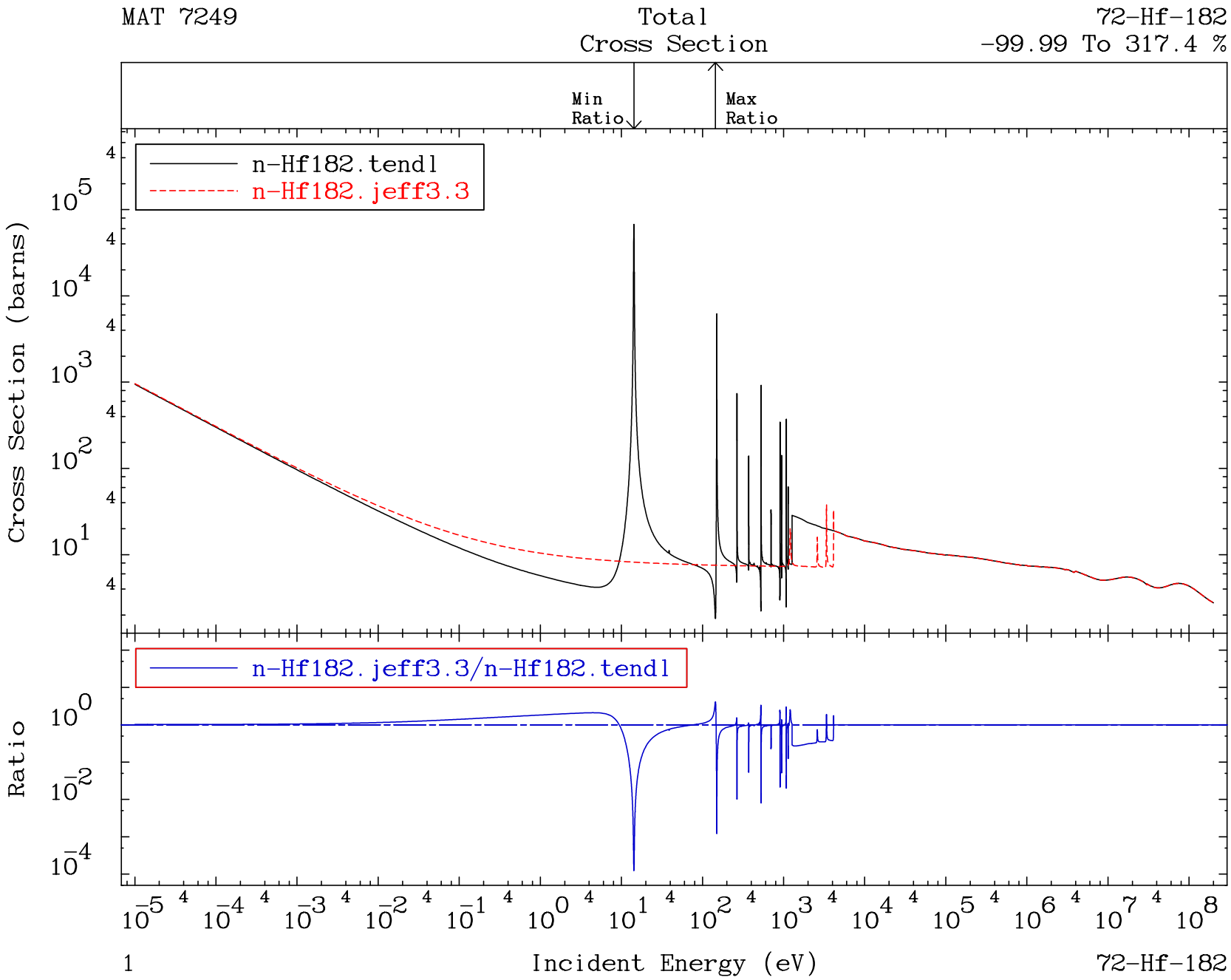
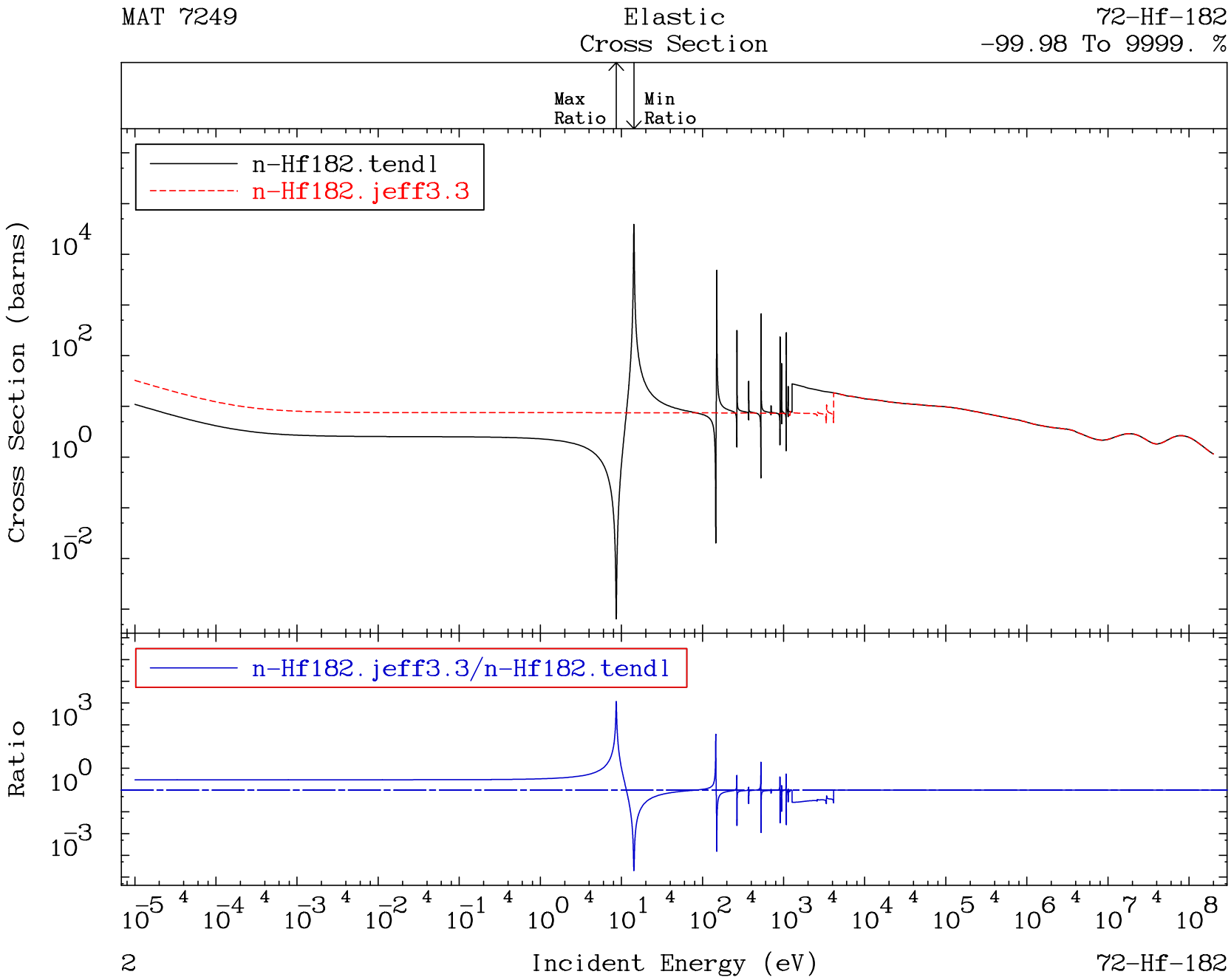
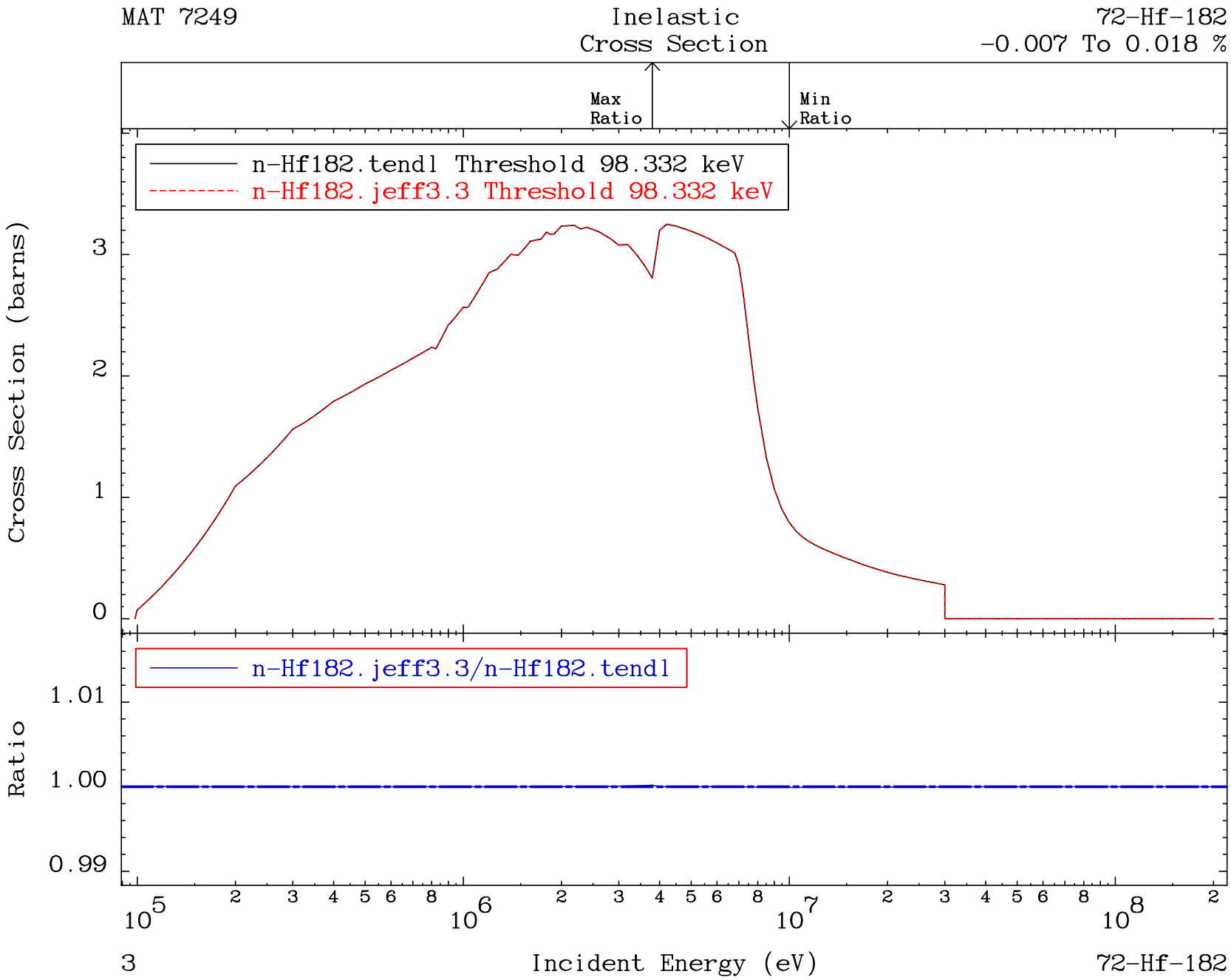
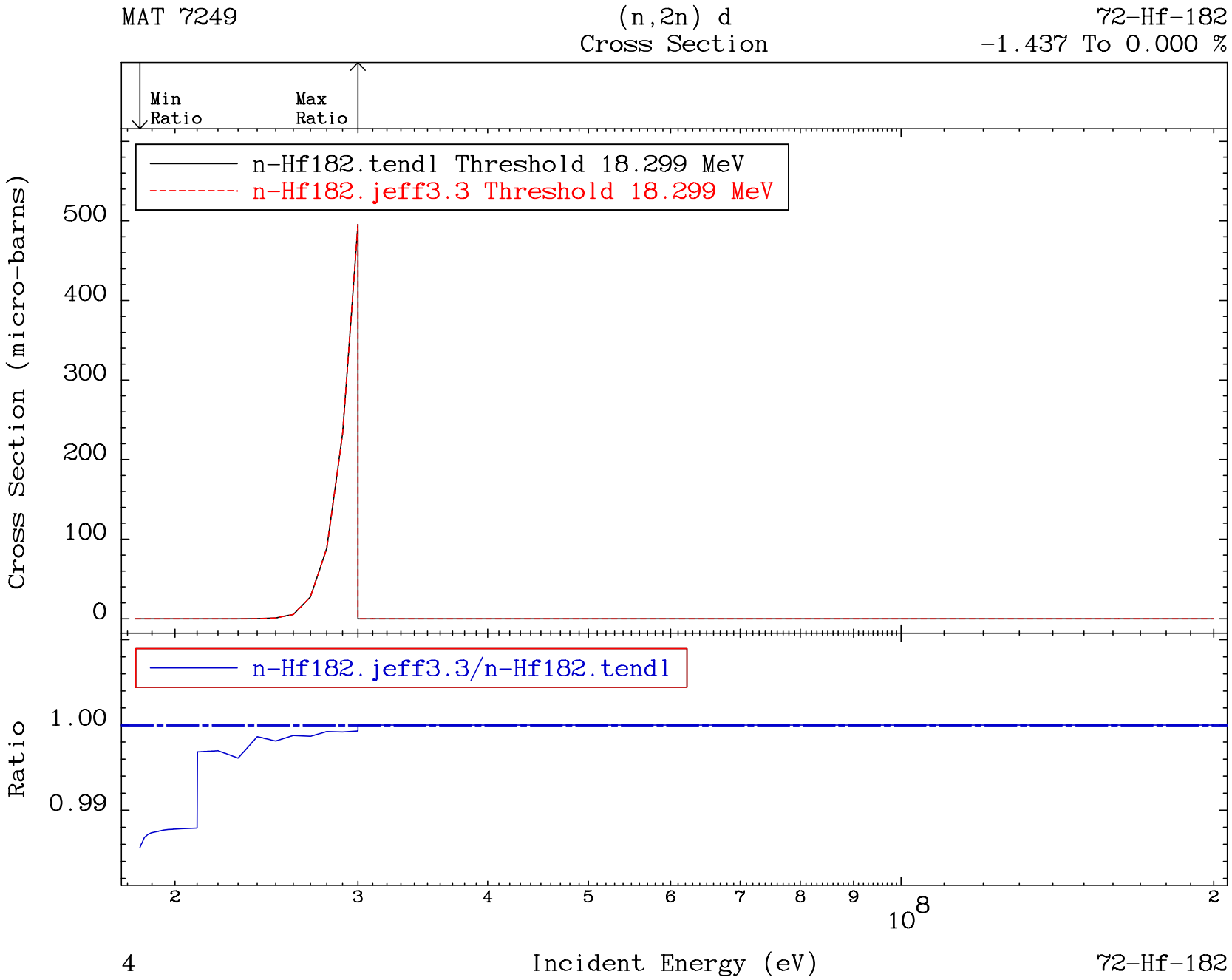
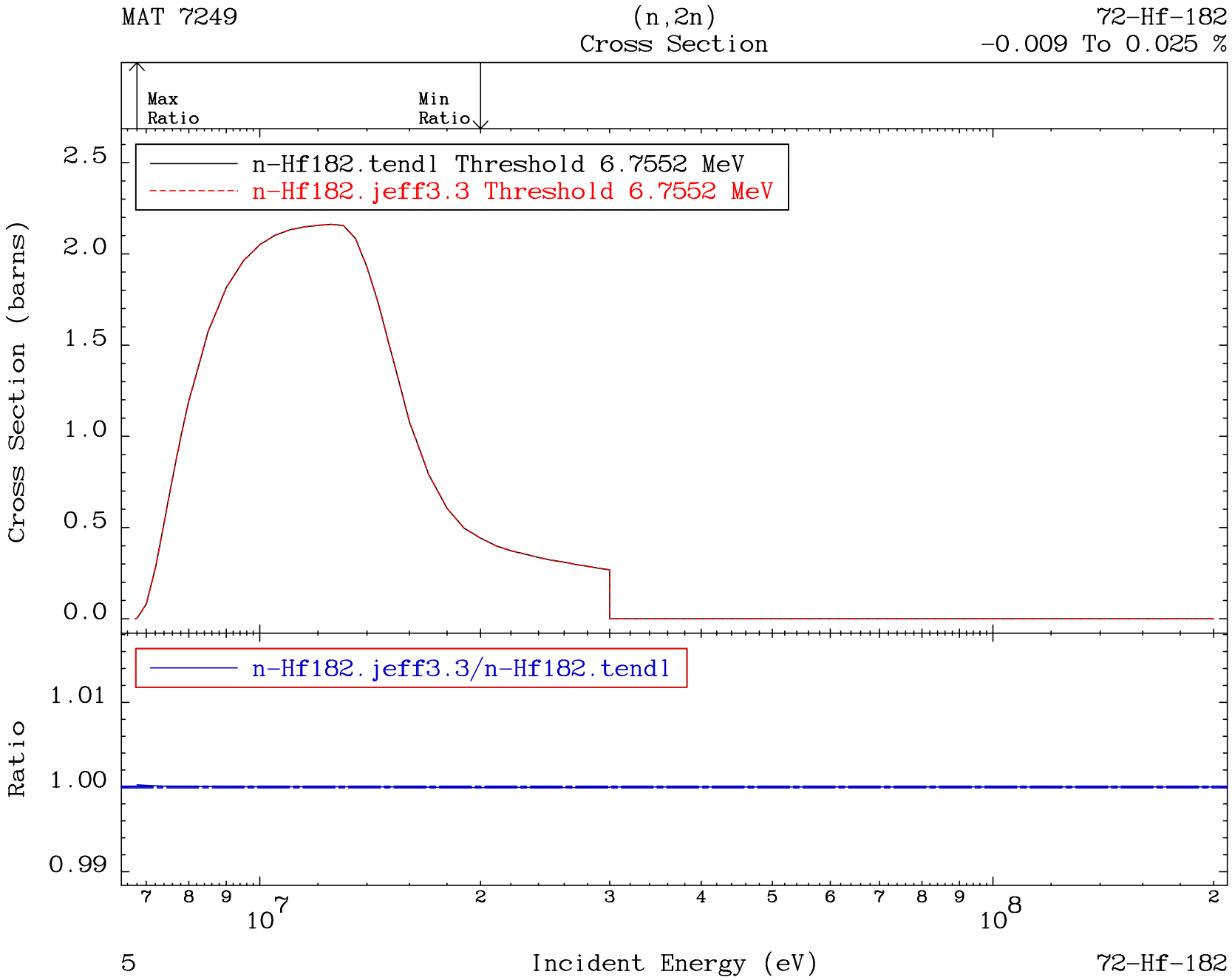
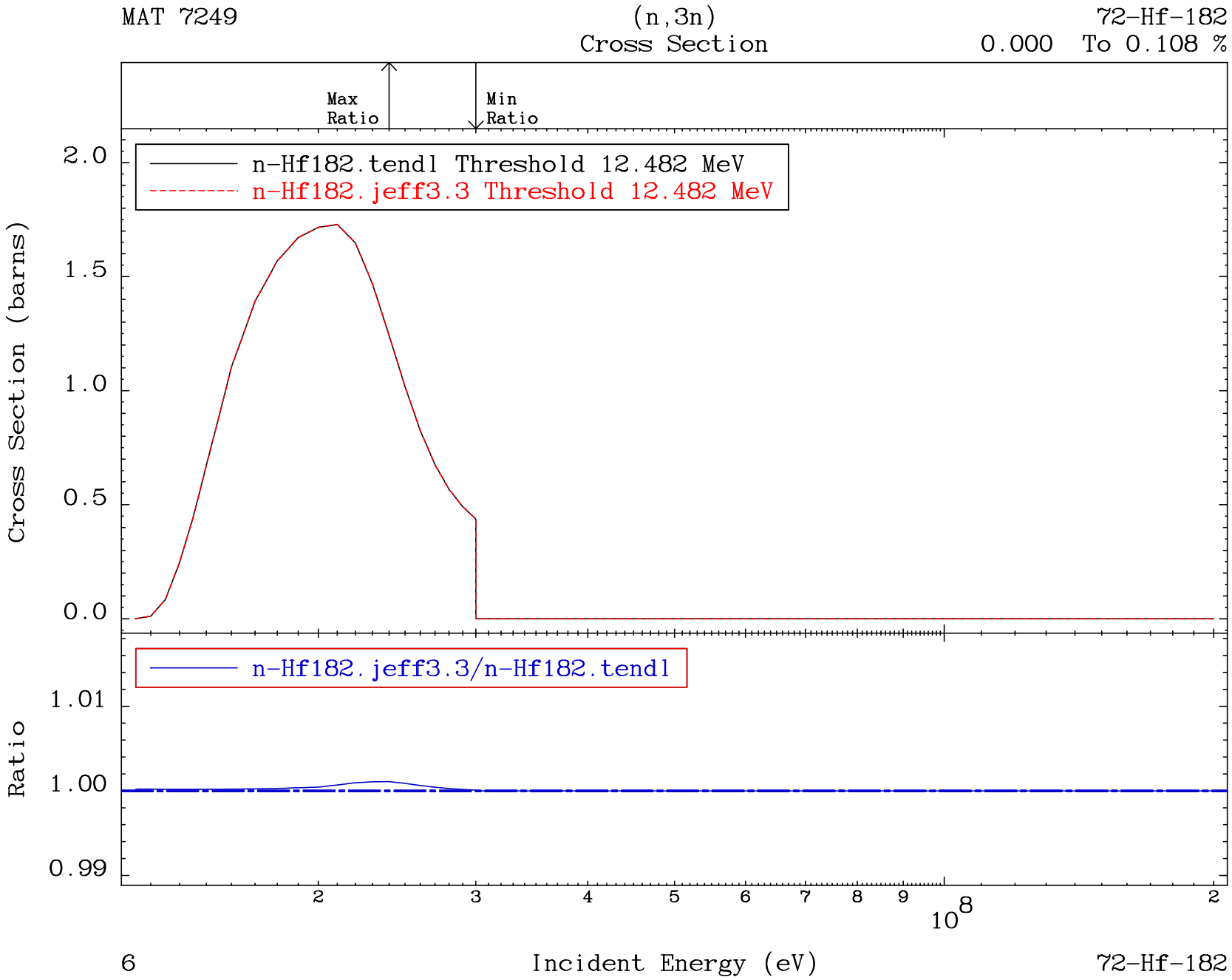

