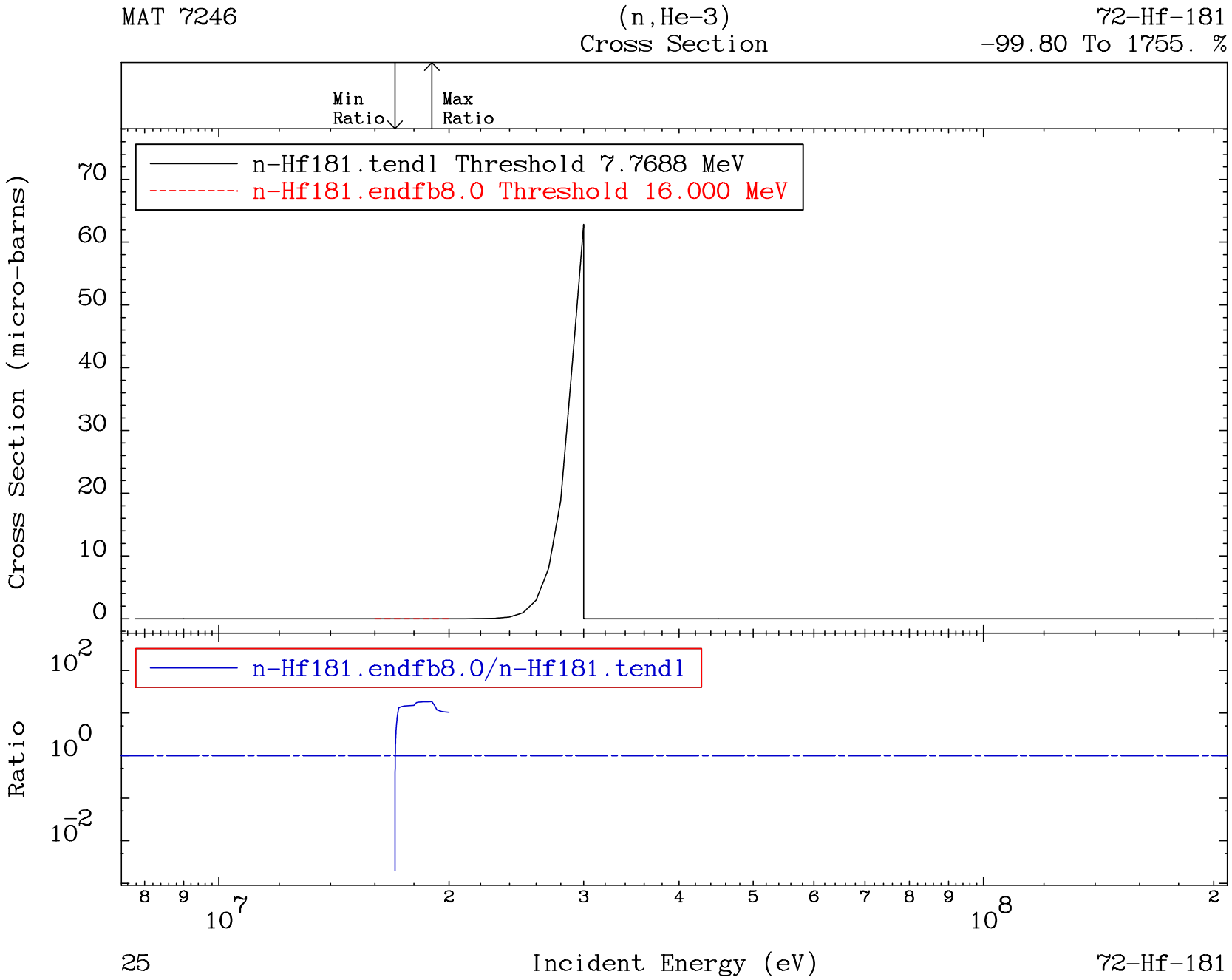

MAT 7246
(n,n') Continuum
Cross Section
72-Hf-181
-2.059 To 8365. %
Max
Ratio
Min
Ratio
n-Hf181.tendl Threshold 1.1234 MeV
n-Hf181.endfb8.0 Threshold 613.40 keV
Cross Section (barns)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^2
10^1
10^0
6 7 8 10^6 2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
20
Incident Energy (eV)
72-Hf-181

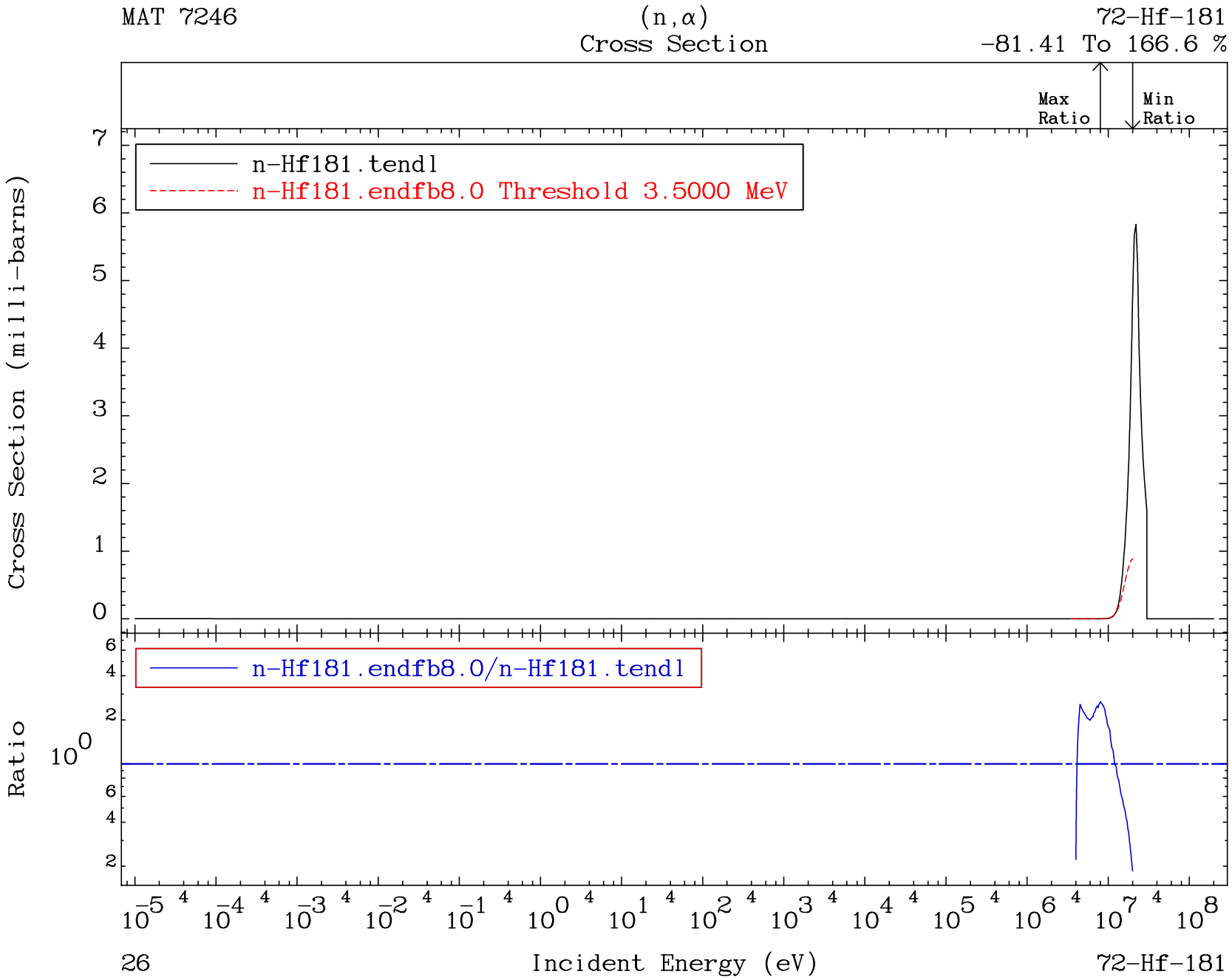

MAT 7246
(n,γ)
Cross Section
72-Hf-181
-99.92 To 6295. %
Min Ratio
Max Ratio
n-Hf181.tendl
n-Hf181.endfb8.0
Cross Section (barns)
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
Incident Energy (eV)
21
72-Hf-181

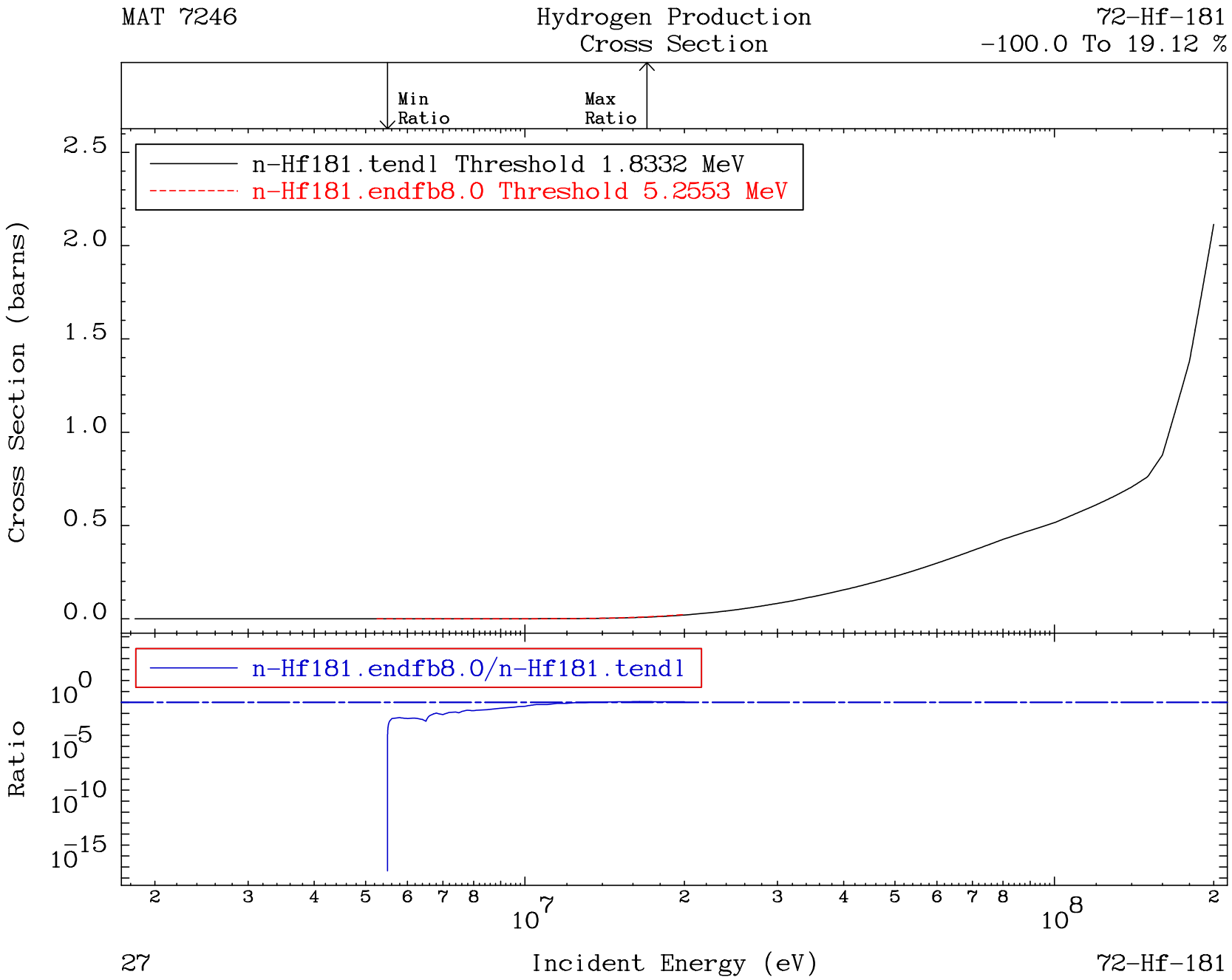

MAT 7246
(n,p)
Cross Section
72-Hf-181
-98.09 To 19.43 %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 1.8332 MeV
n-Hf181.endfb8.0 Threshold 5.5000 MeV
Cross Section (milli-barns)
16
12
8
4
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^0
10^-1
2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
22
Incident Energy (eV)
72-Hf-181

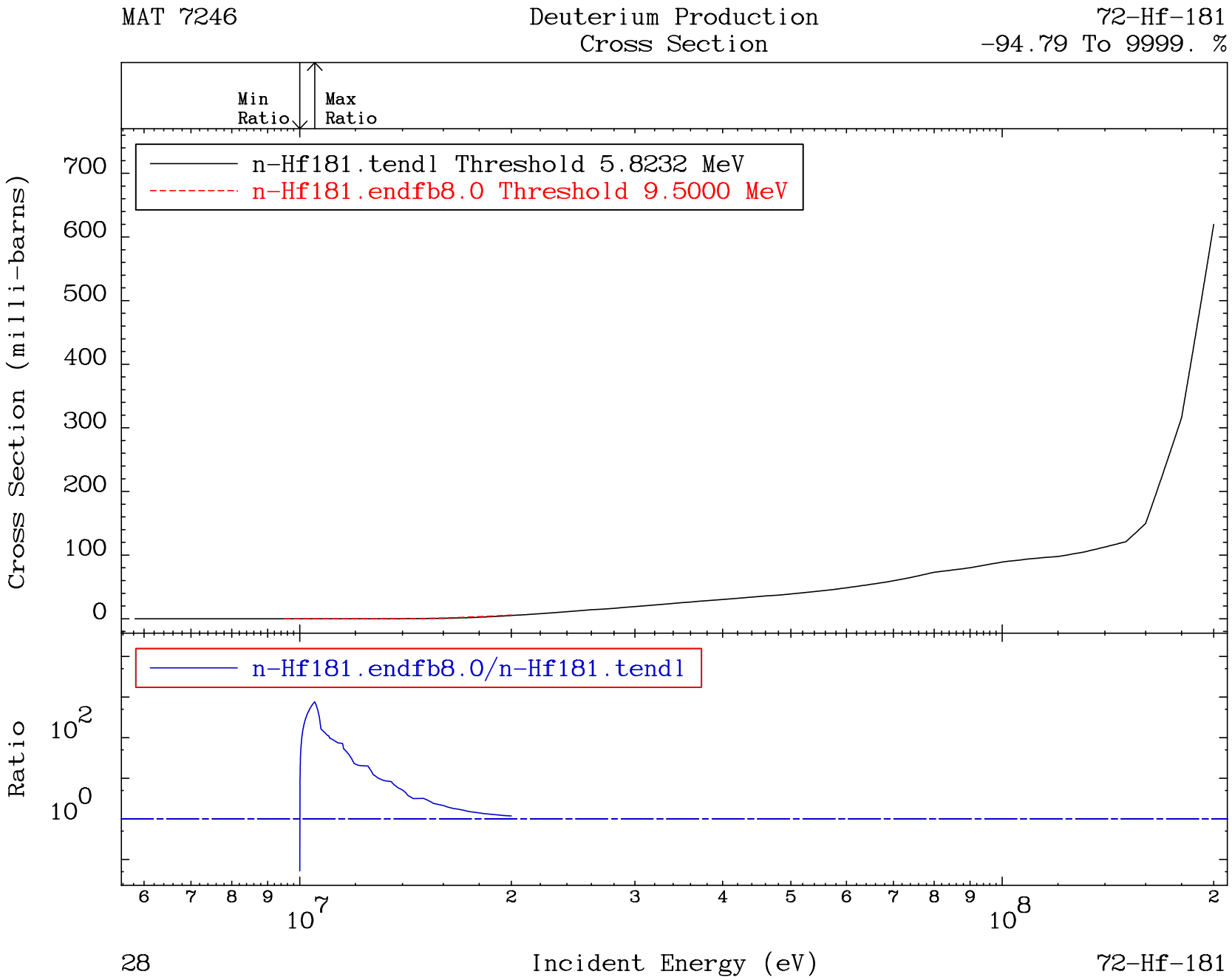

MAT 7246
(n,d)
Cross Section
72-Hf-181
-94.79 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 5.8232 MeV
n-Hf181.endfb8.0 Threshold 9.5000 MeV
Cross Section (milli-barns)
0
2
4
6
8
10
12
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^0
10^2
6 7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
23
Incident Energy (eV)
72-Hf-181

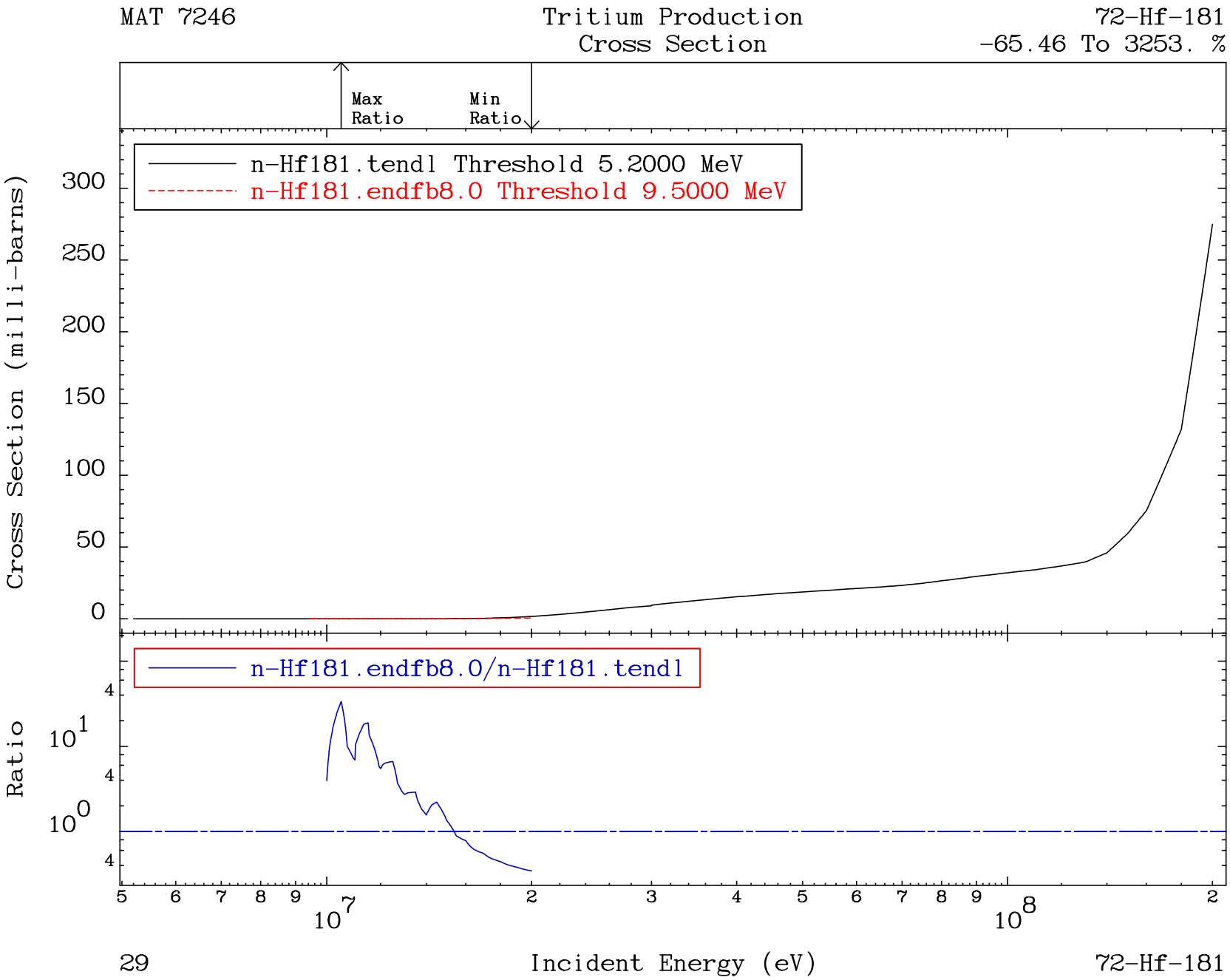

MAT 7246
(n,t)
Cross Section
72-Hf-181
-65.19 To 3253. %
Max Ratio
Min Ratio
n-Hf181.tendl Threshold 5.2515 MeV
n-Hf181.endfb8.0 Threshold 9.5000 MeV
Cross Section (milli-barns)
0
1
2
3
4
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^1
10^0
6 7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
24
Incident Energy (eV)
72-Hf-181