MAT 7249
Total
Cross Section
72-Hf-182
-99.99 To 317.4 %
Min
Ratio
Max
Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
1
72-Hf-182

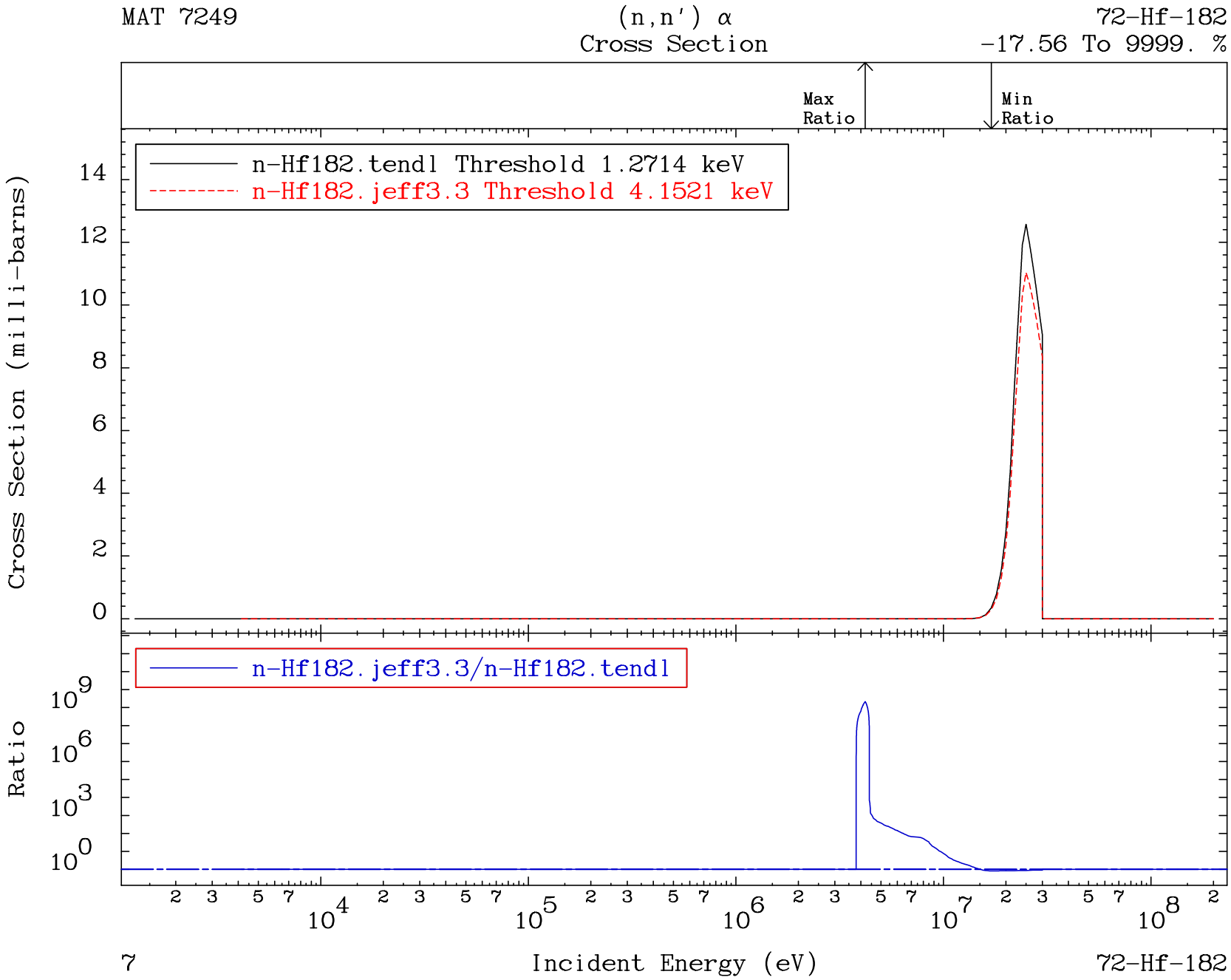

MAT 7249
Elastic
Cross Section
72-Hf-182
-99.98 To 9999. %
Max
Ratio
Min
Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
2
72-Hf-182

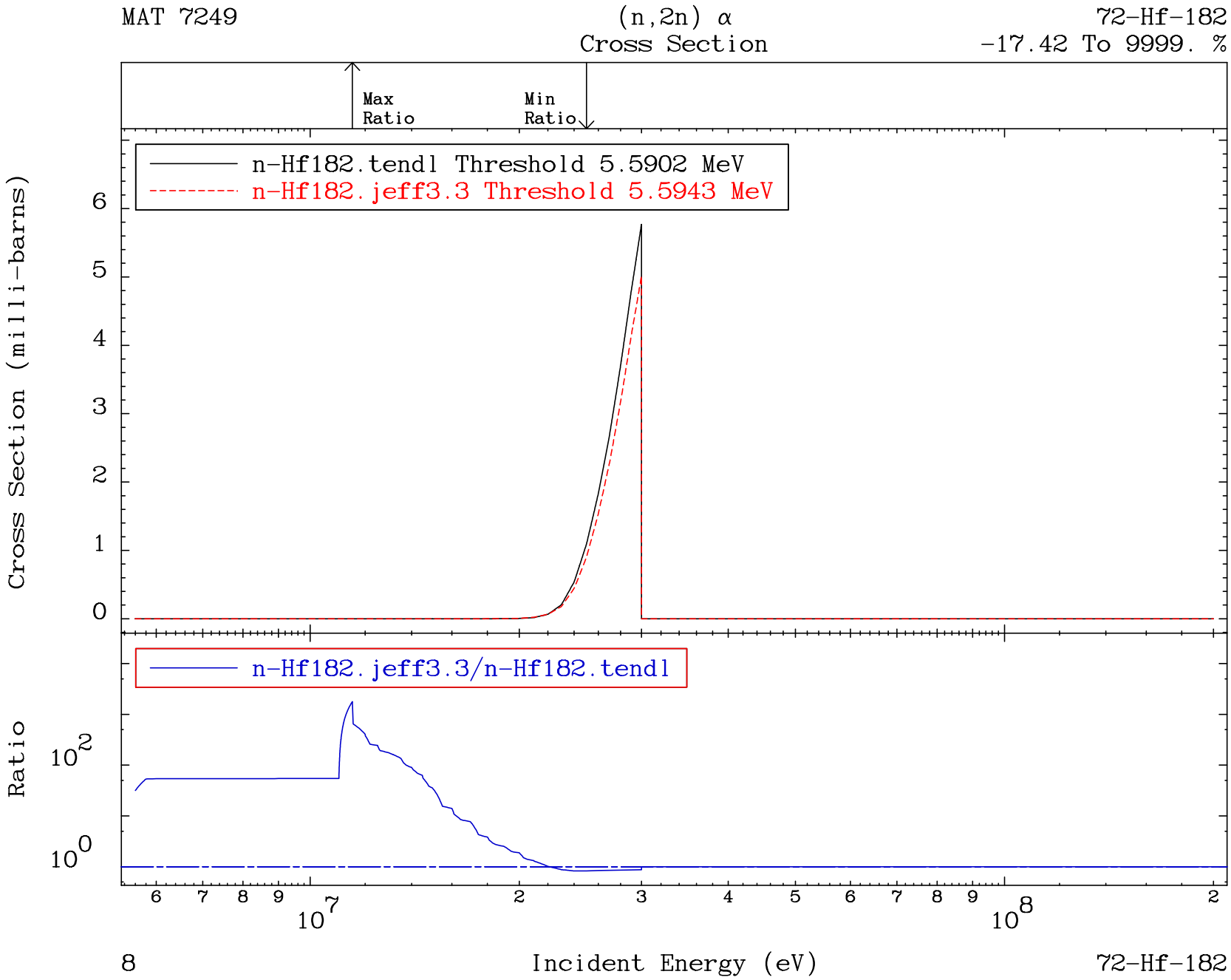

MAT 7249
Inelastic
Cross Section
72-Hf-182
-0.007 To 0.018 %
Max
Ratio
Min
Ratio
n-Hf182.tendl Threshold 98.332 keV
n-Hf182.jeff3.3 Threshold 98.332 keV
Cross Section (barns)
0
1
2
3
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
0.99
1.00
1.01
10^5
10^6
10^7
10^8
Incident Energy (eV)
3
72-Hf-182

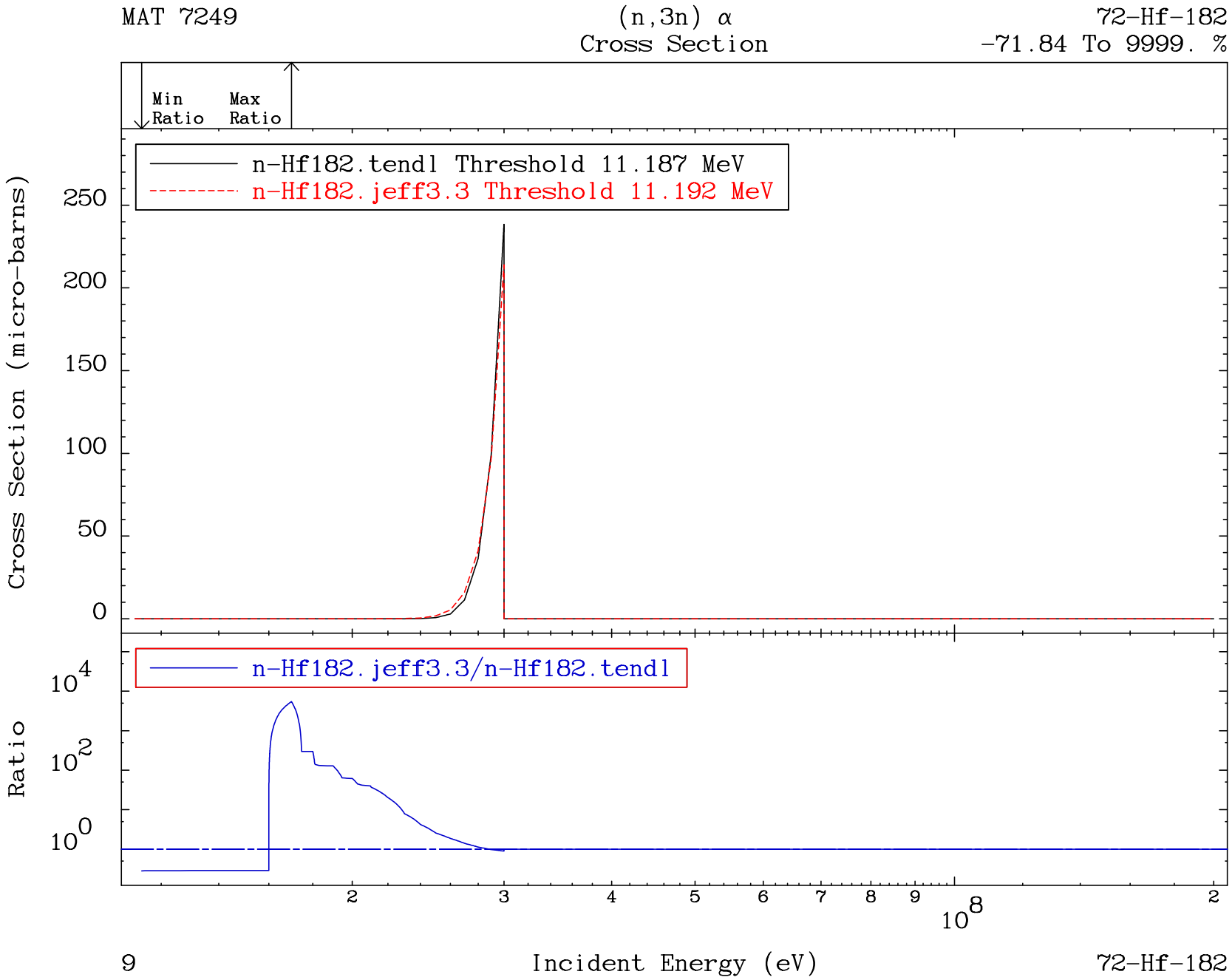

MAT 7249
(n,2n) d
Cross Section
72-Hf-182
-1.437 To 0.000 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 18.299 MeV
n-Hf182.jeff3.3 Threshold 18.299 MeV
Cross Section (micro-barns)
500
400
300
200
100
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.00
0.99
2
3
4
5
6
7
8
9
10^8
2
4
Incident Energy (eV)
72-Hf-182

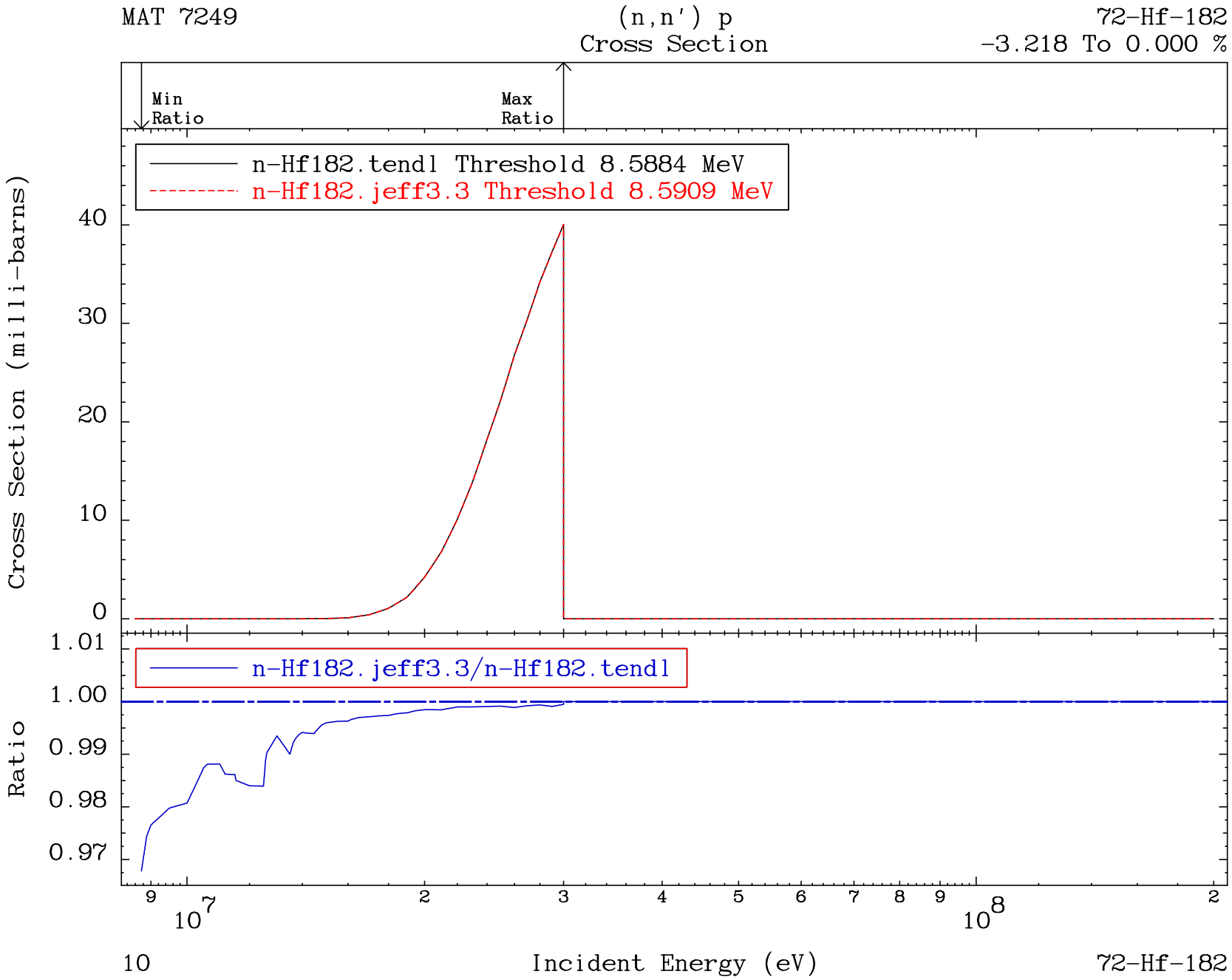

MAT 7249
(n,2n)
Cross Section
72-Hf-182
-0.009 To 0.025 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 6.7552 MeV
n-Hf182.jeff3.3 Threshold 6.7552 MeV
Cross Section (barns)
2.5
2.0
1.5
1.0
0.5
0.0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
5
Incident Energy (eV)
72-Hf-182

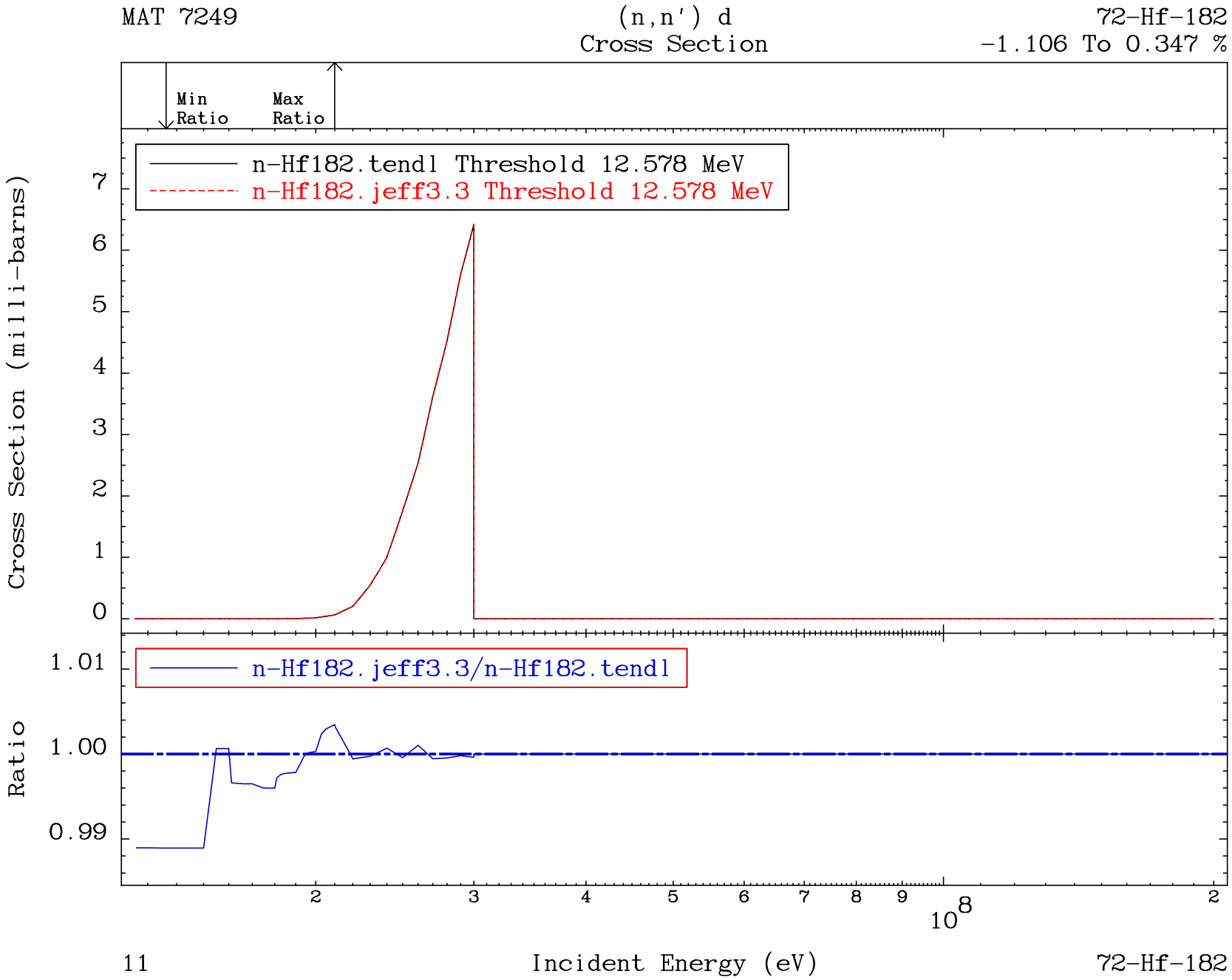

MAT 7249
(n,3n)
Cross Section
72-Hf-182
0.000 To 0.108 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 12.482 MeV
n-Hf182.jeff3.3 Threshold 12.482 MeV
Cross Section (barns)
2.0
1.5
1.0
0.5
0.0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2
3
4
5
6
7
8
9
10^8
2
6
Incident Energy (eV)
72-Hf-182