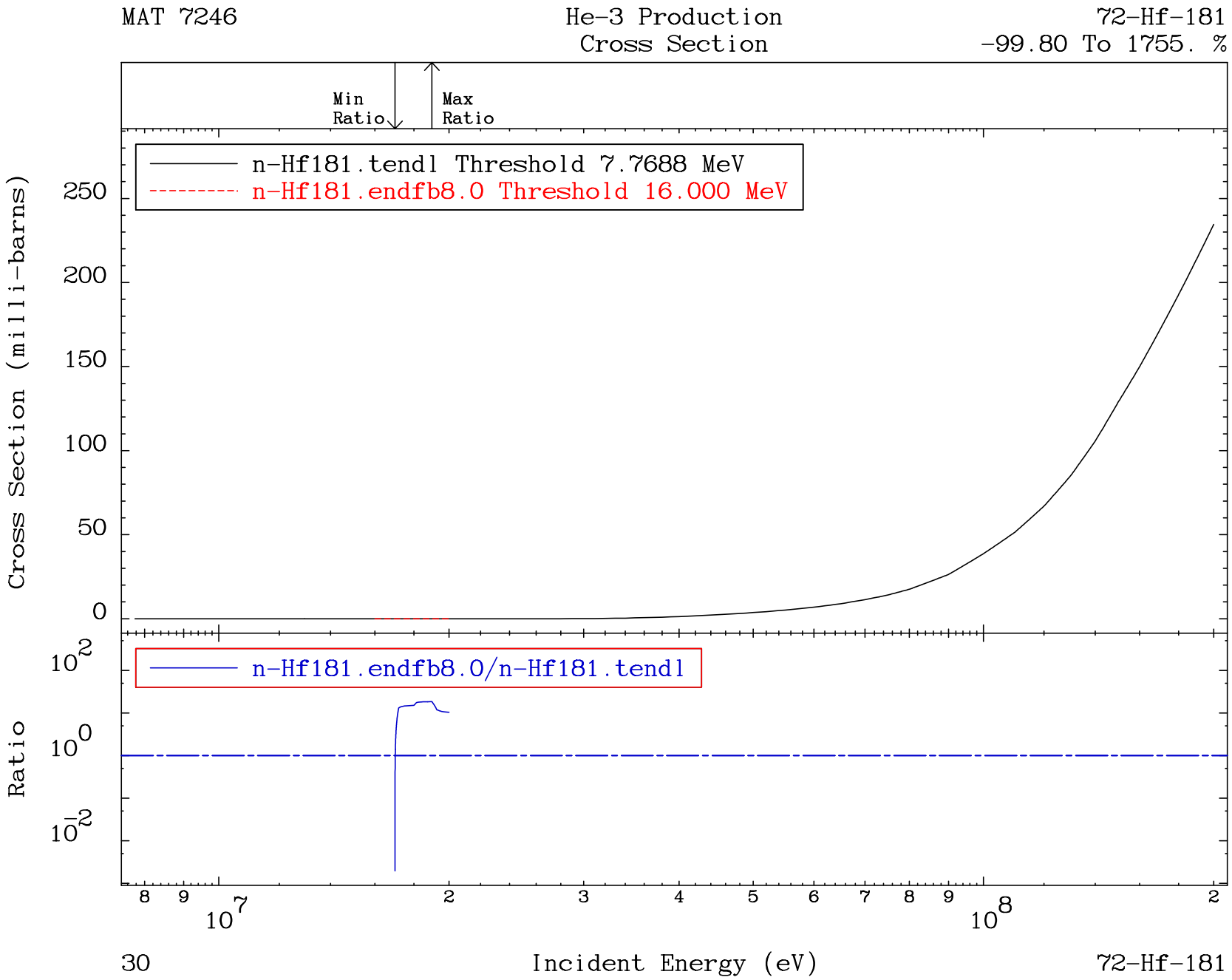

MAT 7246
(n,He-3)
Cross Section
72-Hf-181
-99.80 To 1755. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 7.7688 MeV
n-Hf181.endfb8.0 Threshold 16.000 MeV
Cross Section (micro-barns)
70
60
50
40
30
20
10
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^2
10^0
10^-2
8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
25
Incident Energy (eV)
72-Hf-181

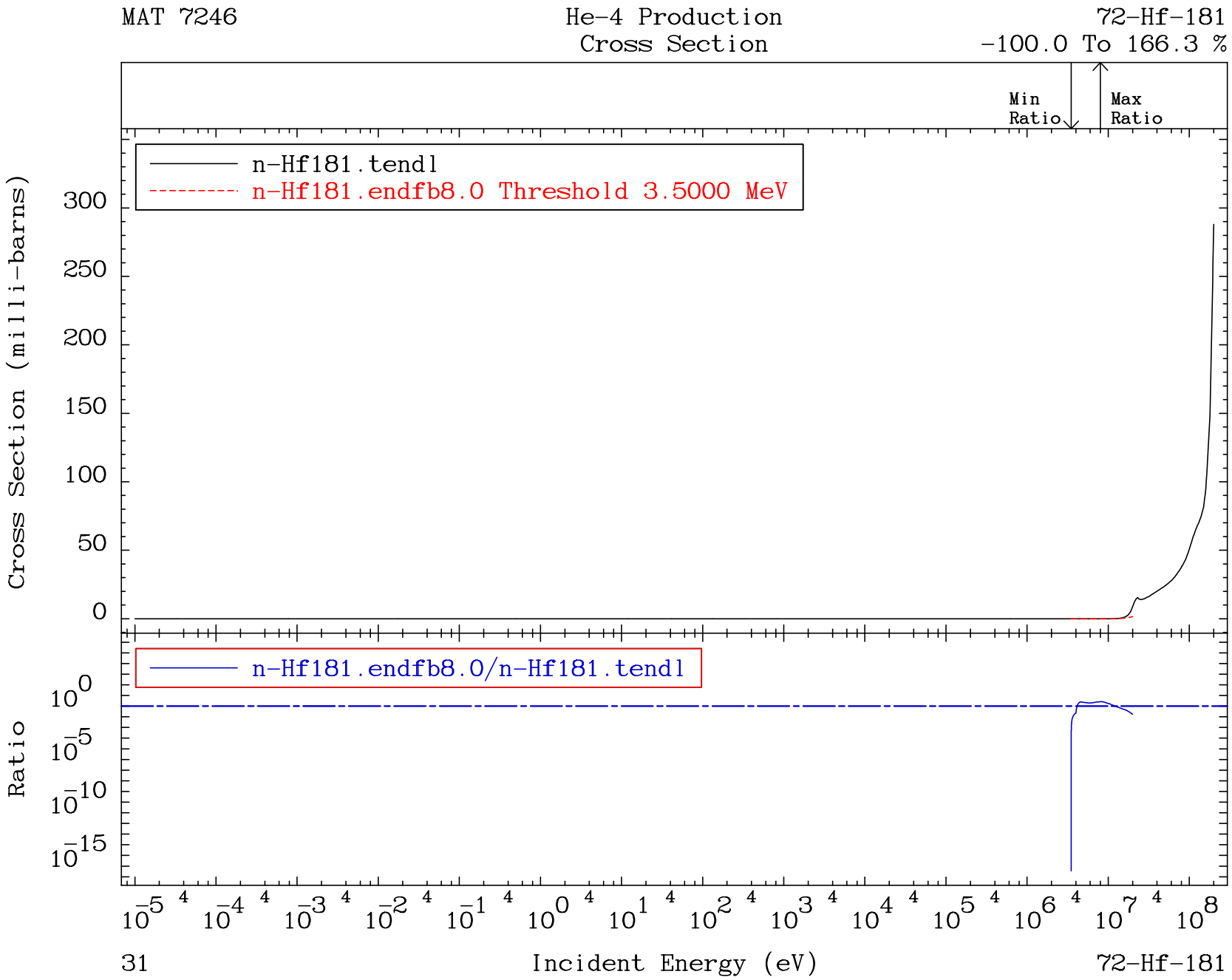

MAT 7246
(n,α)
Cross Section
72-Hf-181
-81.41 To 166.6 %
Max Ratio
Min Ratio
n-Hf181.tendl
n-Hf181.endfb8.0 Threshold 3.5000 MeV
Cross Section (milli-barns)
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
Incident Energy (eV)
26
72-Hf-181