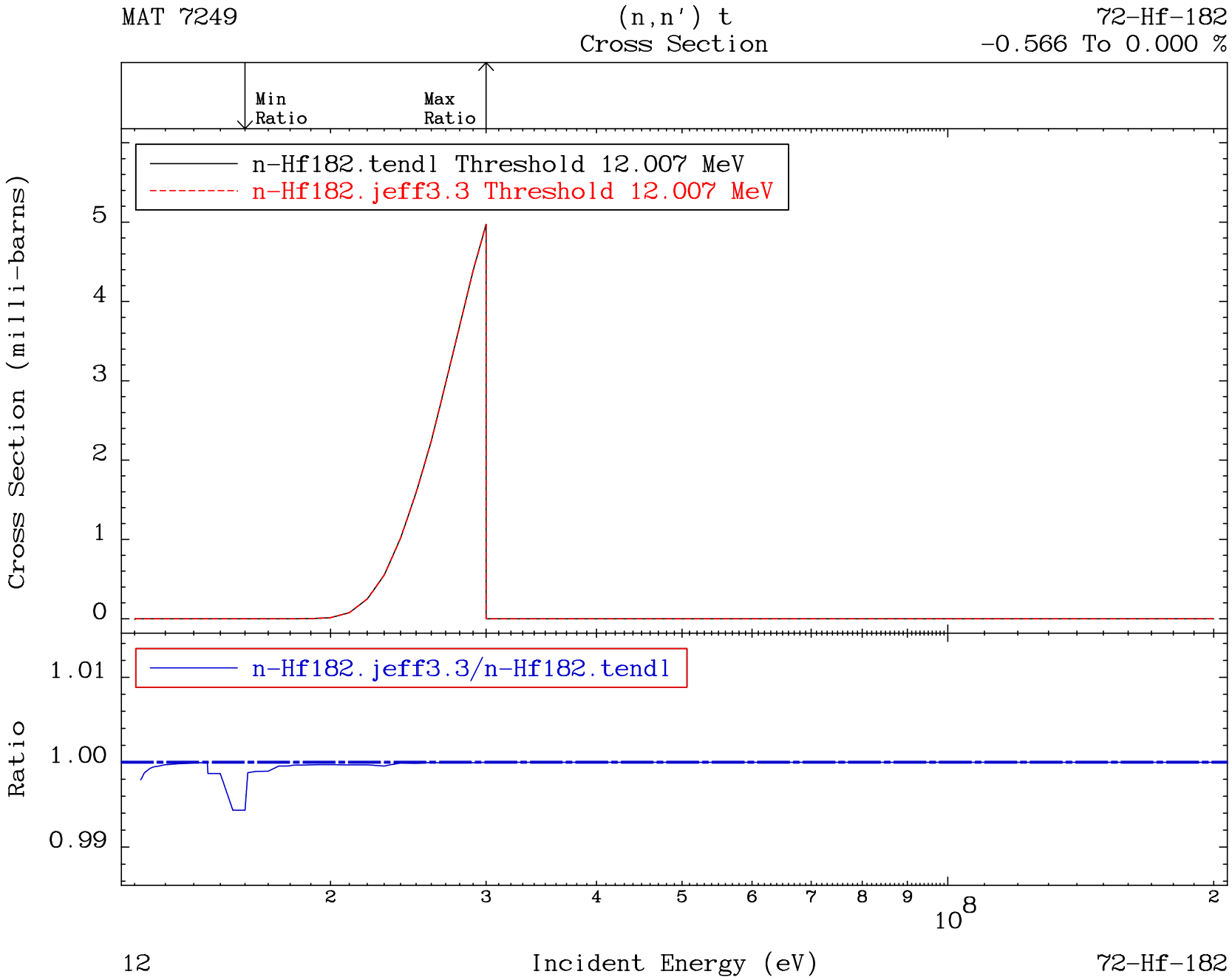

MAT 7249
(n,n') α
Cross Section
72-Hf-182
-17.56 To 9999. %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.2714 keV
n-Hf182.jeff3.3 Threshold 4.1521 keV
Cross Section (milli-barns)
0
2
4
6
8
10
12
14
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
10^0
10^3
10^6
10^9
2 3 5 7 10^4 2 3 5 7 10^5 2 3 5 7 10^6 2 3 5 7 10^7 2 3 5 7 10^8 2
7
Incident Energy (eV)
72-Hf-182

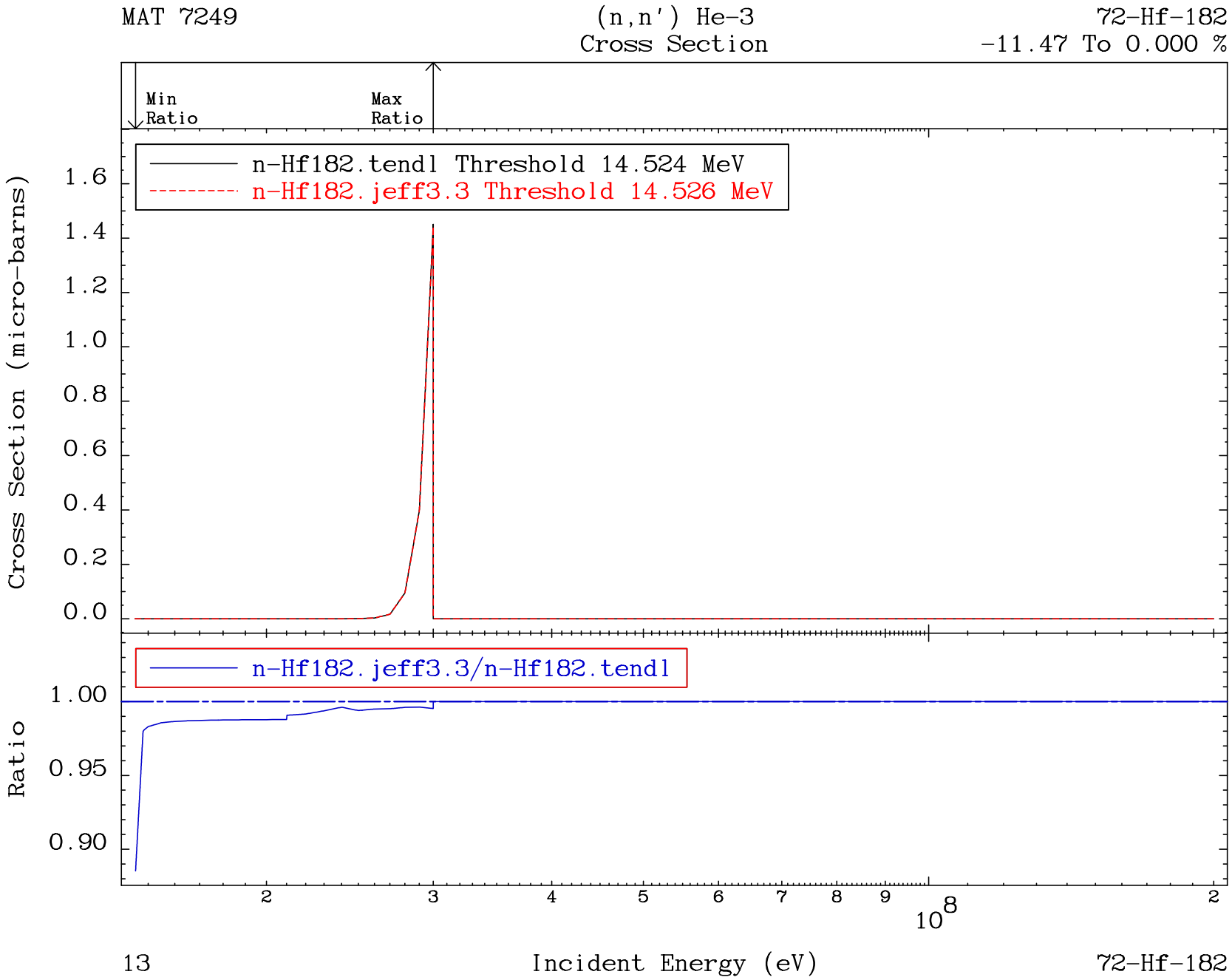

MAT 7249
(n,2n) α
Cross Section
72-Hf-182
-17.42 To 9999. %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 5.5902 MeV
n-Hf182.jeff3.3 Threshold 5.5943 MeV
Cross Section (milli-barns)
0
1
2
3
4
5
6
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
10^2
10^0
6 7 8 9
10^7
2 3 4 5 6 7 8 9
10^8
2
8
Incident Energy (eV)
72-Hf-182

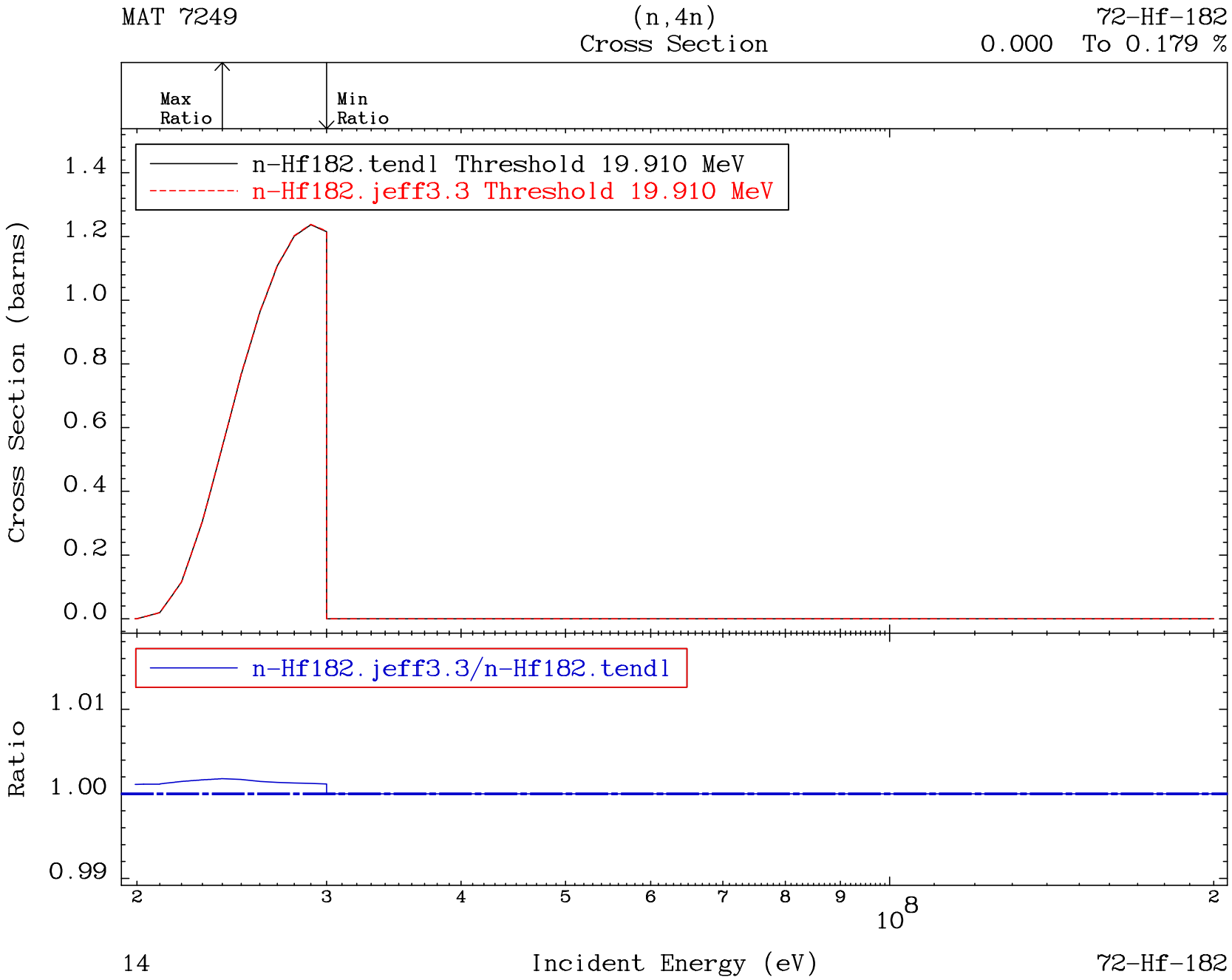

MAT 7249
(n,3n) α
Cross Section
72-Hf-182
-71.84 To 9999. %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 11.187 MeV
n-Hf182.jeff3.3 Threshold 11.192 MeV
Cross Section (micro-barns)
250
200
150
100
50
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
10^4
10^2
10^0
2
3
4
5
6
7
8
9
10^8
2
9
Incident Energy (eV)
72-Hf-182

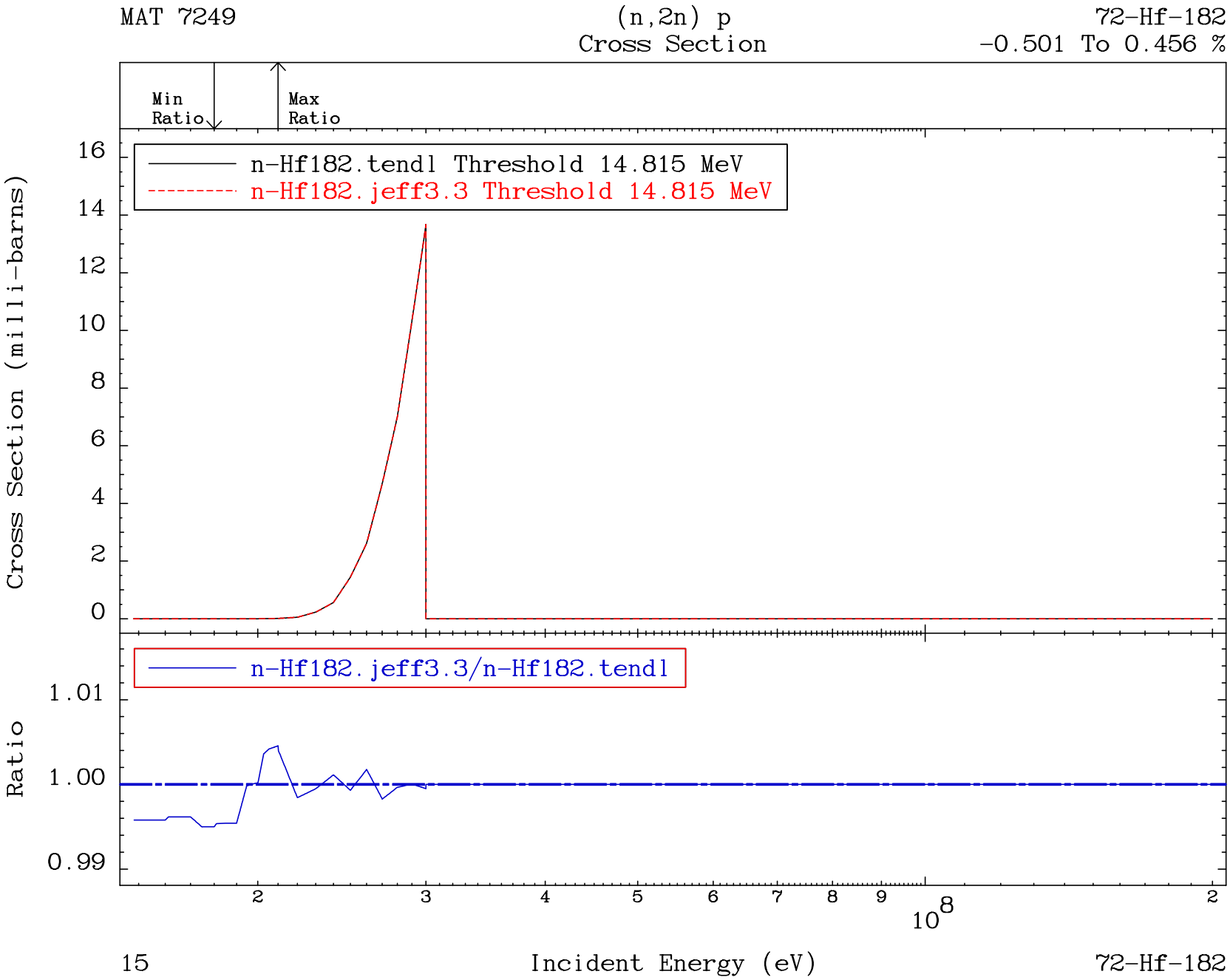

MAT 7249
(n,n') p
Cross Section
72-Hf-182
-3.218 To 0.000 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 8.5884 MeV
n-Hf182.jeff3.3 Threshold 8.5909 MeV
Cross Section (milli-barns)
40
30
20
10
0
1.01
1.00
0.99
0.98
0.97
Ratio
n-Hf182.jeff3.3/n-Hf182.tendl
9
10^7
2
3
4
5
6
7
8
9
10^8
2
10
Incident Energy (eV)
72-Hf-182

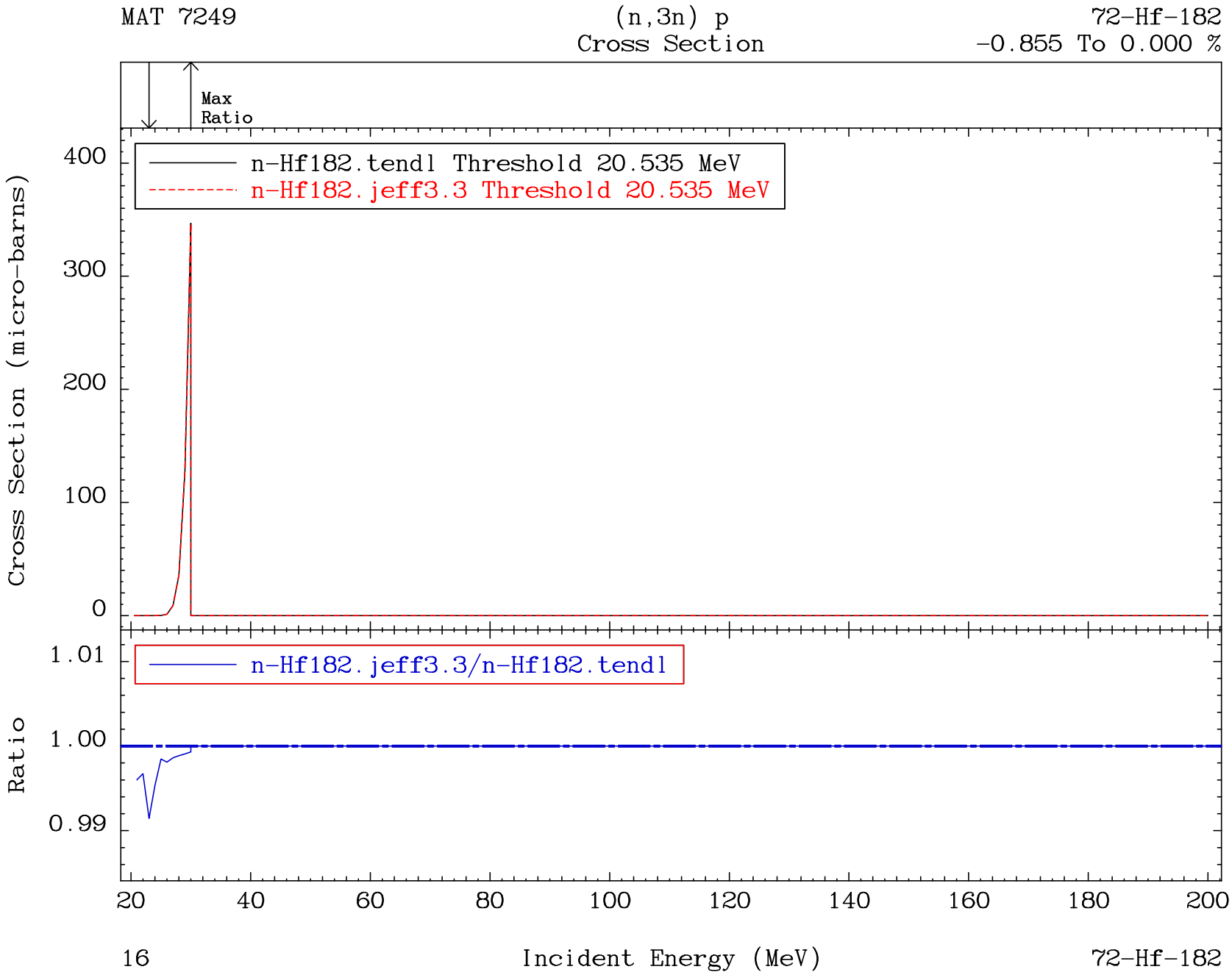

MAT 7249
(n,n') d
Cross Section
72-Hf-182
-1.106 To 0.347 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 12.578 MeV
n-Hf182.jeff3.3 Threshold 12.578 MeV
Cross Section (milli-barns)
0
1
2
3
4
5
6
7
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
0.99
1.00
1.01
2
3
4
5
6
7
8
9
10^8
2
11
Incident Energy (eV)
72-Hf-182

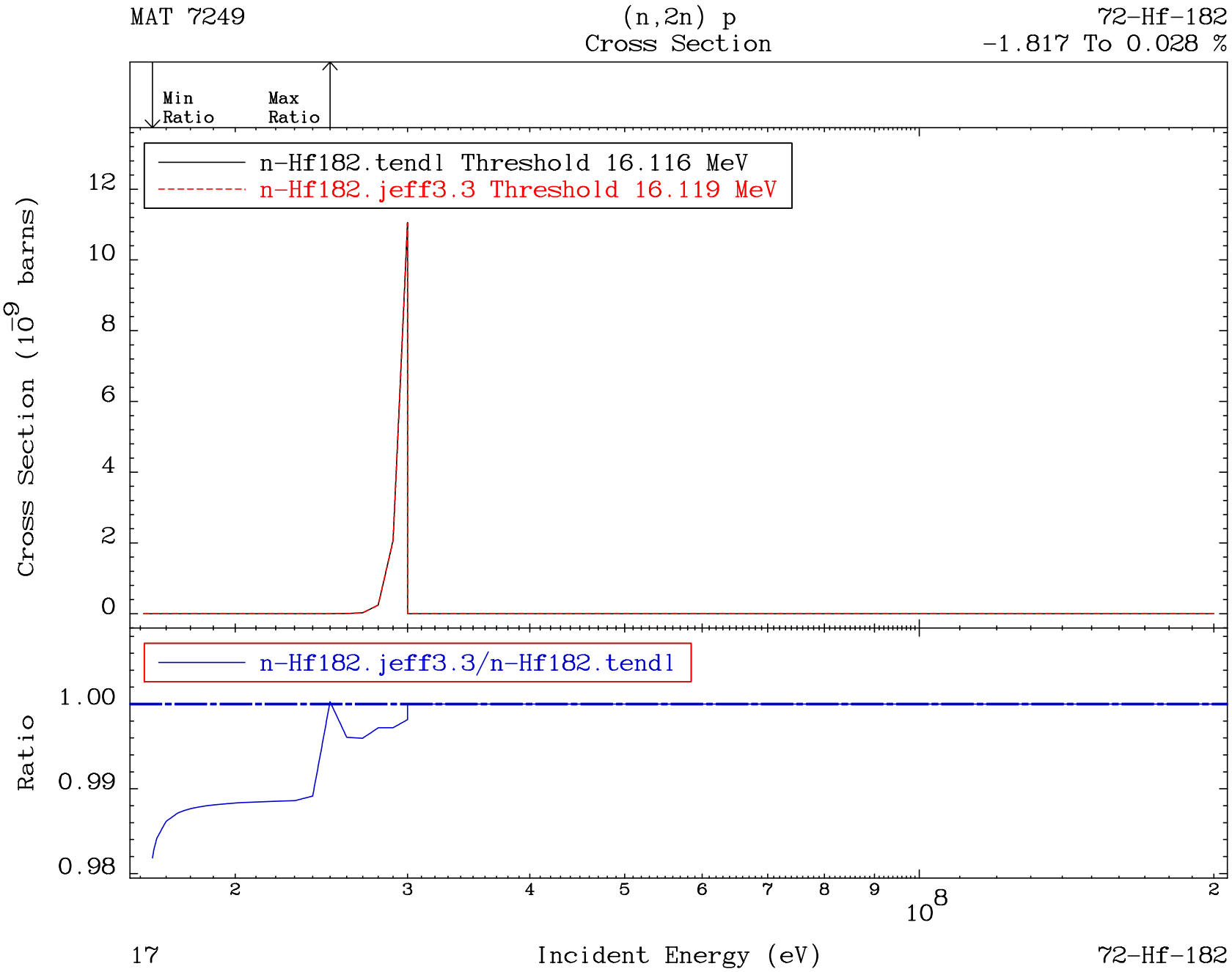

MAT 7249
(n,n') t
Cross Section
72-Hf-182
-0.566 To 0.000 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 12.007 MeV
n-Hf182.jeff3.3 Threshold 12.007 MeV
Cross Section (milli-barns)
0
1
2
3
4
5
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
0.99
1.00
1.01
2
3
4
5
6
7
8
9
10^8
2
12
Incident Energy (eV)
72-Hf-182

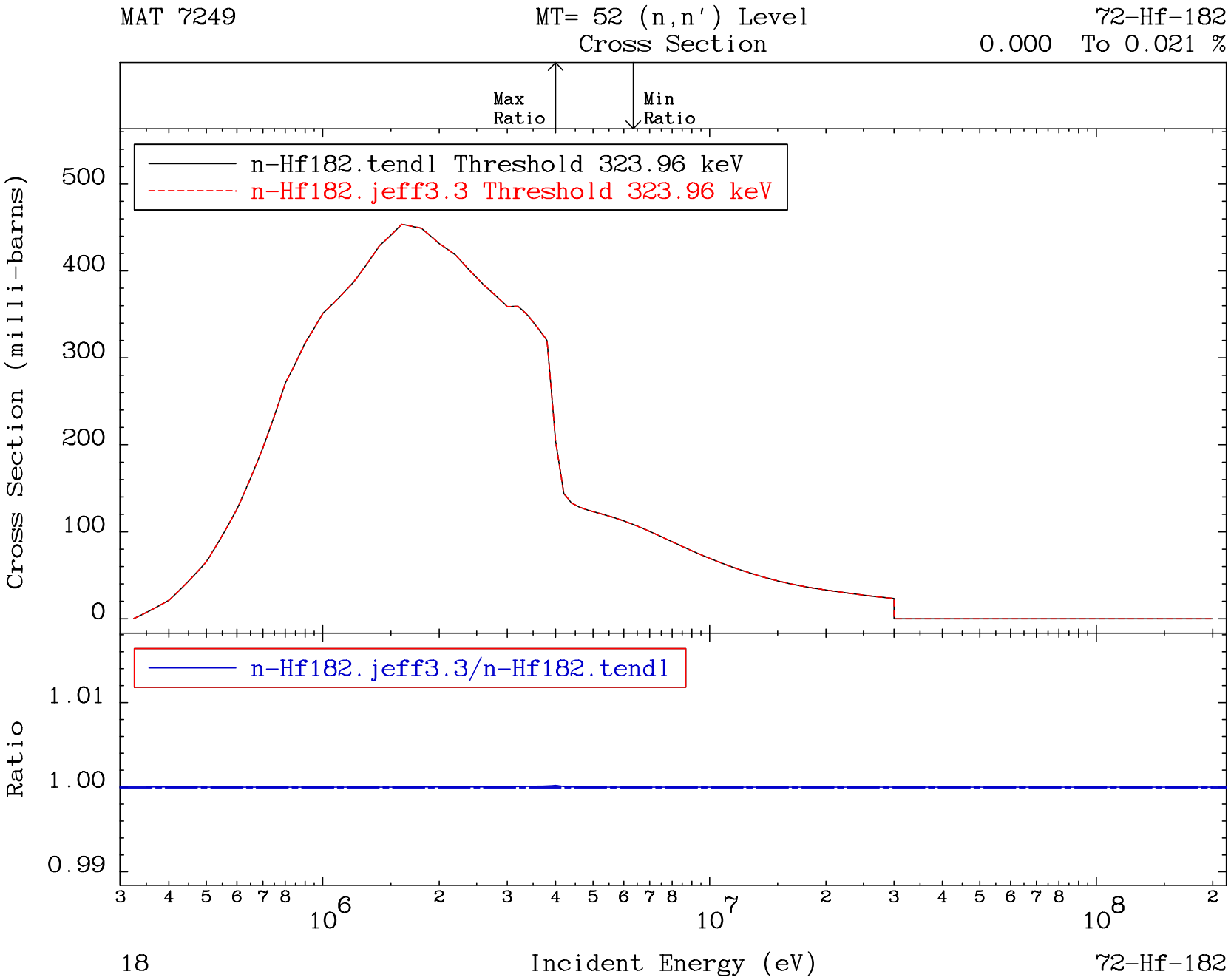

MAT 7249
(n,n') He-3
Cross Section
72-Hf-182
-11.47 To 0.000 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 14.524 MeV
n-Hf182.jeff3.3 Threshold 14.526 MeV
Cross Section (micro-barns)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.00
0.95
0.90
2
3
4
5
6
7
8
9
10^8
2
13
Incident Energy (eV)
72-Hf-182

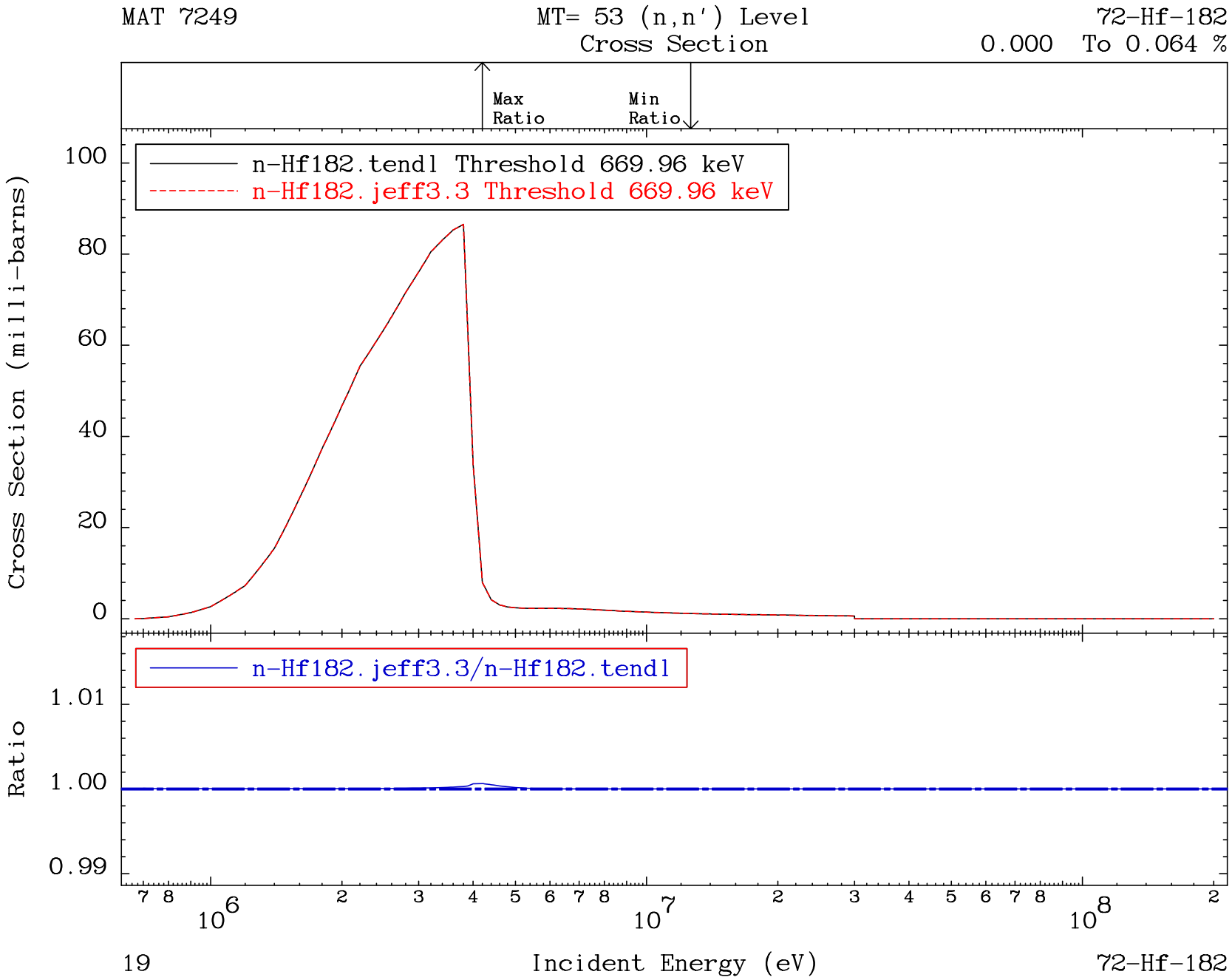

MAT 7249
(n,4n)
Cross Section
72-Hf-182
0.000 To 0.179 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 19.910 MeV
n-Hf182.jeff3.3 Threshold 19.910 MeV
Cross Section (barns)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2
3
4
5
6
7
8
9
10^8
2
14
Incident Energy (eV)
72-Hf-182

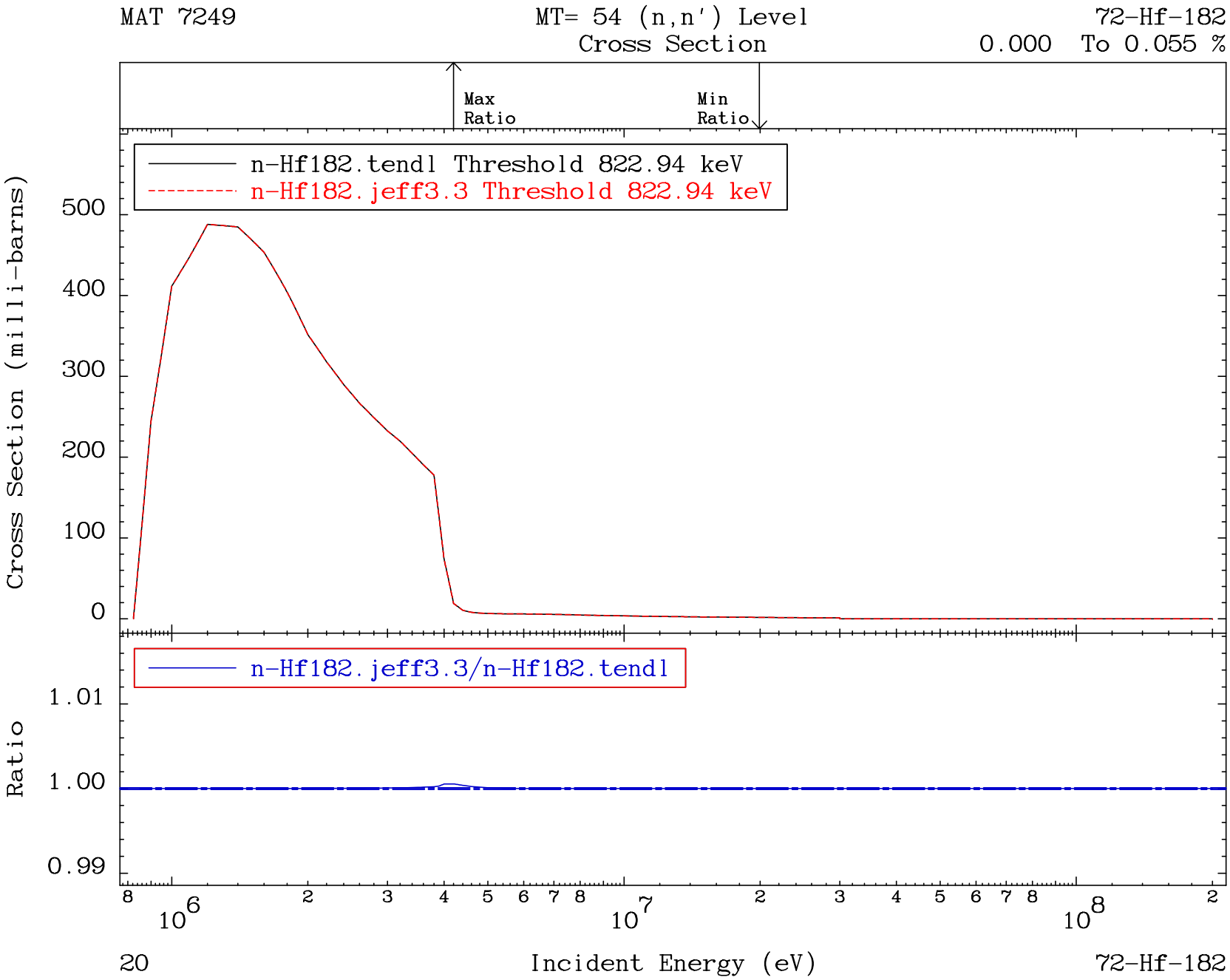

MAT 7249
(n,2n) p
Cross Section
72-Hf-182
-0.501 To 0.456 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 14.815 MeV
n-Hf182.jeff3.3 Threshold 14.815 MeV
Cross Section (milli-barns)
16
14
12
10
8
6
4
2
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2
3
4
5
6
7
8
9
10^8
2
15
Incident Energy (eV)
72-Hf-182

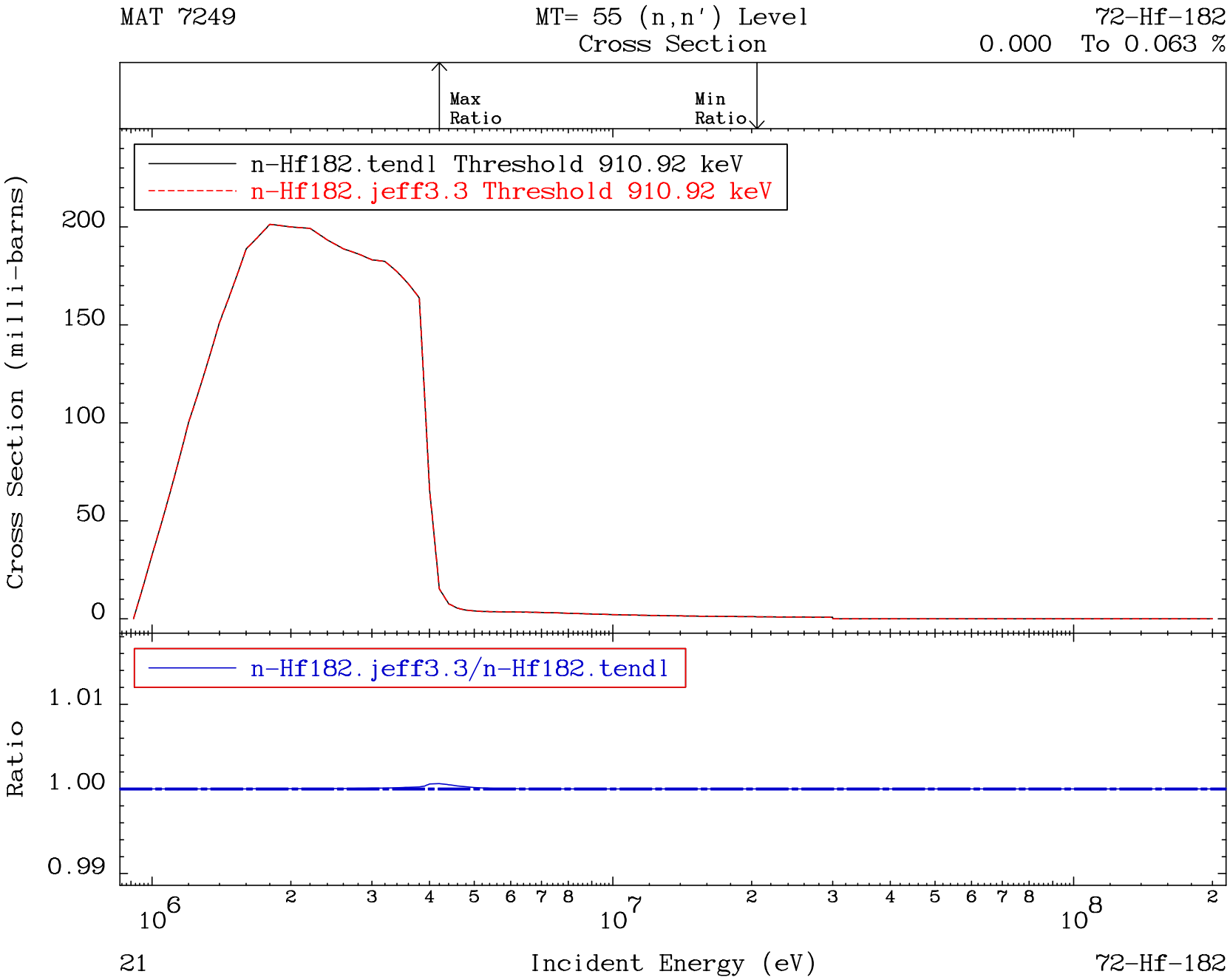

MAT 7249
(n,3n) p
Cross Section
72-Hf-182
-0.855 To 0.000 %
Max
Ratio
n-Hf182.tendl Threshold 20.535 MeV
n-Hf182.jeff3.3 Threshold 20.535 MeV
Cross Section (micro-barns)
400
300
200
100
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
20
40
60
80
100
120
140
160
180
200
16
Incident Energy (MeV)
72-Hf-182