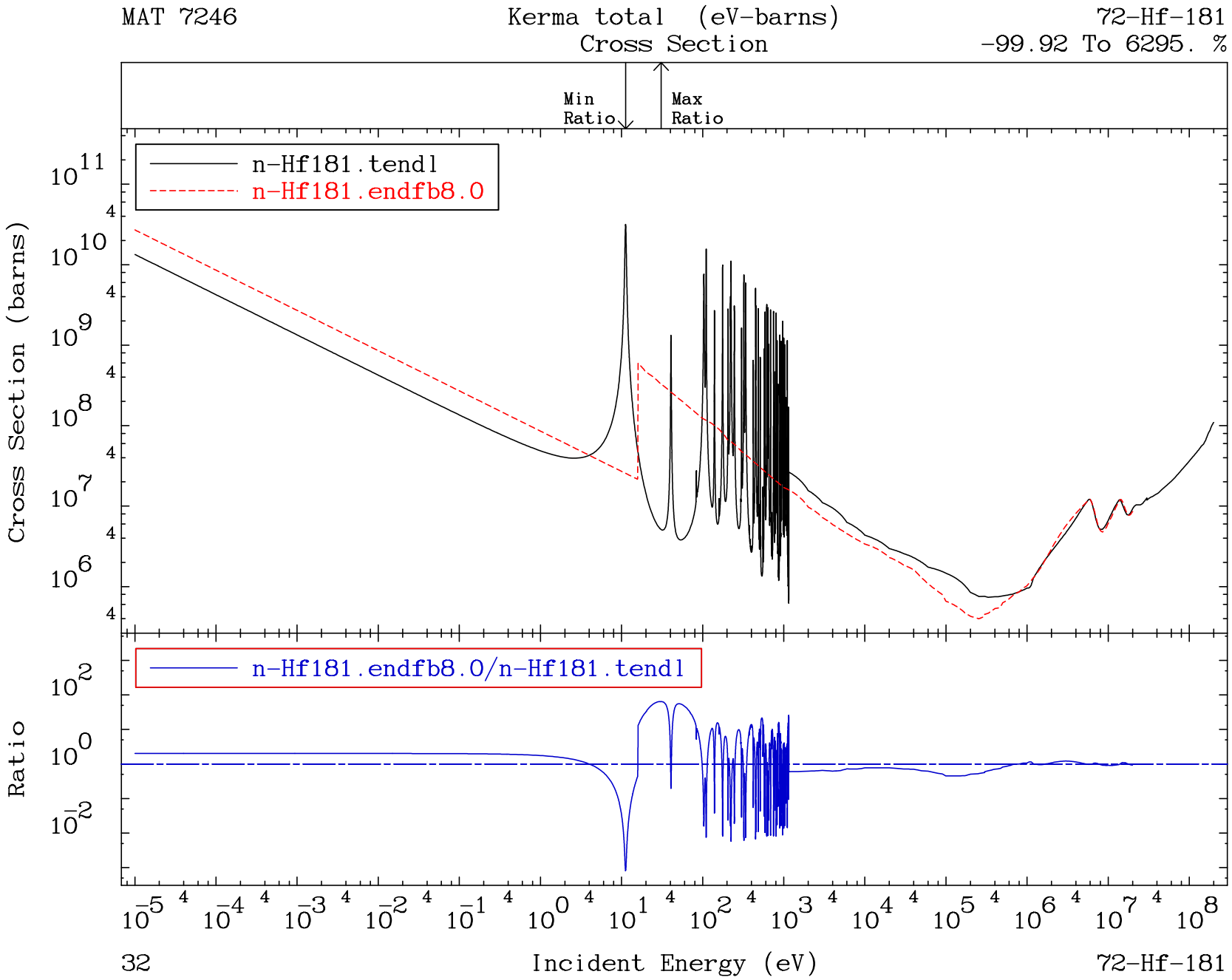

MAT 7246
Hydrogen Production
Cross Section
72-Hf-181
-100.0 To 19.12 %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 1.8332 MeV
n-Hf181.endfb8.0 Threshold 5.2553 MeV
Cross Section (barns)
2.5
2.0
1.5
1.0
0.5
0.0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^0
10^-5
10^-10
10^-15
2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
27
Incident Energy (eV)
72-Hf-181

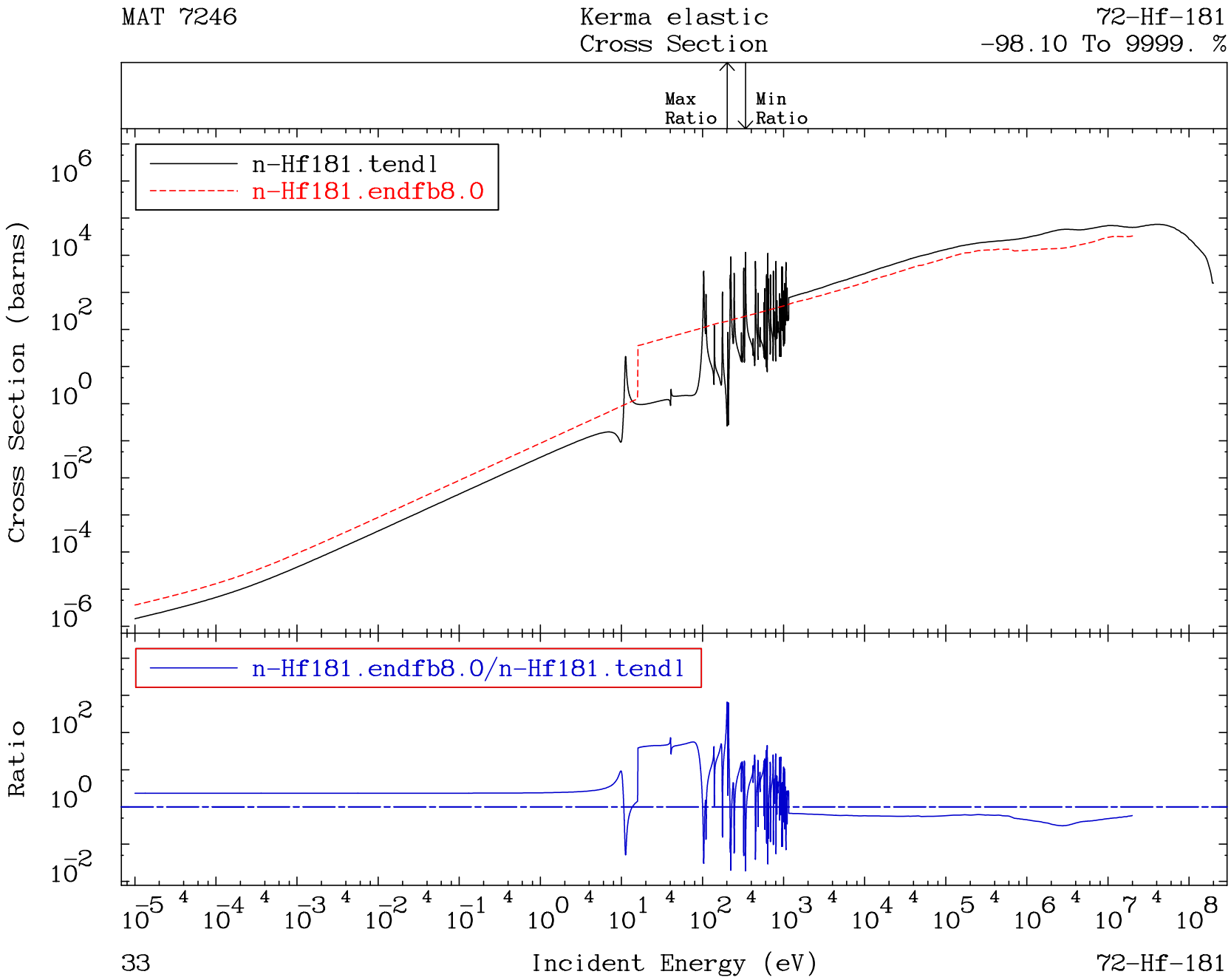

MAT 7246
Deuterium Production
Cross Section
72-Hf-181
-94.79 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 5.8232 MeV
n-Hf181.endfb8.0 Threshold 9.5000 MeV
Cross Section (milli-barns)
700
600
500
400
300
200
100
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^2
10^0
6 7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
28
Incident Energy (eV)
72-Hf-181

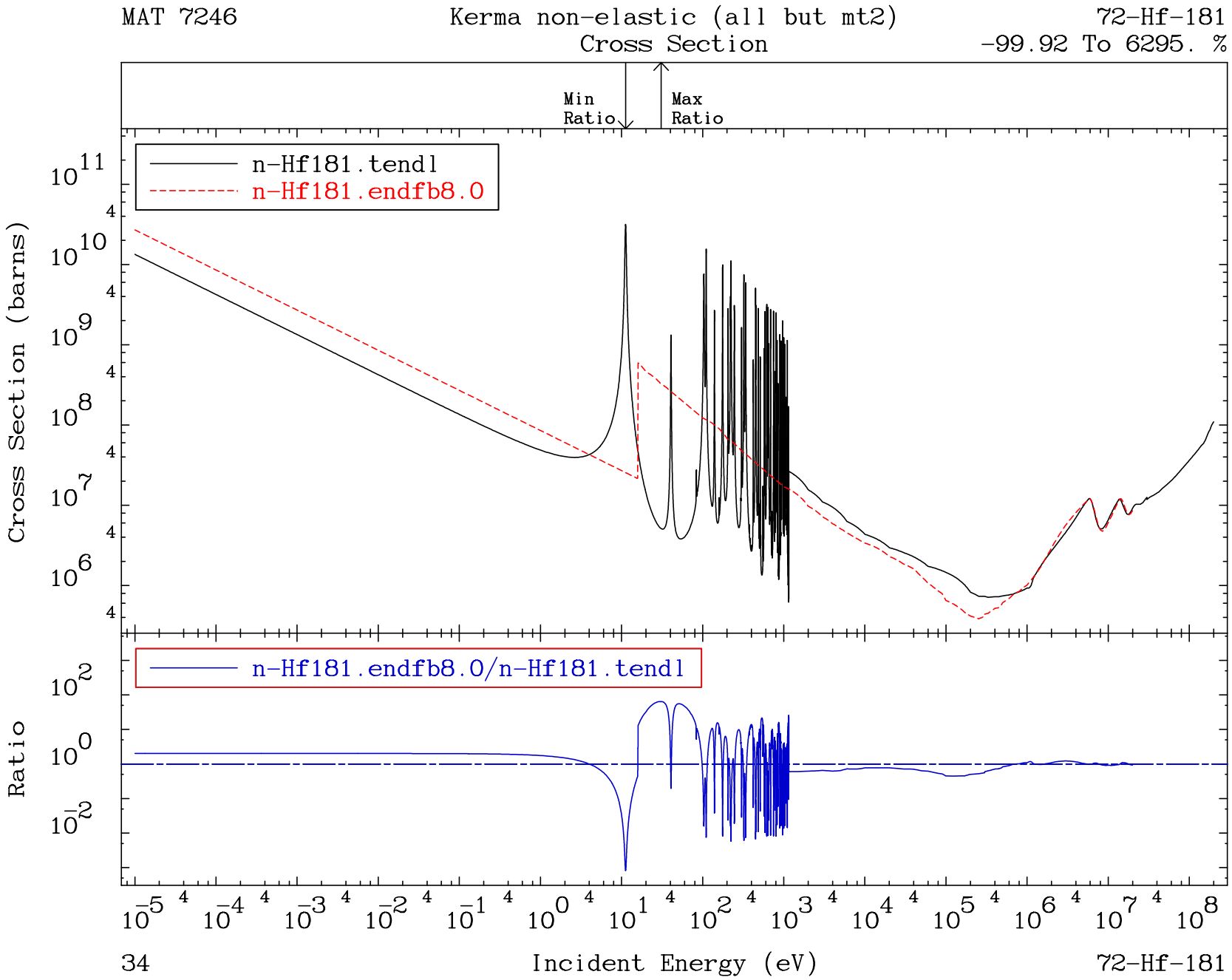

MAT 7246
Tritium Production
Cross Section
72-Hf-181
-65.46 To 3253. %
Max Ratio
Min Ratio
n-Hf181.tendl Threshold 5.2000 MeV
n-Hf181.endfb8.0 Threshold 9.5000 MeV
Cross Section (milli-barns)
300
250
200
150
100
50
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^1
10^0
5 6 7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
29
Incident Energy (eV)
72-Hf-181

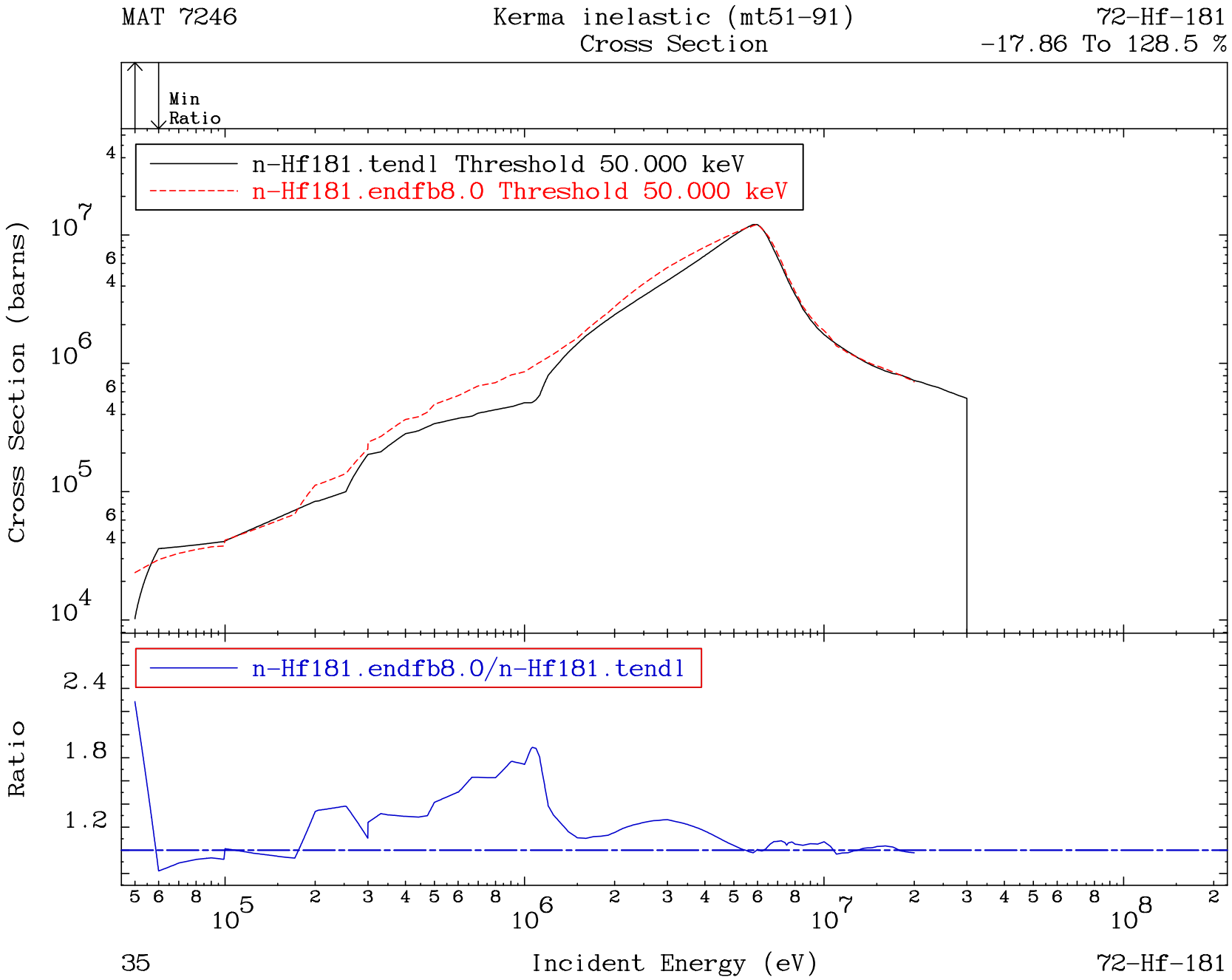

MAT 7246
He-3 Production
Cross Section
72-Hf-181
-99.80 To 1755. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 7.7688 MeV
n-Hf181.endfb8.0 Threshold 16.000 MeV
Cross Section (milli-barns)
250
200
150
100
50
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^2
10^0
10^-2
8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
30
Incident Energy (eV)
72-Hf-181

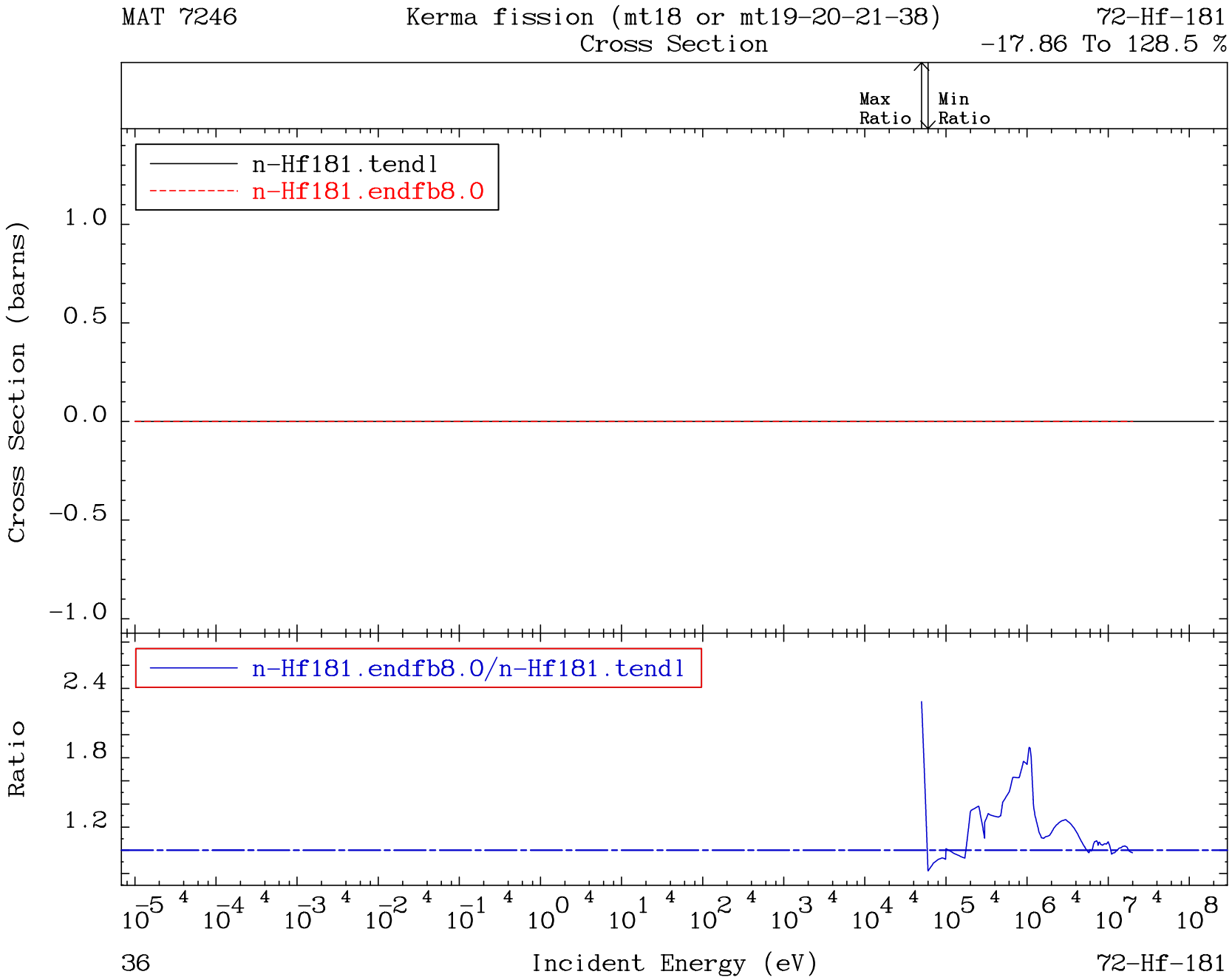

MAT 7246
He-4 Production
Cross Section
72-Hf-181
-100.0 To 166.3 %
Min Ratio
Max Ratio
n-Hf181.tendl
n-Hf181.endfb8.0 Threshold 3.5000 MeV
Cross Section (milli-barns)
300
250
200
150
100
50
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^0
10^-5
10^-10
10^-15
10^-5 10^-4 10^-3 10^-2 10^-1 10^0 10^1 10^2 10^3 10^4 10^5 10^6 10^7 10^8
31
Incident Energy (eV)
72-Hf-181