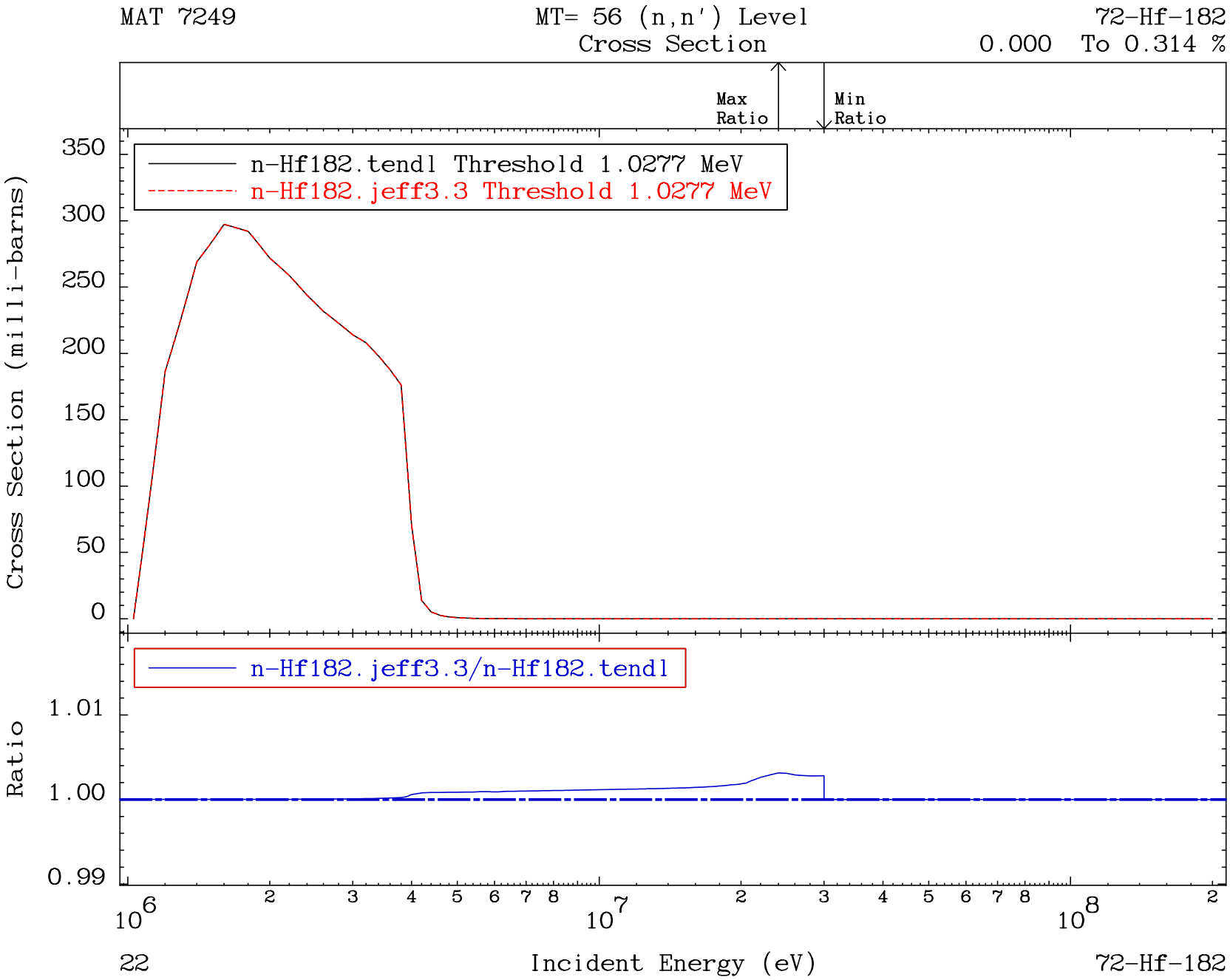

MAT 7249
(n,2n) p
Cross Section
72-Hf-182
-1.817 To 0.028 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 16.116 MeV
n-Hf182.jeff3.3 Threshold 16.119 MeV
Cross Section (10^{-9} barns)
12
10
8
6
4
2
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.00
0.99
0.98
2
3
4
5
6
7
8
9
10^8
2
17
Incident Energy (eV)
72-Hf-182

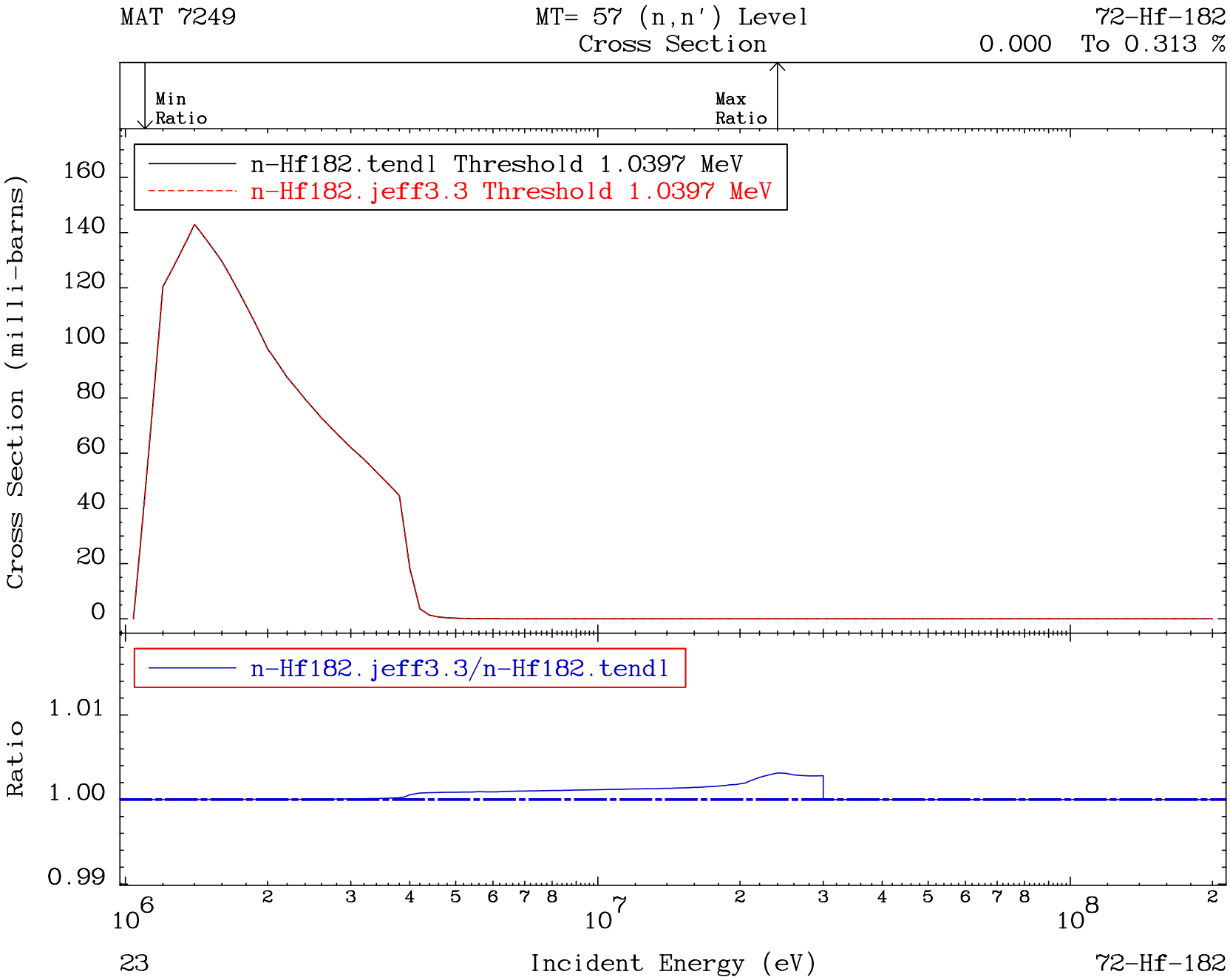

MAT 7249
MT= 52 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.021 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 323.96 keV
n-Hf182.jeff3.3 Threshold 323.96 keV
Cross Section (milli-barns)
500
400
300
200
100
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
3 4 5 6 7 8 10^6 2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
18
Incident Energy (eV)
72-Hf-182

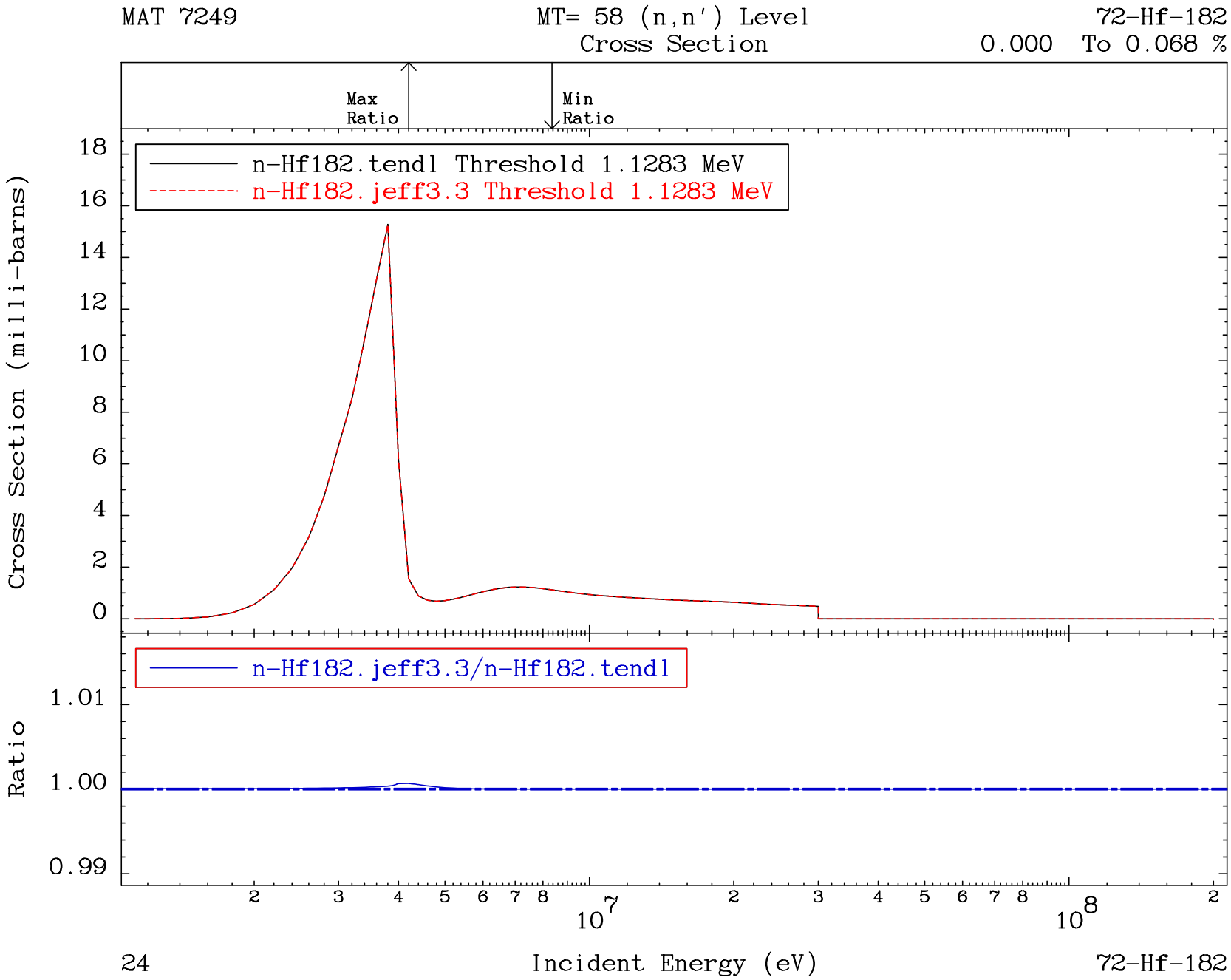

MAT 7249
MT= 53 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.064 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 669.96 keV
n-Hf182.jeff3.3 Threshold 669.96 keV
Cross Section (milli-barns)
100
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
7 8 10^6 2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
19
Incident Energy (eV)
72-Hf-182

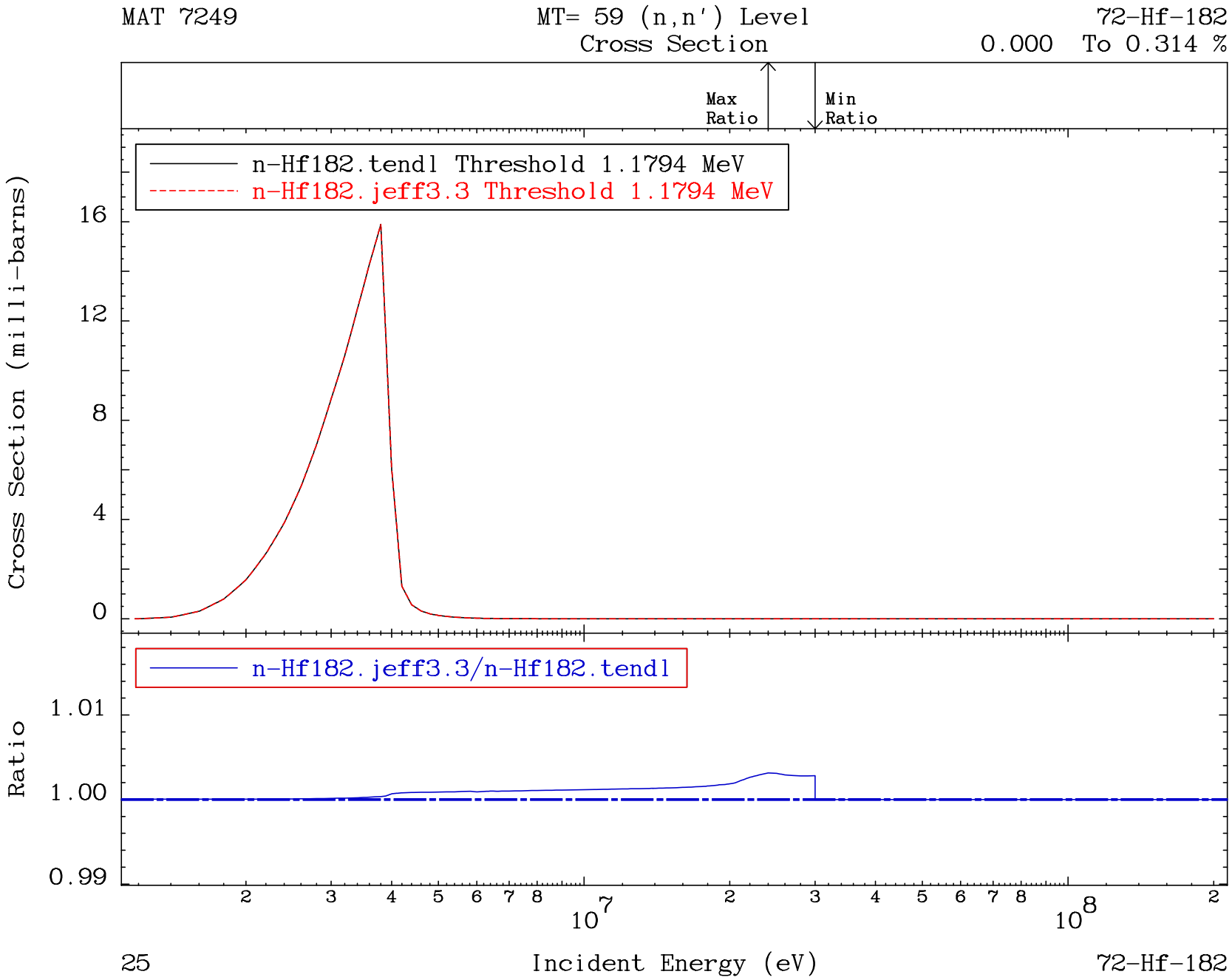

MAT 7249
MT= 54 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.055 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 822.94 keV
n-Hf182.jeff3.3 Threshold 822.94 keV
Cross Section (milli-barns)
500
400
300
200
100
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
8 2 3 4 5 6 7 8 2 3 4 5 6 7 8 2
10^6
10^7
10^8
20
Incident Energy (eV)
72-Hf-182

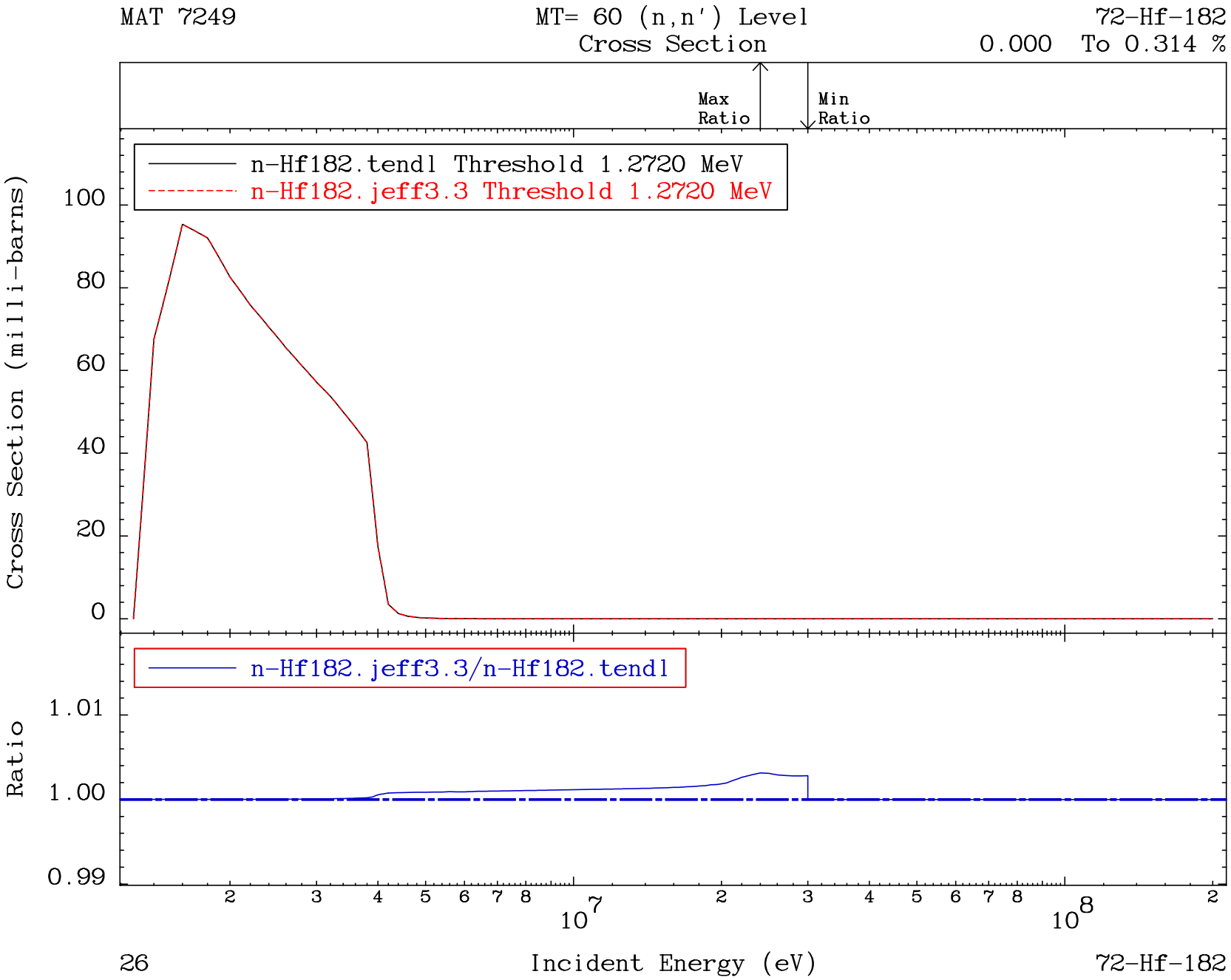

MAT 7249
MT= 55 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.063 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 910.92 keV
n-Hf182.jeff3.3 Threshold 910.92 keV
Cross Section (milli-barns)
200
150
100
50
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
10^6
10^7
10^8
21
Incident Energy (eV)
72-Hf-182