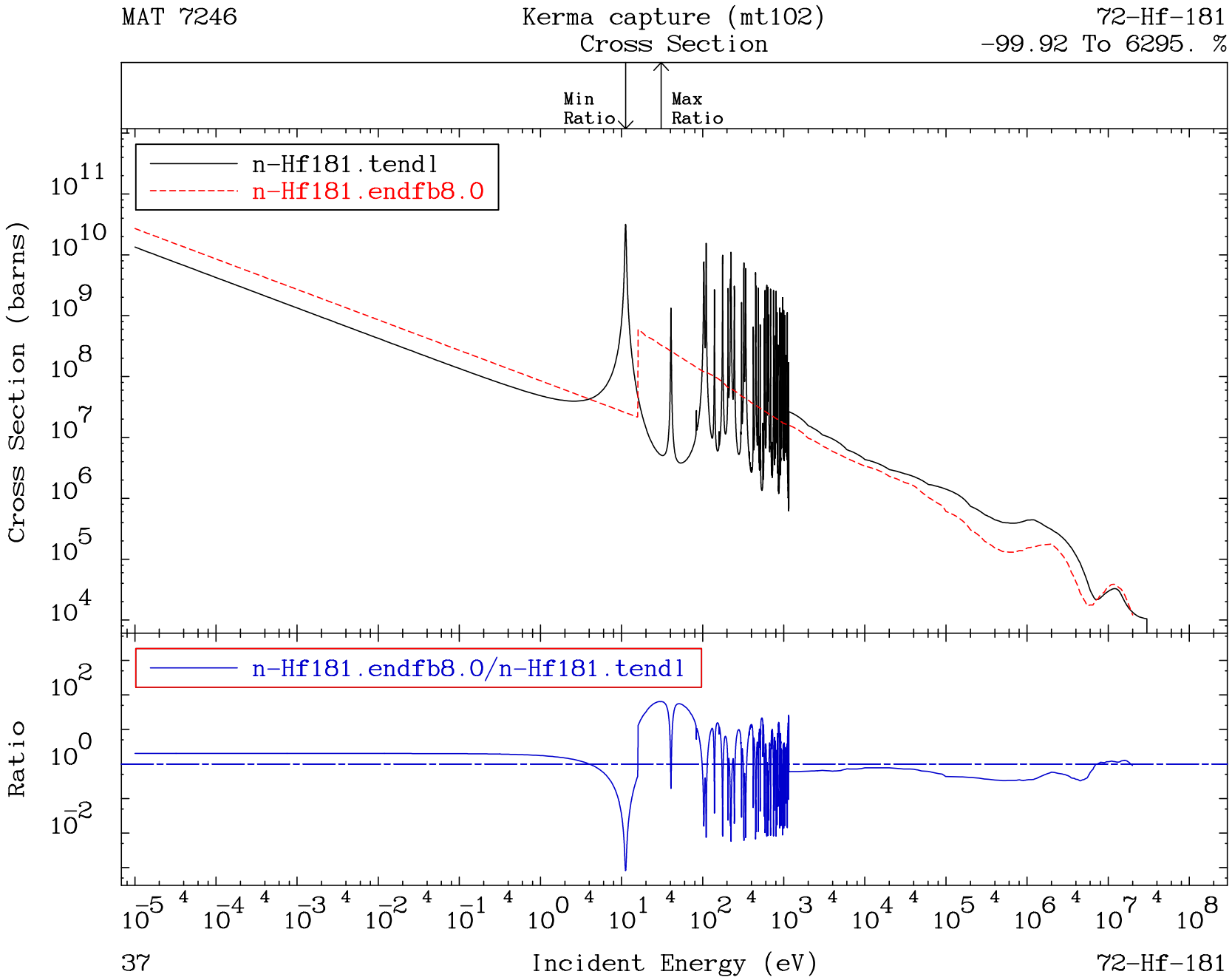

MAT 7246
Kerma total (eV-barns)
Cross Section
72-Hf-181
-99.92 To 6295. %
Min Ratio
Max Ratio
n-Hf181.tendl
n-Hf181.endfb8.0
Cross Section (barns)
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
Incident Energy (eV)
32
72-Hf-181

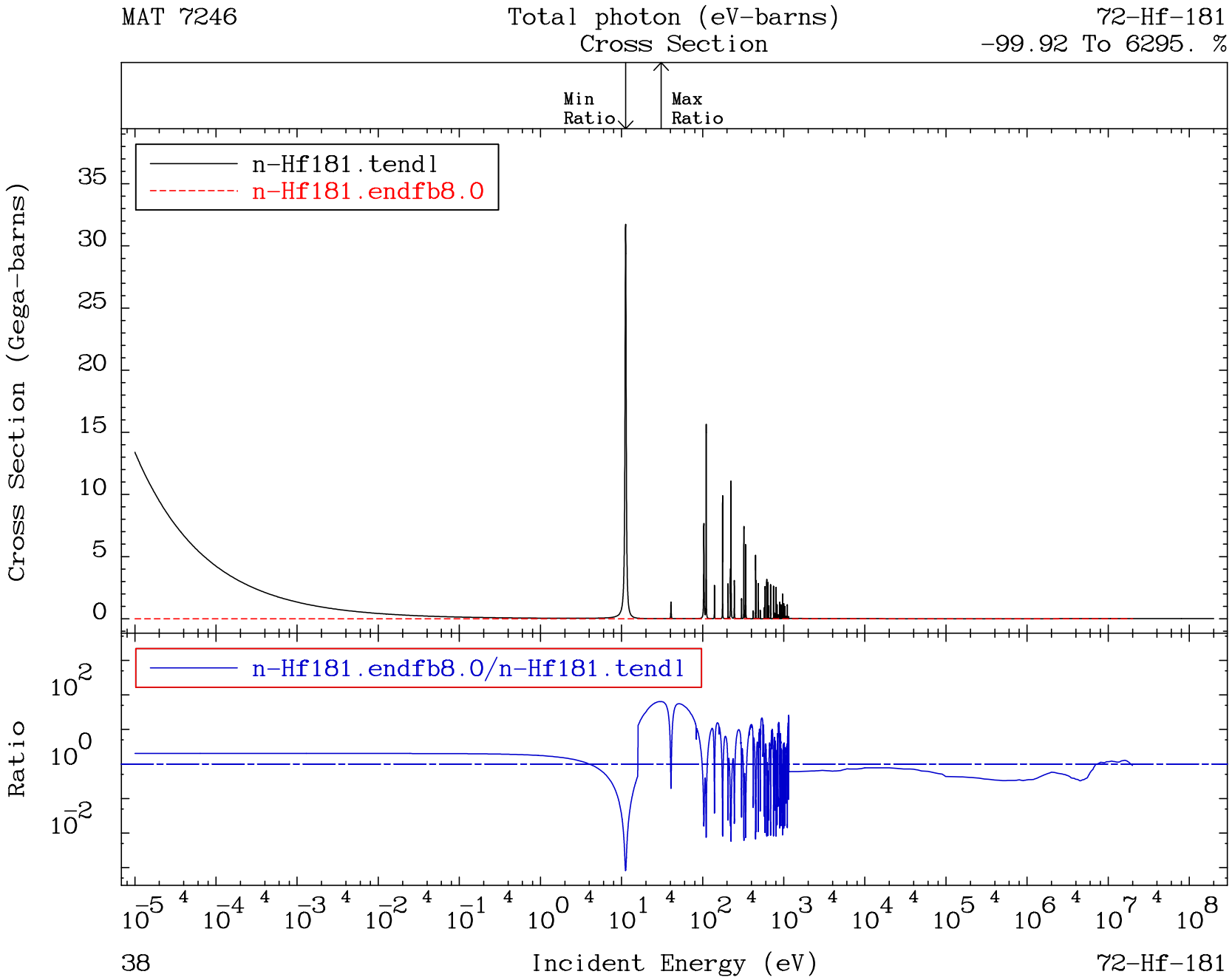

MAT 7246
Kerma elastic
Cross Section
72-Hf-181
-98.10 To 9999. %
Max
Ratio
Min
Ratio
n-Hf181.tendl
n-Hf181.endfb8.0
Cross Section (barns)
Ratio
n-Hf181.endfb8.0/n-Hf181.tendl
Incident Energy (eV)
33
72-Hf-181

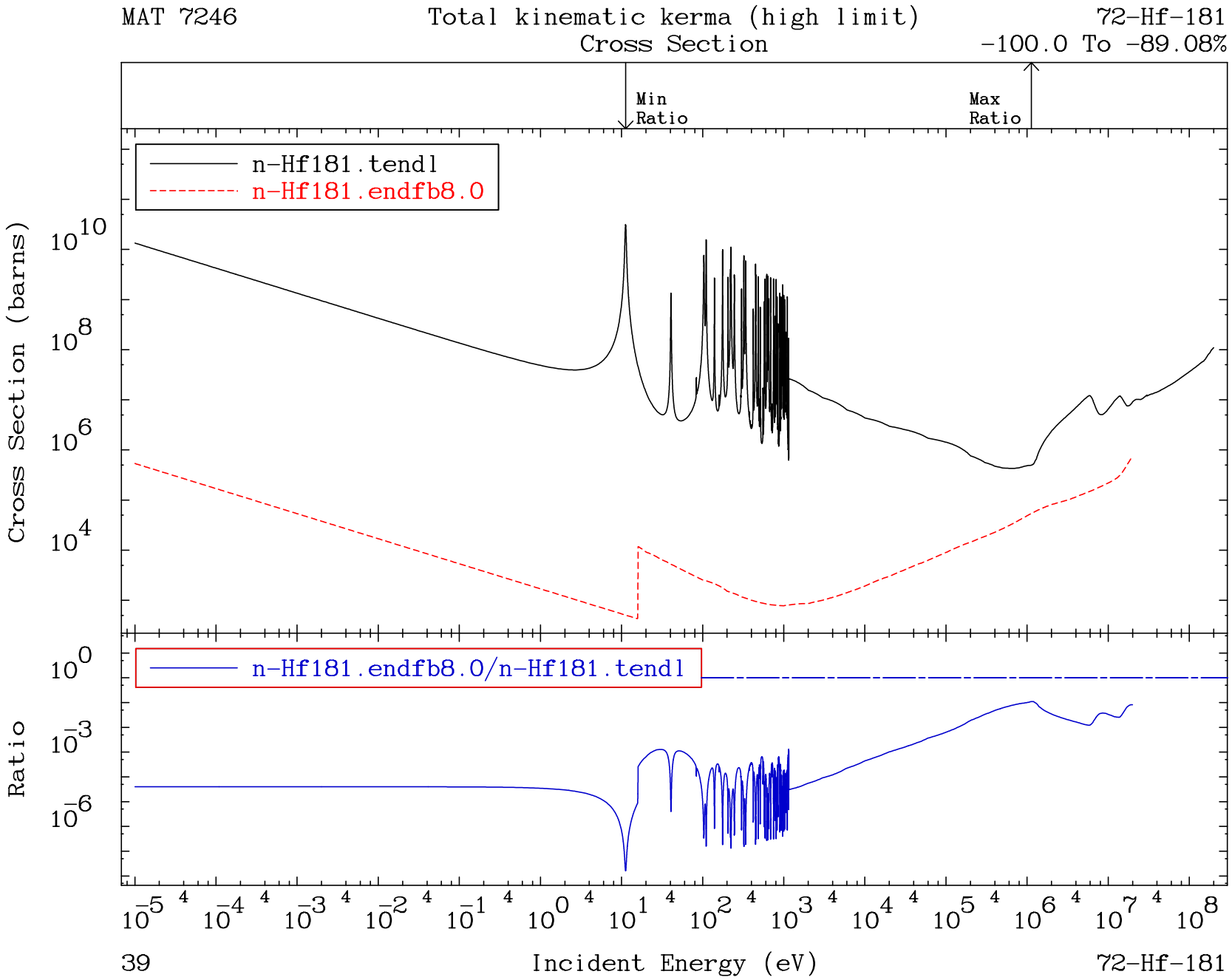

MAT 7246
Kerma non-elastic (all but mt2)
Cross Section
72-Hf-181
-99.92 To 6295. %
Min Ratio
Max Ratio
n-Hf181.tendl
n-Hf181.endfb8.0
Cross Section (barns)
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
34
Incident Energy (eV)
72-Hf-181

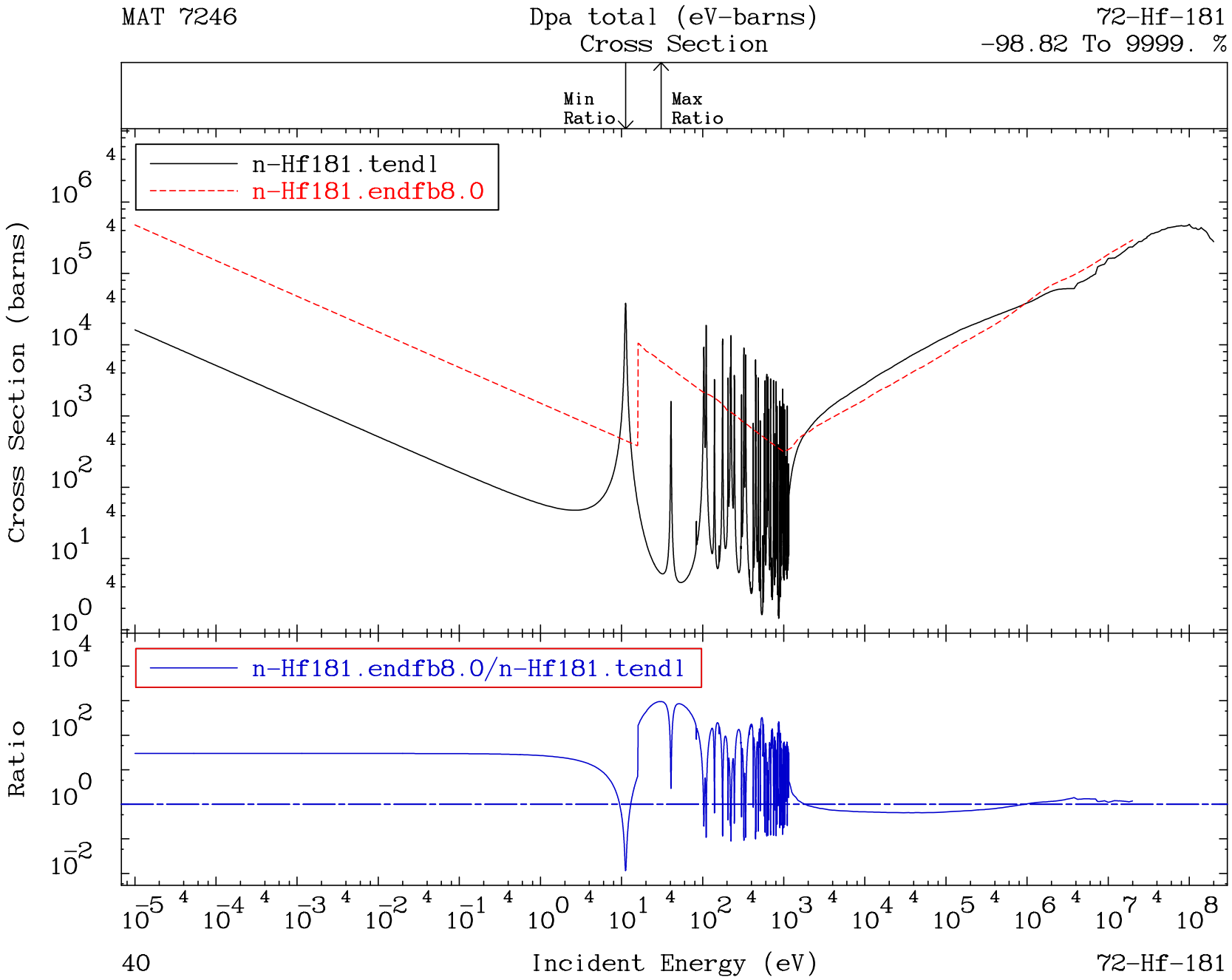

MAT 7246
Kerma inelastic (mt51-91)
Cross Section
72-Hf-181
-17.86 To 128.5 %
Min
Ratio
n-Hf181.tendl Threshold 50.000 keV
n-Hf181.endfb8.0 Threshold 50.000 keV
Cross Section (barns)
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
Incident Energy (eV)
35
72-Hf-181

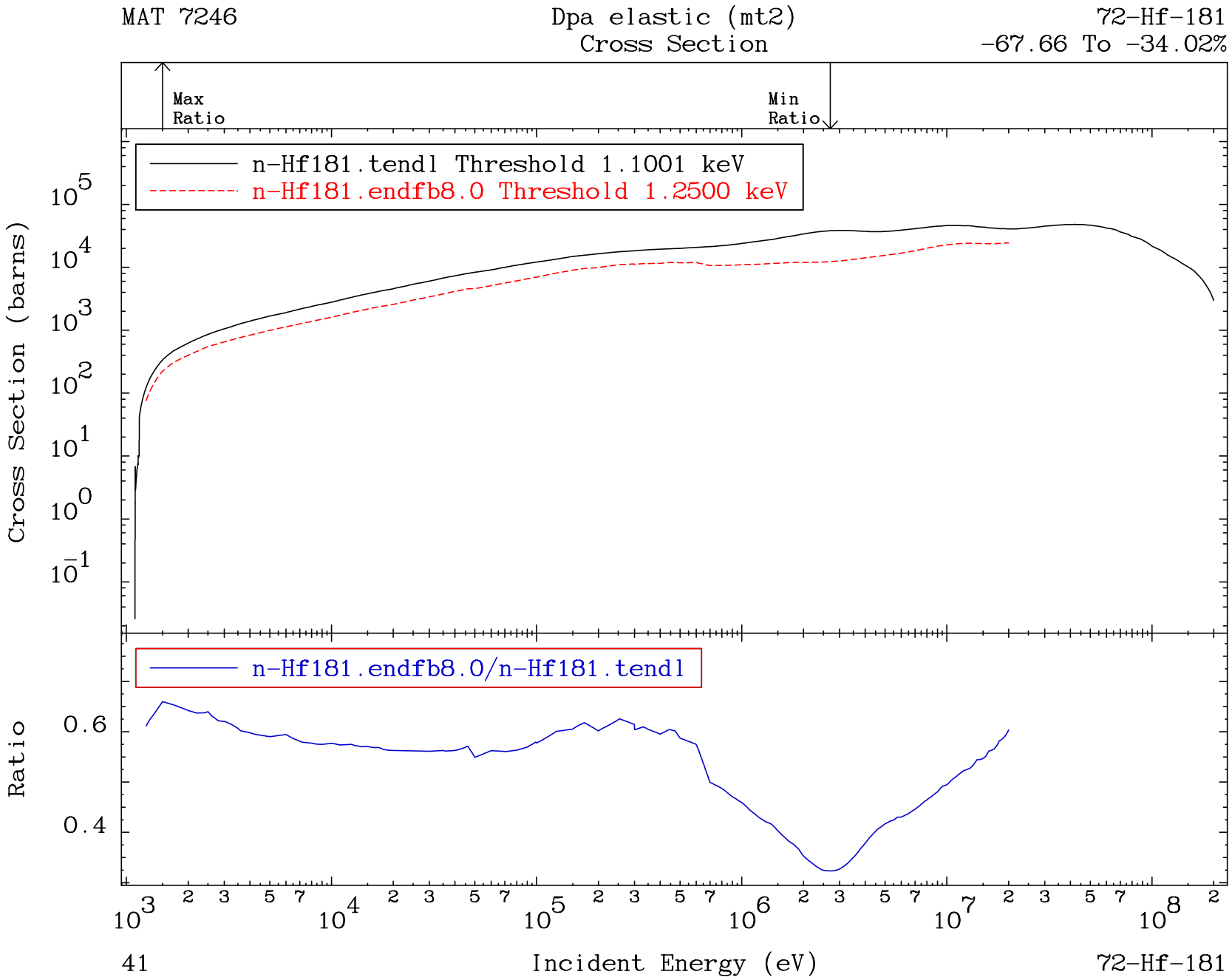

MAT 7246
Kerma fission (mt18 or mt19-20-21-38)
Cross Section
72-Hf-181
-17.86 To 128.5 %
Max Ratio
Min Ratio
n-Hf181.tendl
n-Hf181.endfb8.0
Cross Section (barns)
1.0
0.5
0.0
-0.5
-1.0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
2.4
1.8
1.2
10^-5 10^-4 10^-3 10^-2 10^-1 10^0 10^1 10^2 10^3 10^4 10^5 10^6 10^7 10^8
36
Incident Energy (eV)
72-Hf-181