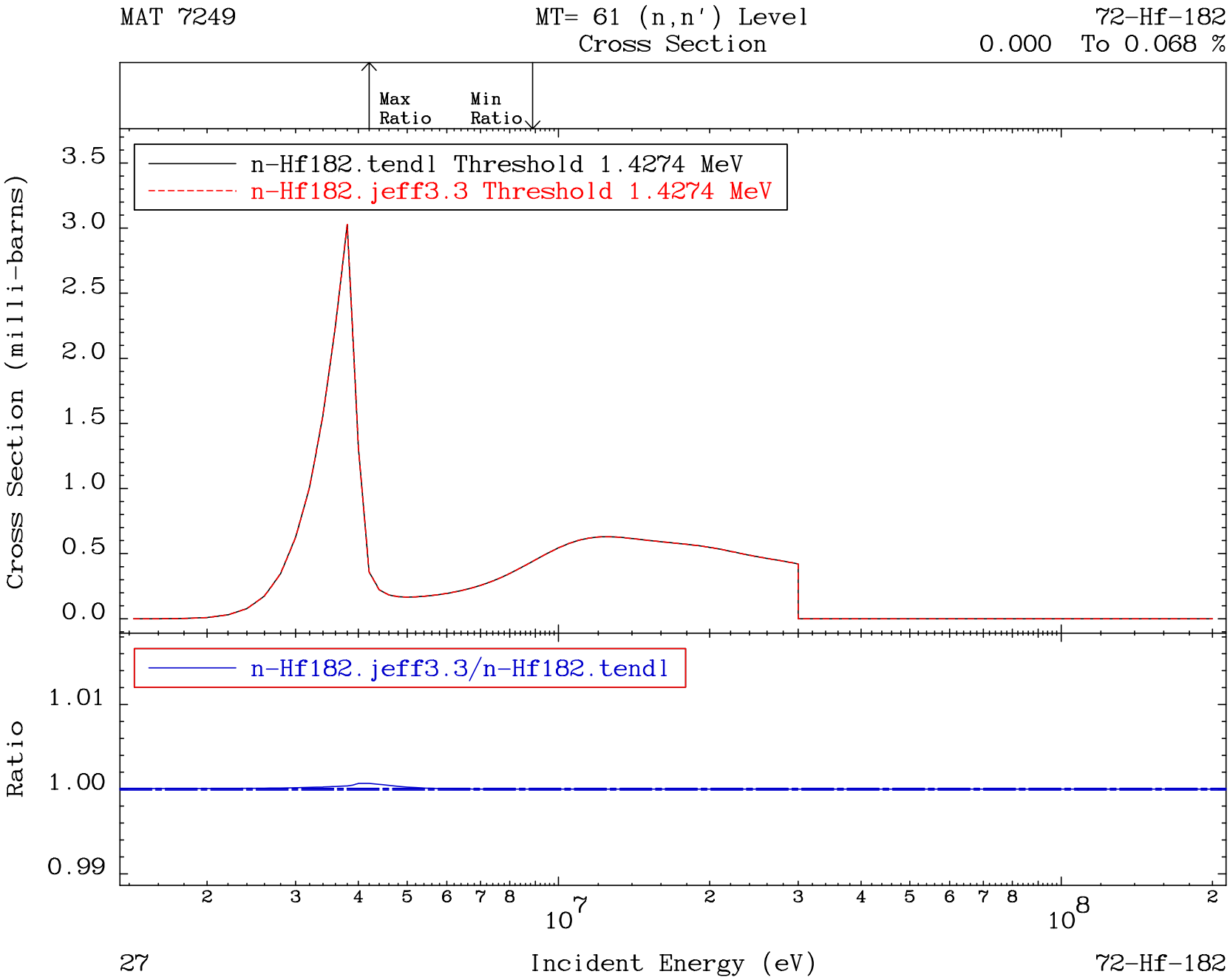

MAT 7249
MT= 56 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.314 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.0277 MeV
n-Hf182.jeff3.3 Threshold 1.0277 MeV
Cross Section (milli-barns)
350
300
250
200
150
100
50
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
10^6
10^7
10^8
22
Incident Energy (eV)
72-Hf-182

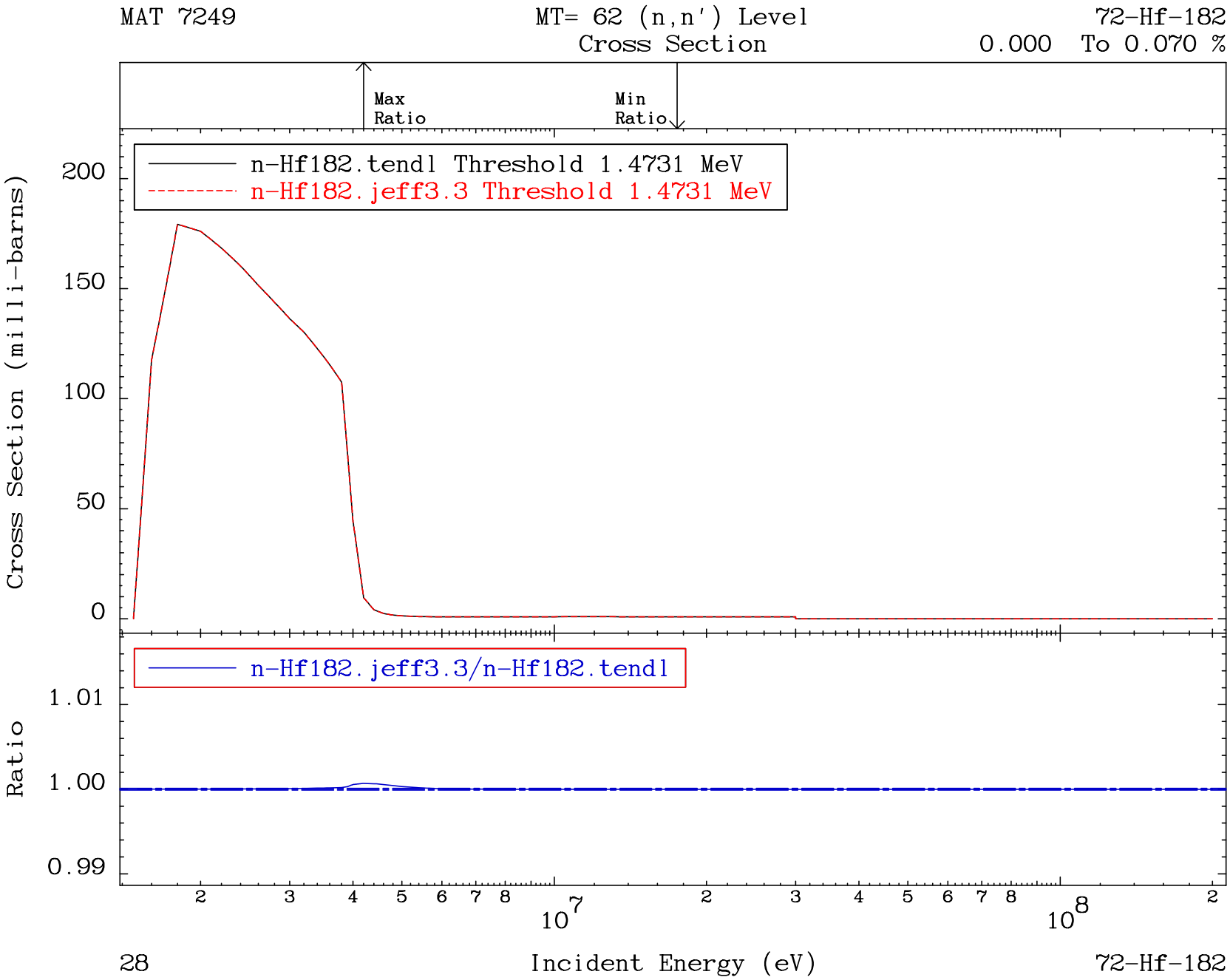

MAT 7249
MT= 57 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.313 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 1.0397 MeV
n-Hf182.jeff3.3 Threshold 1.0397 MeV
Cross Section (milli-barns)
160
140
120
100
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
10^6
10^7
10^8
23
Incident Energy (eV)
72-Hf-182

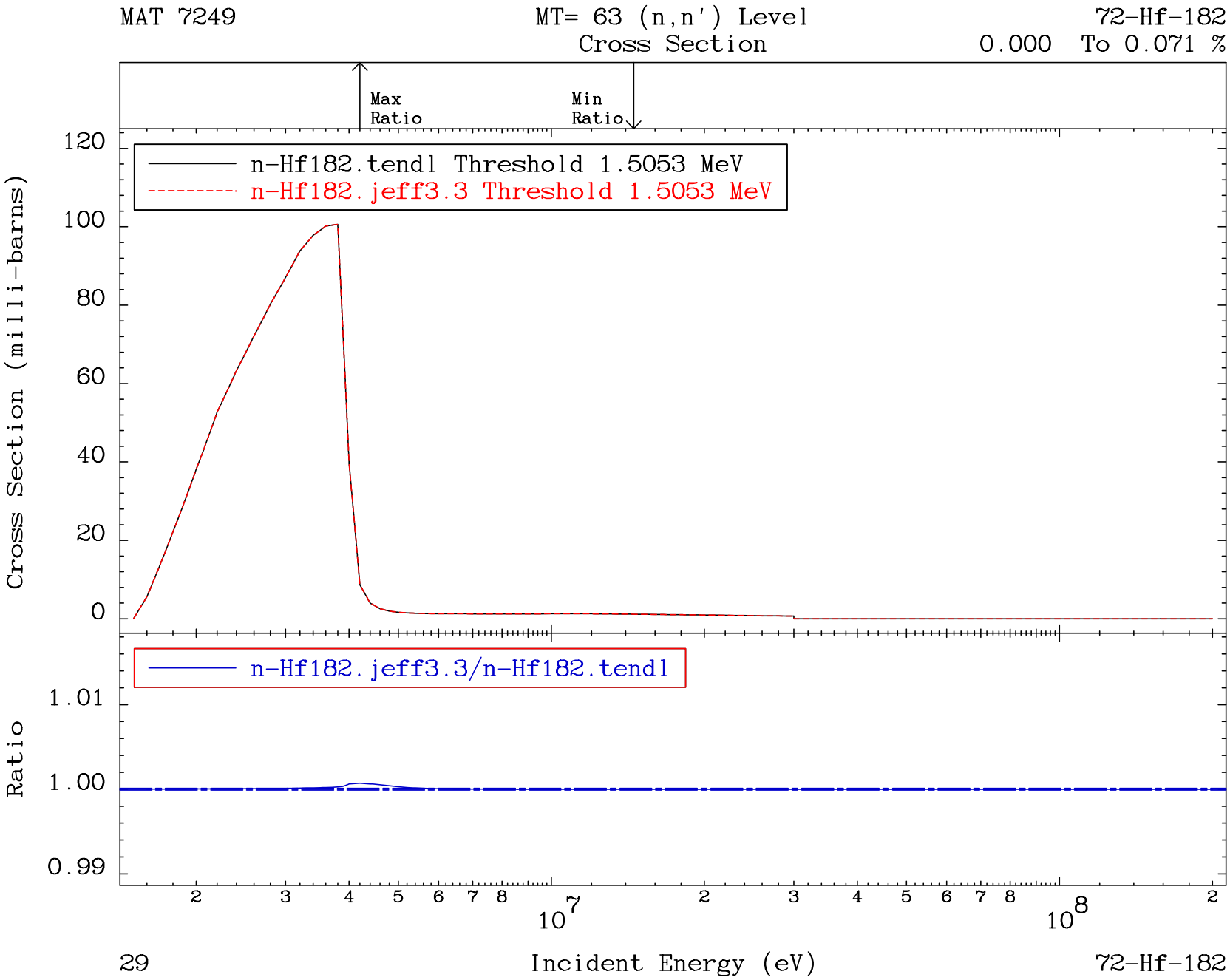

MAT 7249
MT= 58 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.068 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.1283 MeV
n-Hf182.jeff3.3 Threshold 1.1283 MeV
Cross Section (milli-barns)
18
16
14
12
10
8
6
4
2
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
24
Incident Energy (eV)
72-Hf-182

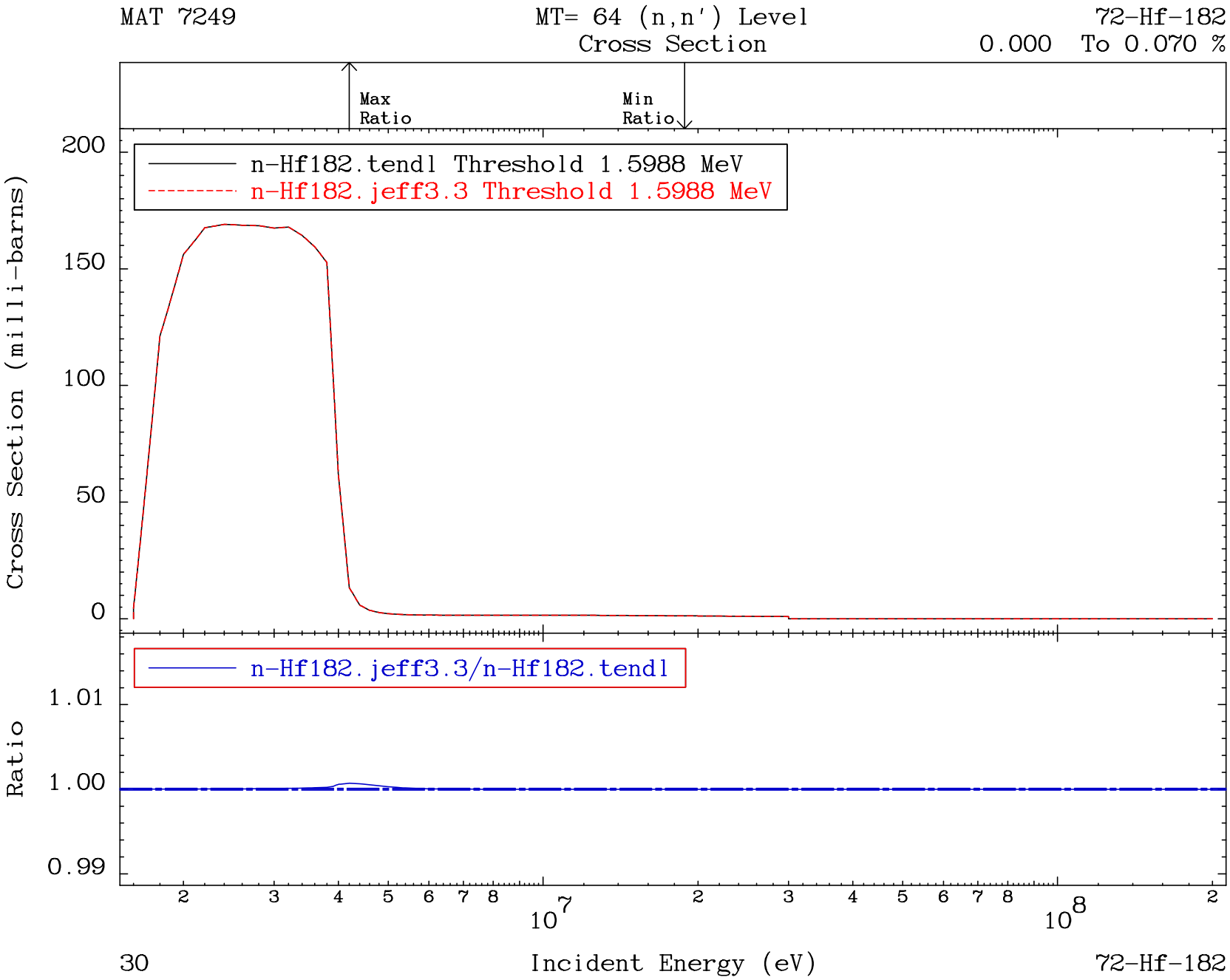

MAT 7249
MT= 59 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.314 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.1794 MeV
n-Hf182.jeff3.3 Threshold 1.1794 MeV
Cross Section (milli-barns)
16
12
8
4
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8
10^7
2 3 4 5 6 7 8
10^8
2
25
Incident Energy (eV)
72-Hf-182

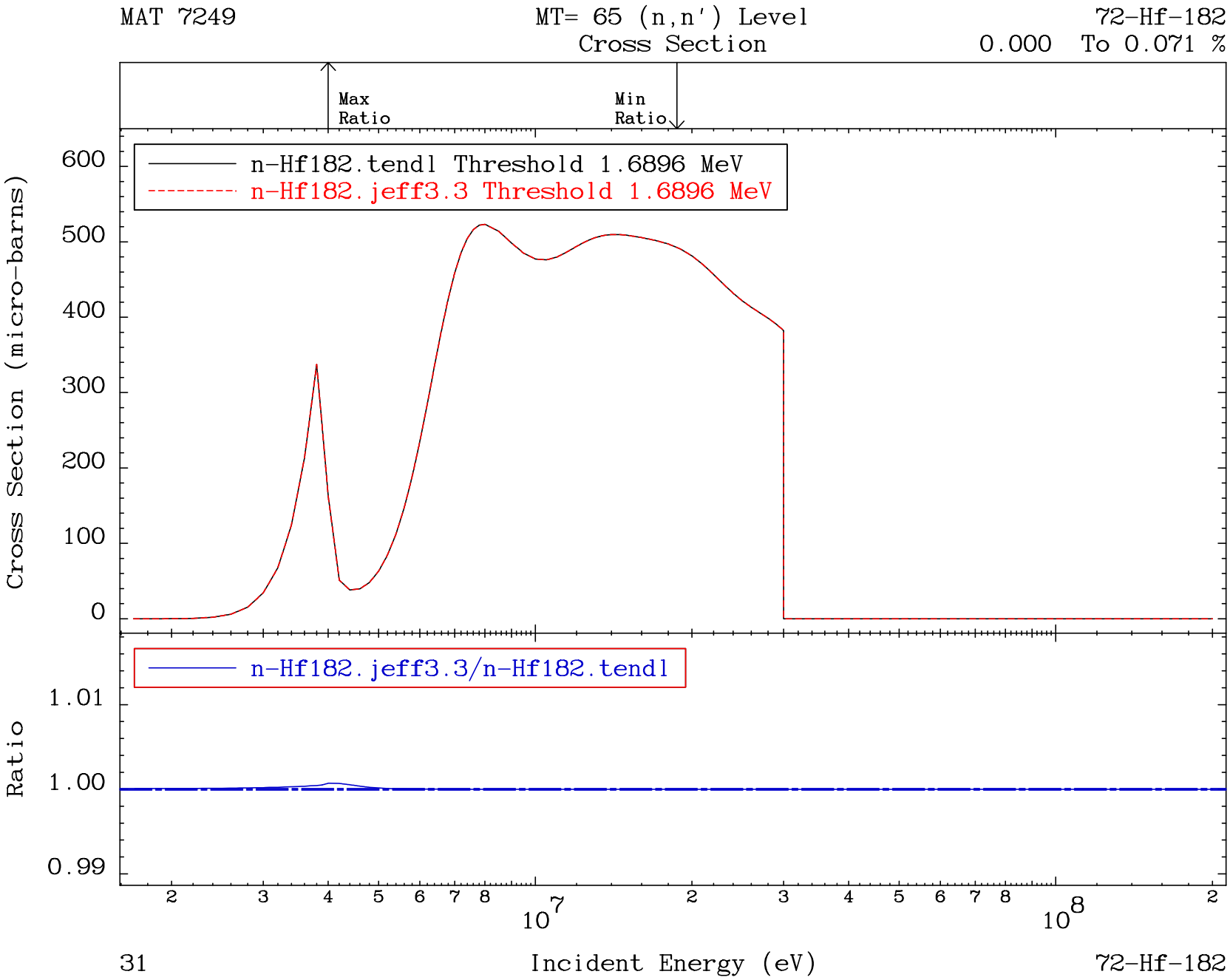

MAT 7249
MT= 60 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.314 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.2720 MeV
n-Hf182.jeff3.3 Threshold 1.2720 MeV
Cross Section (milli-barns)
100
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8
10^7
2 3 4 5 6 7 8
10^8
2
26
Incident Energy (eV)
72-Hf-182