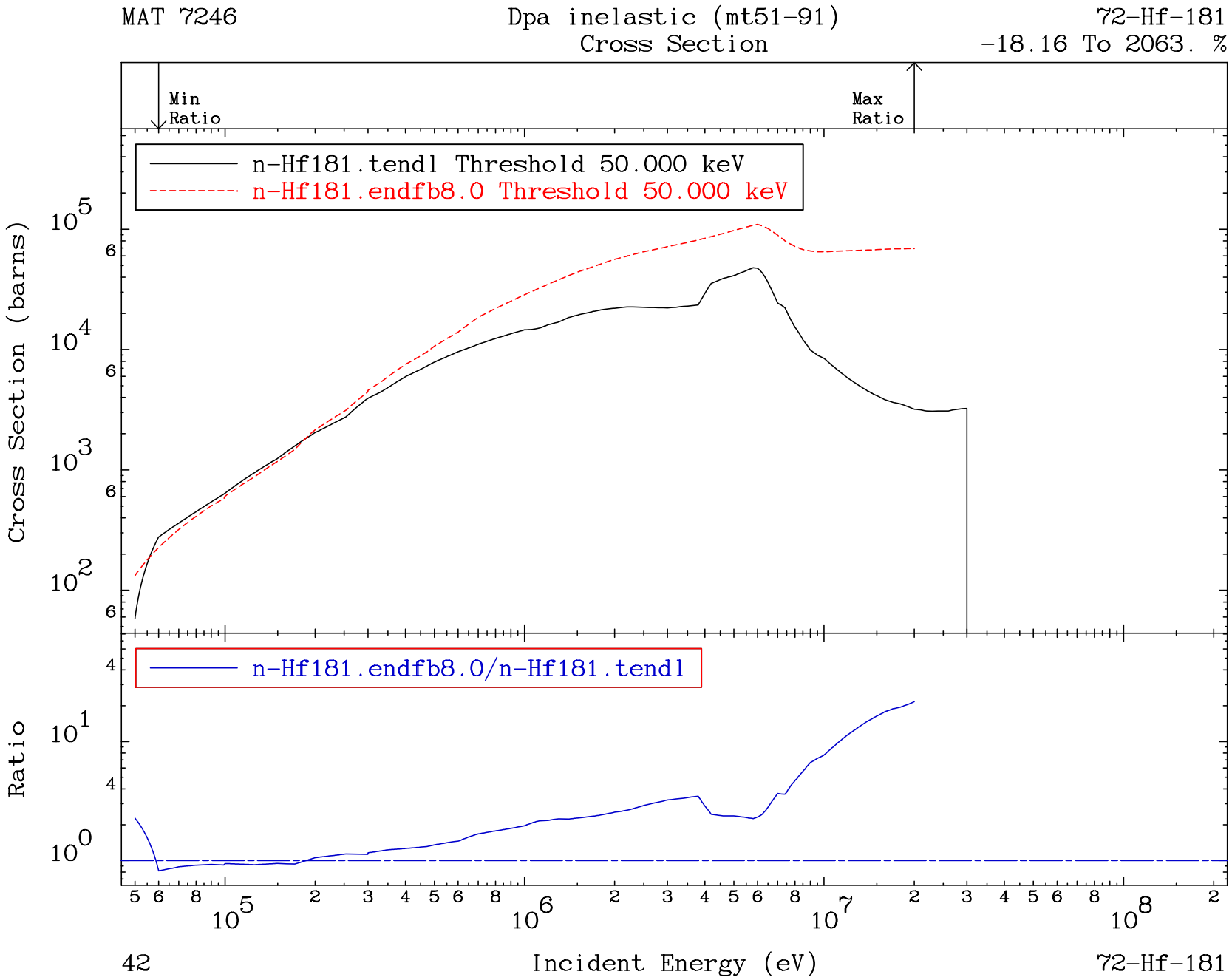

MAT 7246
Kerma capture (mt102)
Cross Section
72-Hf-181
-99.92 To 6295. %
Min Ratio
Max Ratio
n-Hf181.tendl
n-Hf181.endfb8.0
Cross Section (barns)
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
Incident Energy (eV)
37
72-Hf-181

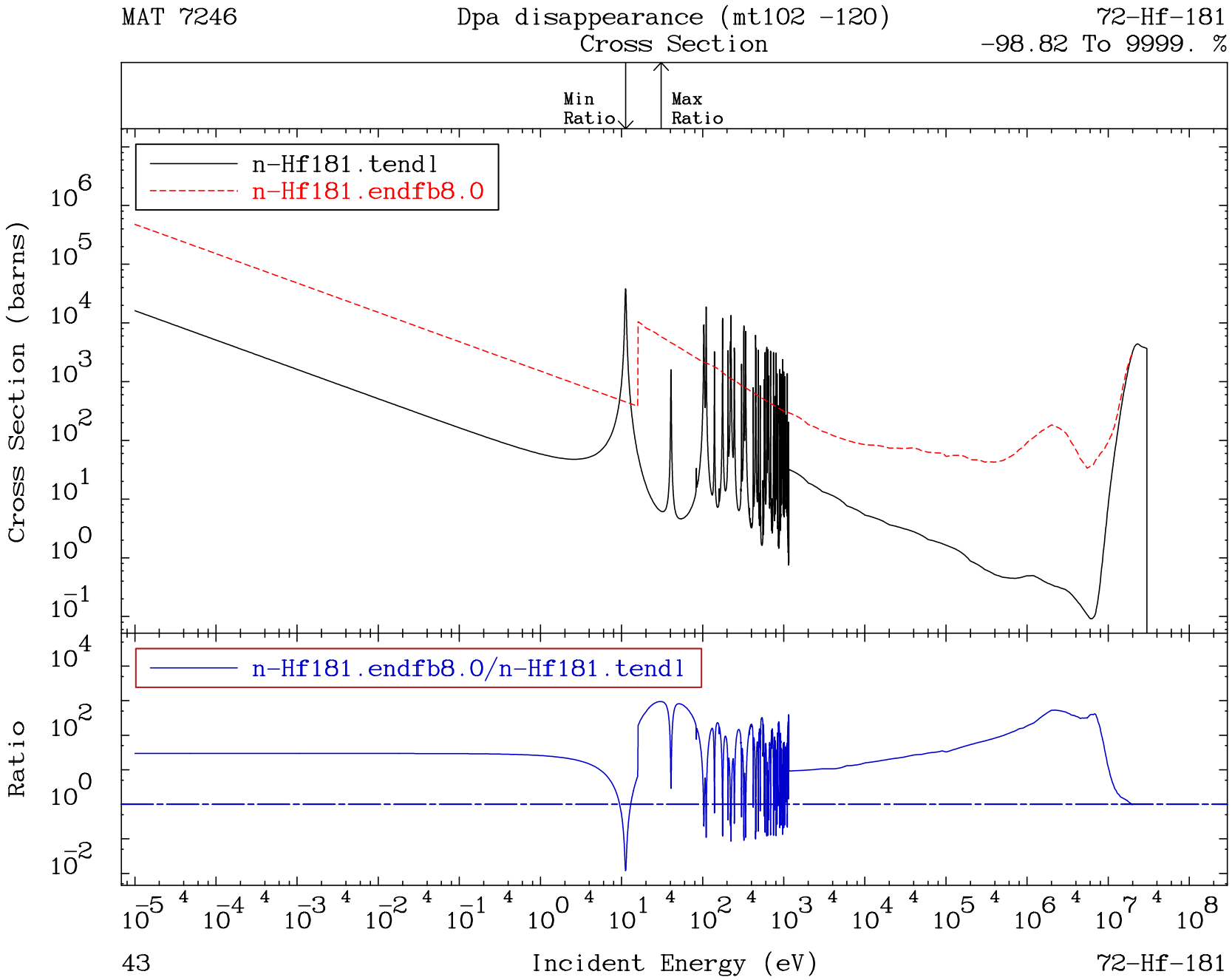

MAT 7246
Total photon (eV-barns)
Cross Section
72-Hf-181
-99.92 To 6295. %
Min Ratio
Max Ratio
n-Hf181.tendl
n-Hf181.endfb8.0
Cross Section (Giga-barns)
35
30
25
20
15
10
5
0
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^2
10^0
10^-2
10^-5 10^-4 10^-3 10^-2 10^-1 10^0 10^1 10^2 10^3 10^4 10^5 10^6 10^7 10^8
38
Incident Energy (eV)
72-Hf-181


MAT 7246
Total kinematic kerma (high limit)
Cross Section
72-Hf-181
-100.0 To -89.08%
Min Ratio
Max Ratio
n-Hf181.tendl
n-Hf181.endfb8.0
Cross Section (barns)
10^10
10^8
10^6
10^4
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
10^0
10^-3
10^-6
10^-5 10^-4 10^-3 10^-2 10^-1 10^0 10^1 10^2 10^3 10^4 10^5 10^6 10^7 10^8
39
Incident Energy (eV)
72-Hf-181


MAT 7246
Dpa total (eV-barns)
Cross Section
72-Hf-181
-98.82 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl
n-Hf181.endfb8.0
Cross Section (barns)
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
Incident Energy (eV)
40
72-Hf-181


MAT 7246
Dpa elastic (mt2)
Cross Section
72-Hf-181
-67.66 To -34.02%
Max Ratio
Min Ratio
n-Hf181.tendl Threshold 1.1001 keV
n-Hf181.endfb8.0 Threshold 1.2500 keV
Cross Section (barns)
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
Incident Energy (eV)
41
72-Hf-181


MAT 7246
Dpa inelastic (mt51-91)
Cross Section
72-Hf-181
-18.16 To 2063. %
Min Ratio
Max Ratio
n-Hf181.tendl Threshold 50.000 keV
n-Hf181.endfb8.0 Threshold 50.000 keV
Cross Section (barns)
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
Incident Energy (eV)
42
72-Hf-181


MAT 7246
Dpa disappearance (mt102 -120)
Cross Section
72-Hf-181
-98.82 To 9999. %
Min Ratio
Max Ratio
n-Hf181.tendl
n-Hf181.endfb8.0
Cross Section (barns)
n-Hf181.endfb8.0/n-Hf181.tendl
Ratio
Incident Energy (eV)
43
72-Hf-181