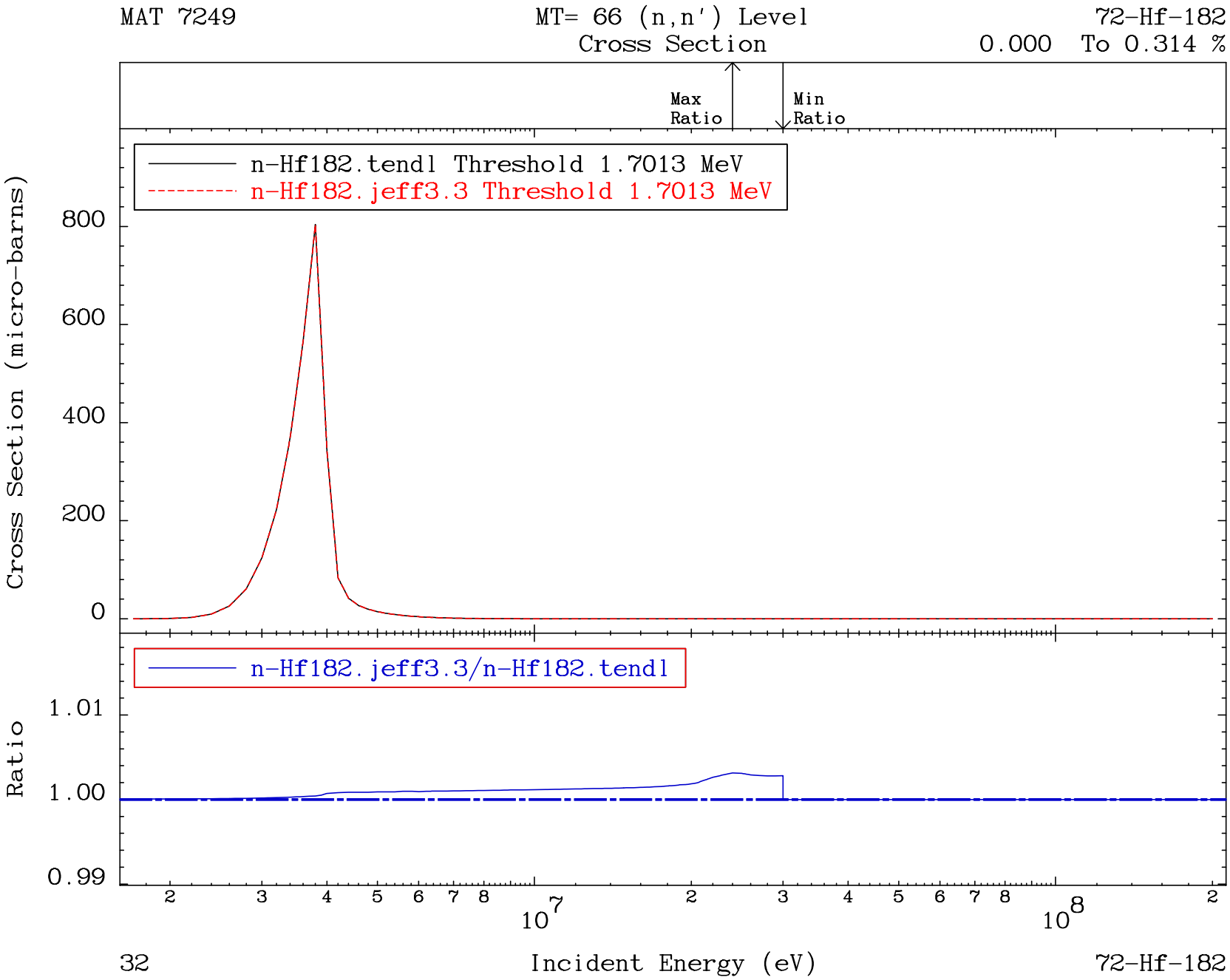

MAT 7249
MT= 61 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.068 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.4274 MeV
n-Hf182.jeff3.3 Threshold 1.4274 MeV
Cross Section (milli-barns)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8
10^7
2 3 4 5 6 7 8
10^8
2
27
Incident Energy (eV)
72-Hf-182

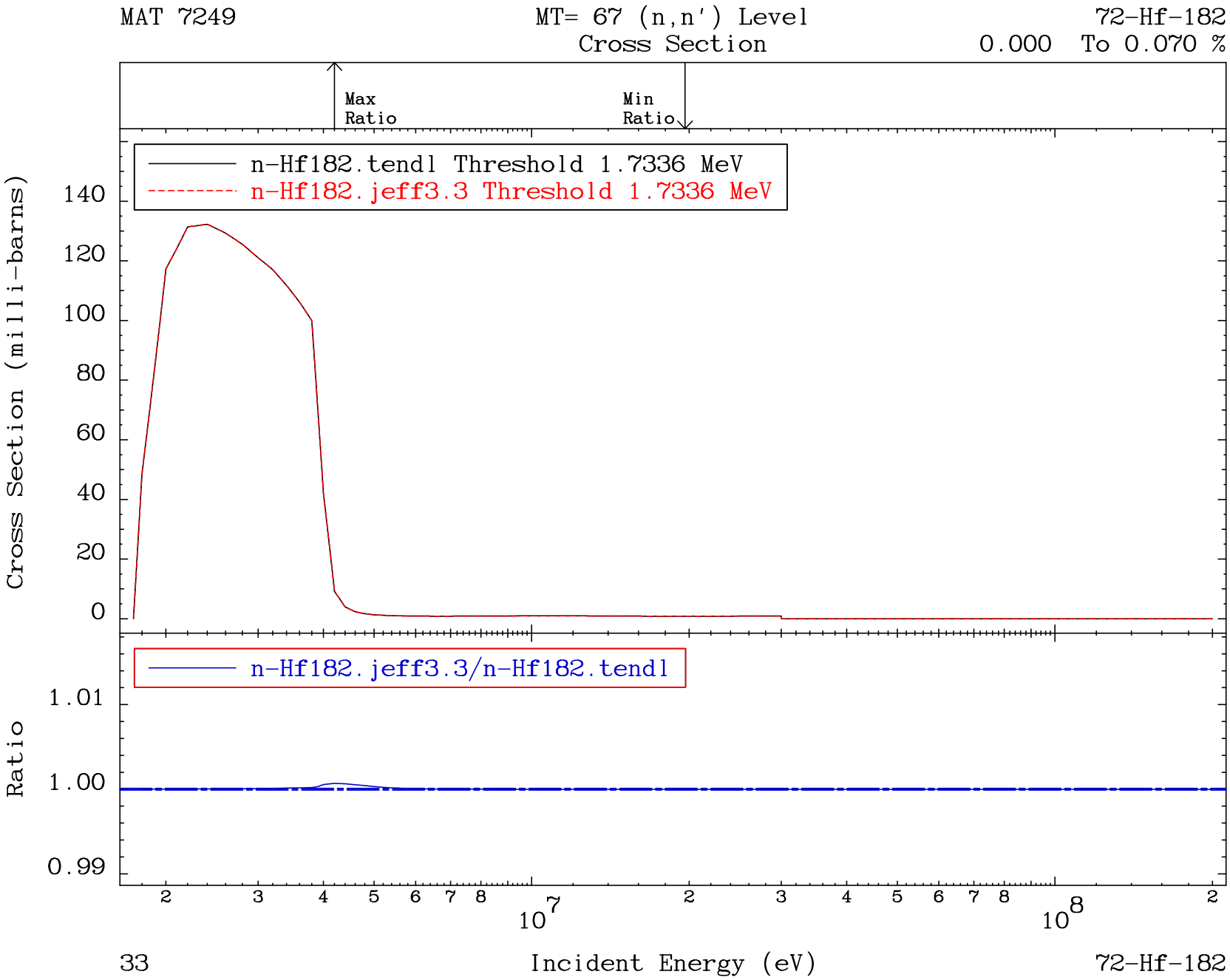

MAT 7249
MT= 62 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.070 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.4731 MeV
n-Hf182.jeff3.3 Threshold 1.4731 MeV
Cross Section (milli-barns)
200
150
100
50
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8
10^7
2 3 4 5 6 7 8
10^8
2
28
Incident Energy (eV)
72-Hf-182

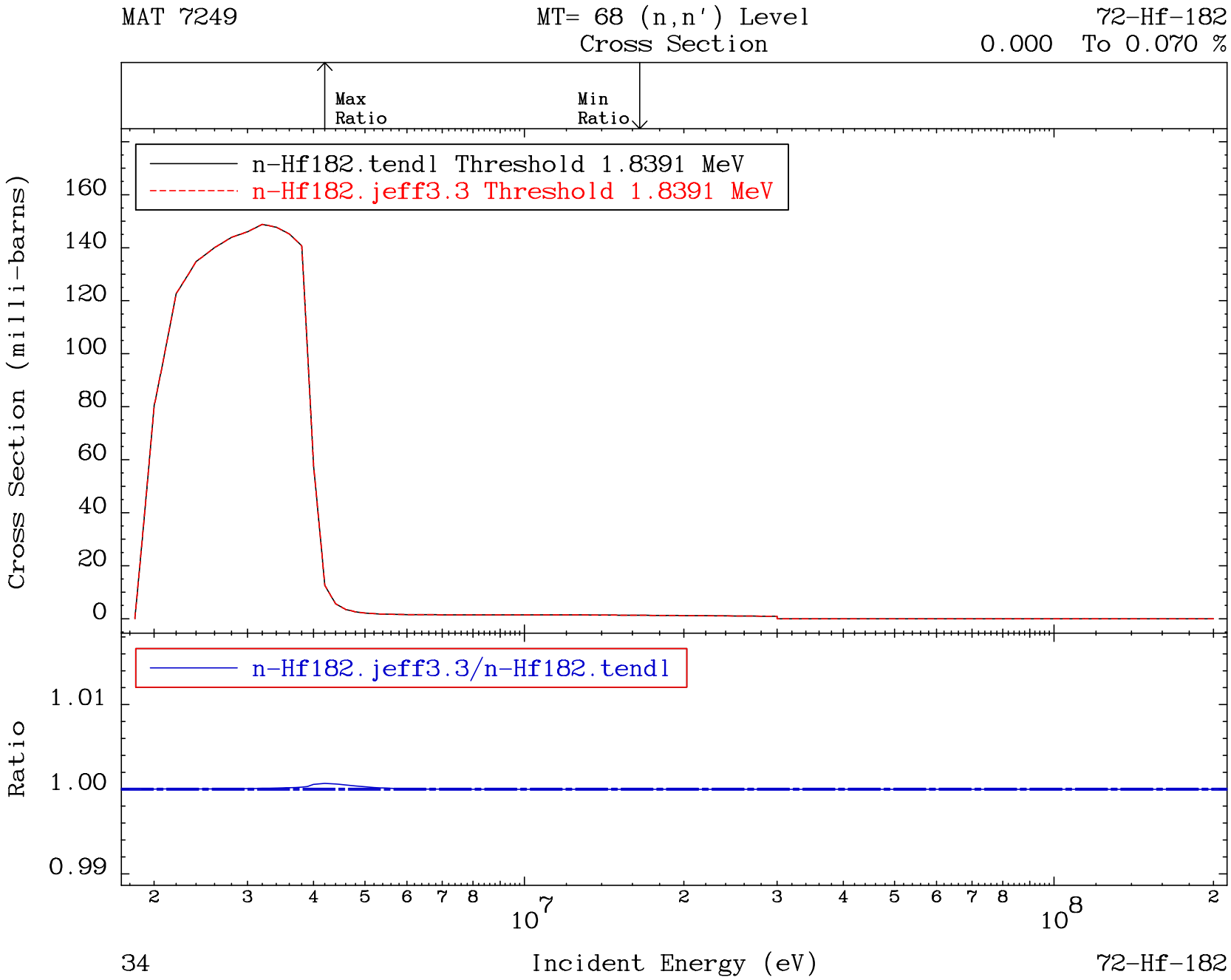

MAT 7249
MT= 63 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.071 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.5053 MeV
n-Hf182.jeff3.3 Threshold 1.5053 MeV
Cross Section (milli-barns)
120
100
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
29
Incident Energy (eV)
72-Hf-182

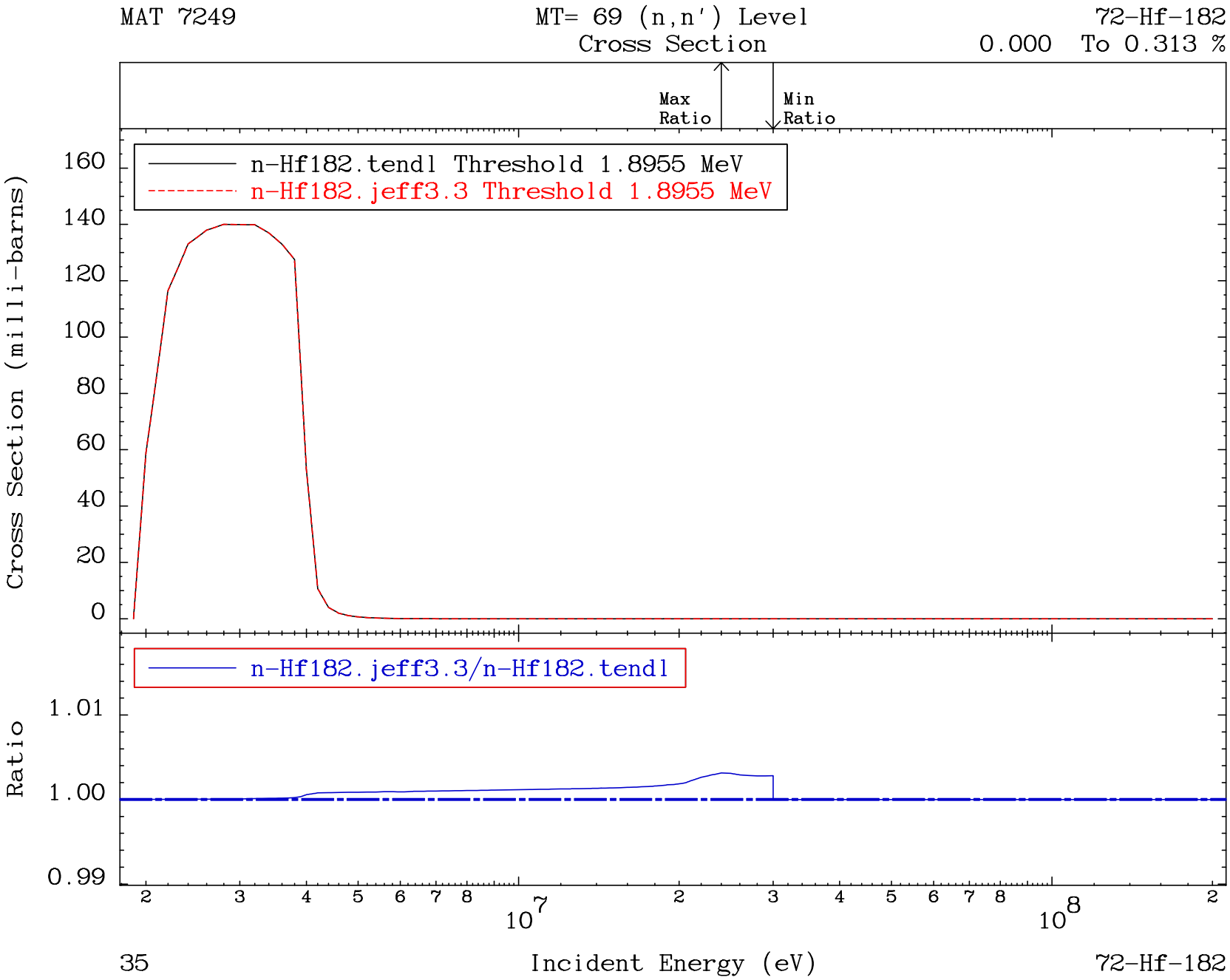

MAT 7249
MT= 64 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.070 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.5988 MeV
n-Hf182.jeff3.3 Threshold 1.5988 MeV
Cross Section (milli-barns)
200
150
100
50
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8
10^7
2 3 4 5 6 7 8
10^8
2
30
Incident Energy (eV)
72-Hf-182

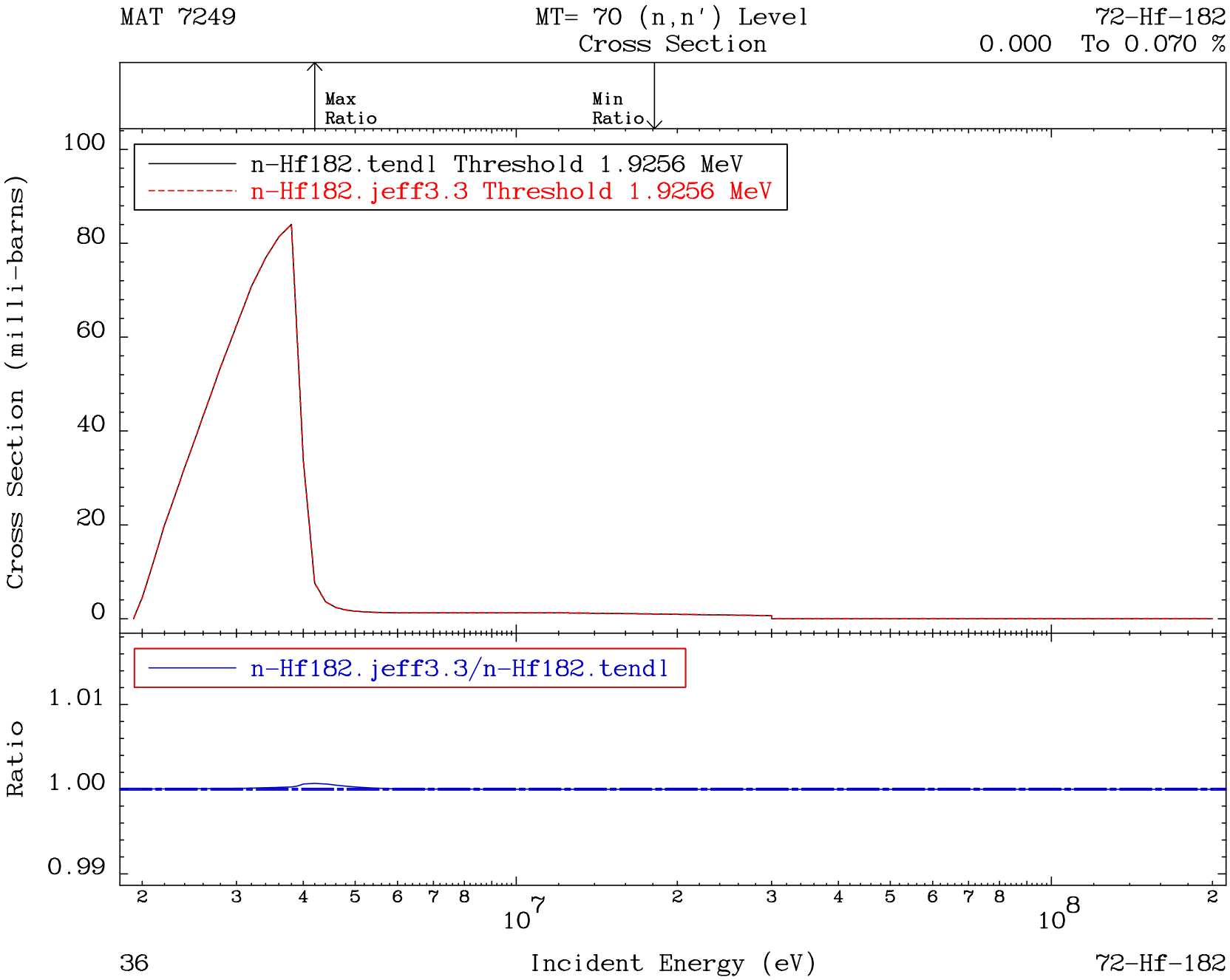

MAT 7249
MT= 65 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.071 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.6896 MeV
n-Hf182.jeff3.3 Threshold 1.6896 MeV
Cross Section (micro-barns)
600
500
400
300
200
100
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8
10^7
2 3 4 5 6 7 8
10^8
2
31
Incident Energy (eV)
72-Hf-182

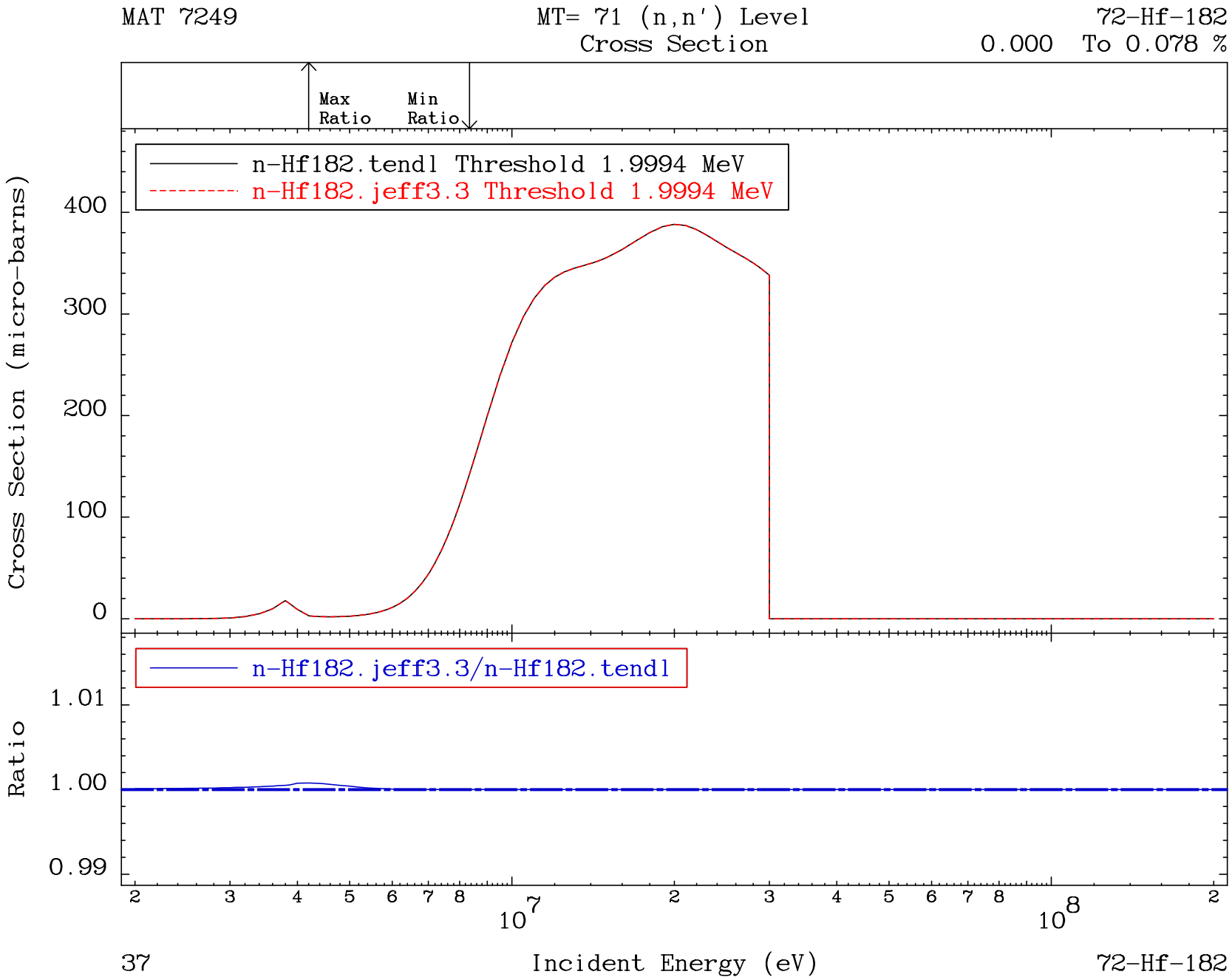

MAT 7249
MT= 66 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.314 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.7013 MeV
n-Hf182.jeff3.3 Threshold 1.7013 MeV
Cross Section (micro-barns)
800
600
400
200
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8
10^7
2 3 4 5 6 7 8
10^8
2
32
Incident Energy (eV)
72-Hf-182

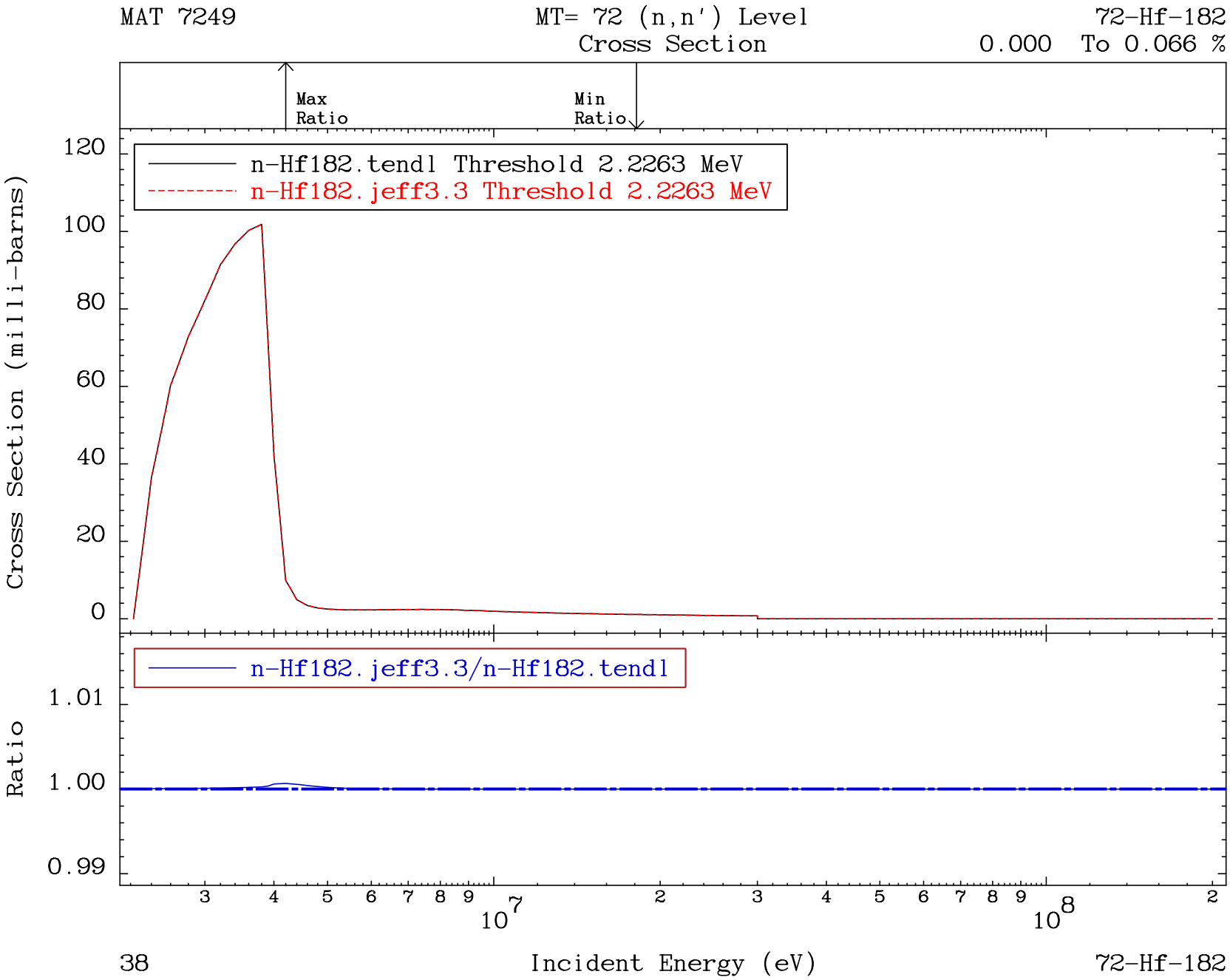

MAT 7249
MT= 67 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.070 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.7336 MeV
n-Hf182.jeff3.3 Threshold 1.7336 MeV
Cross Section (milli-barns)
140
120
100
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
33
Incident Energy (eV)
72-Hf-182

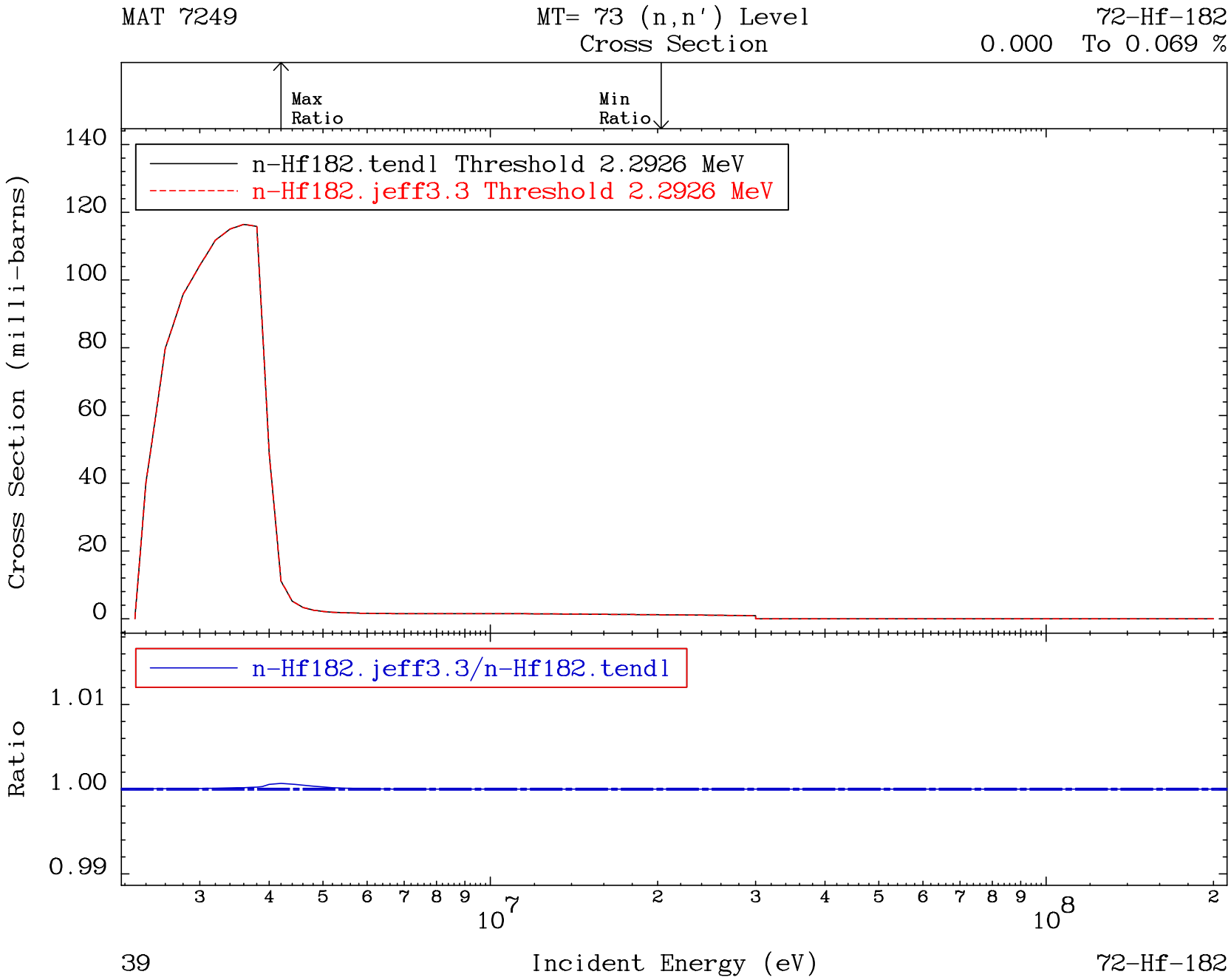

MAT 7249
MT= 68 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.070 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.8391 MeV
n-Hf182.jeff3.3 Threshold 1.8391 MeV
Cross Section (milli-barns)
160
140
120
100
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
34
Incident Energy (eV)
72-Hf-182

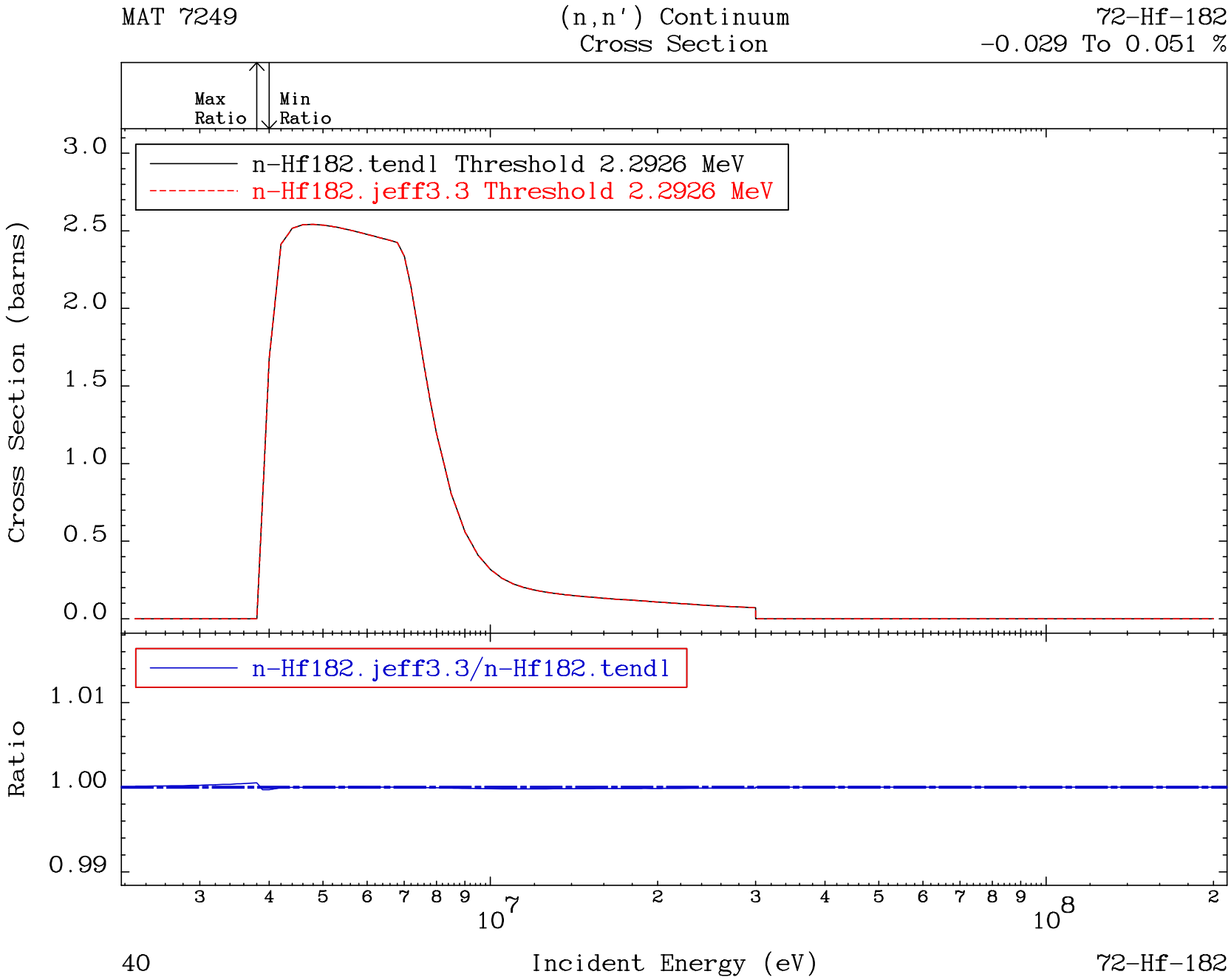

MAT 7249
MT= 69 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.313 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.8955 MeV
n-Hf182.jeff3.3 Threshold 1.8955 MeV
Cross Section (milli-barns)
160
140
120
100
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
35
Incident Energy (eV)
72-Hf-182

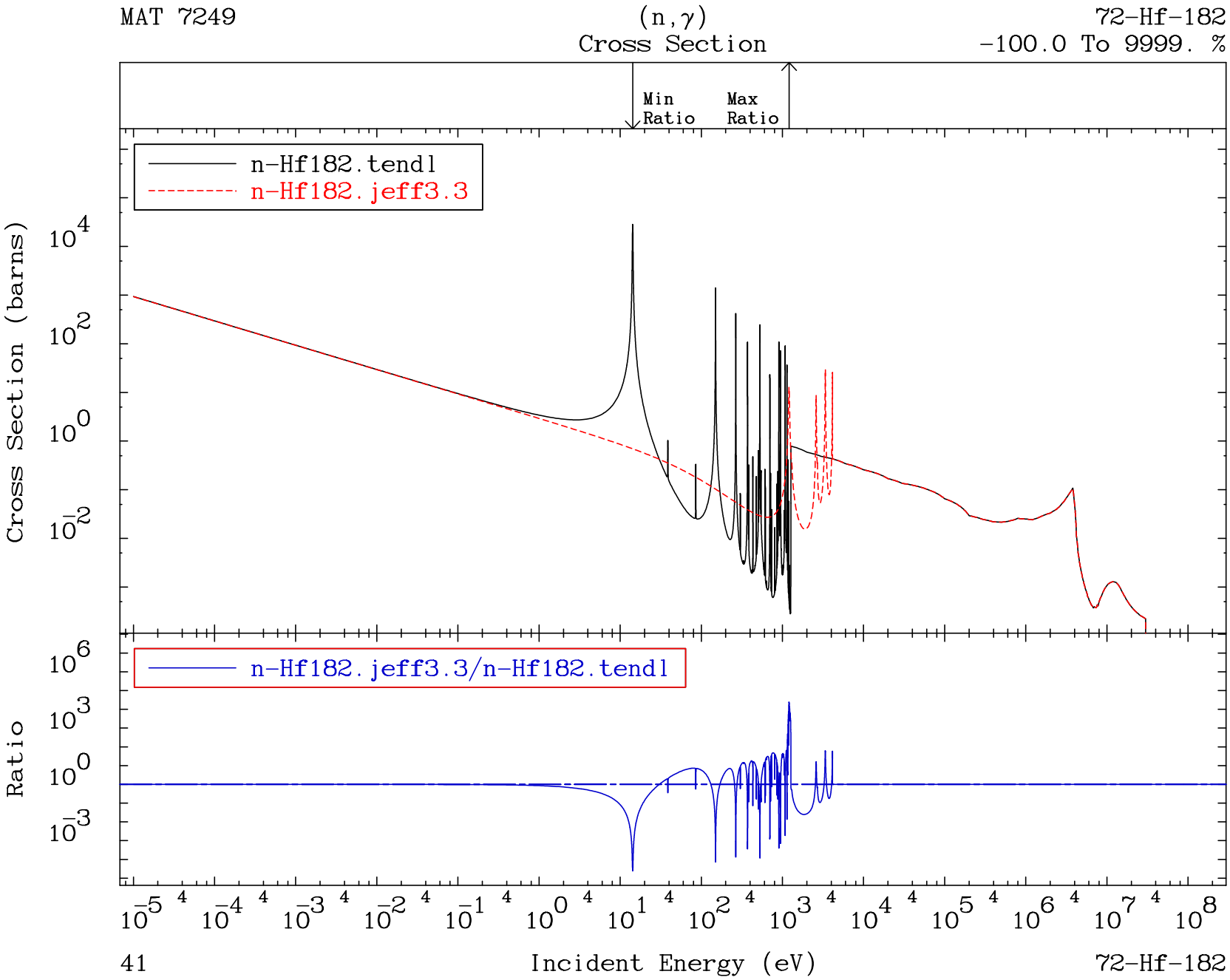

MAT 7249
MT= 70 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.070 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.9256 MeV
n-Hf182.jeff3.3 Threshold 1.9256 MeV
Cross Section (milli-barns)
100
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8 10^7 2 3 4 5 6 7 8 10^8 2
36
Incident Energy (eV)
72-Hf-182

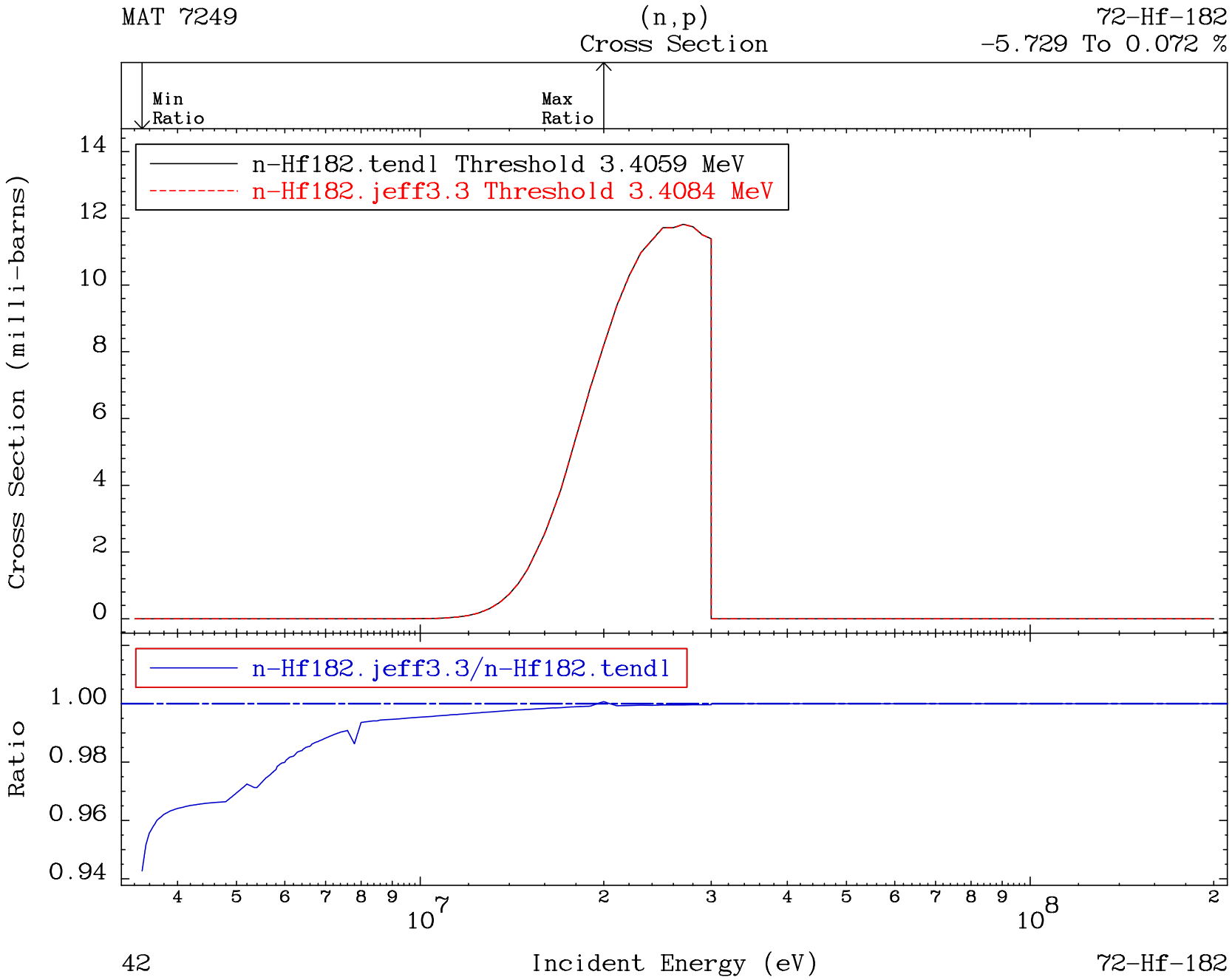

MAT 7249
MT= 71 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.078 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.9994 MeV
n-Hf182.jeff3.3 Threshold 1.9994 MeV
Cross Section (micro-barns)
400
300
200
100
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8
10^7
2 3 4 5 6 7 8
10^8
2
37
Incident Energy (eV)
72-Hf-182

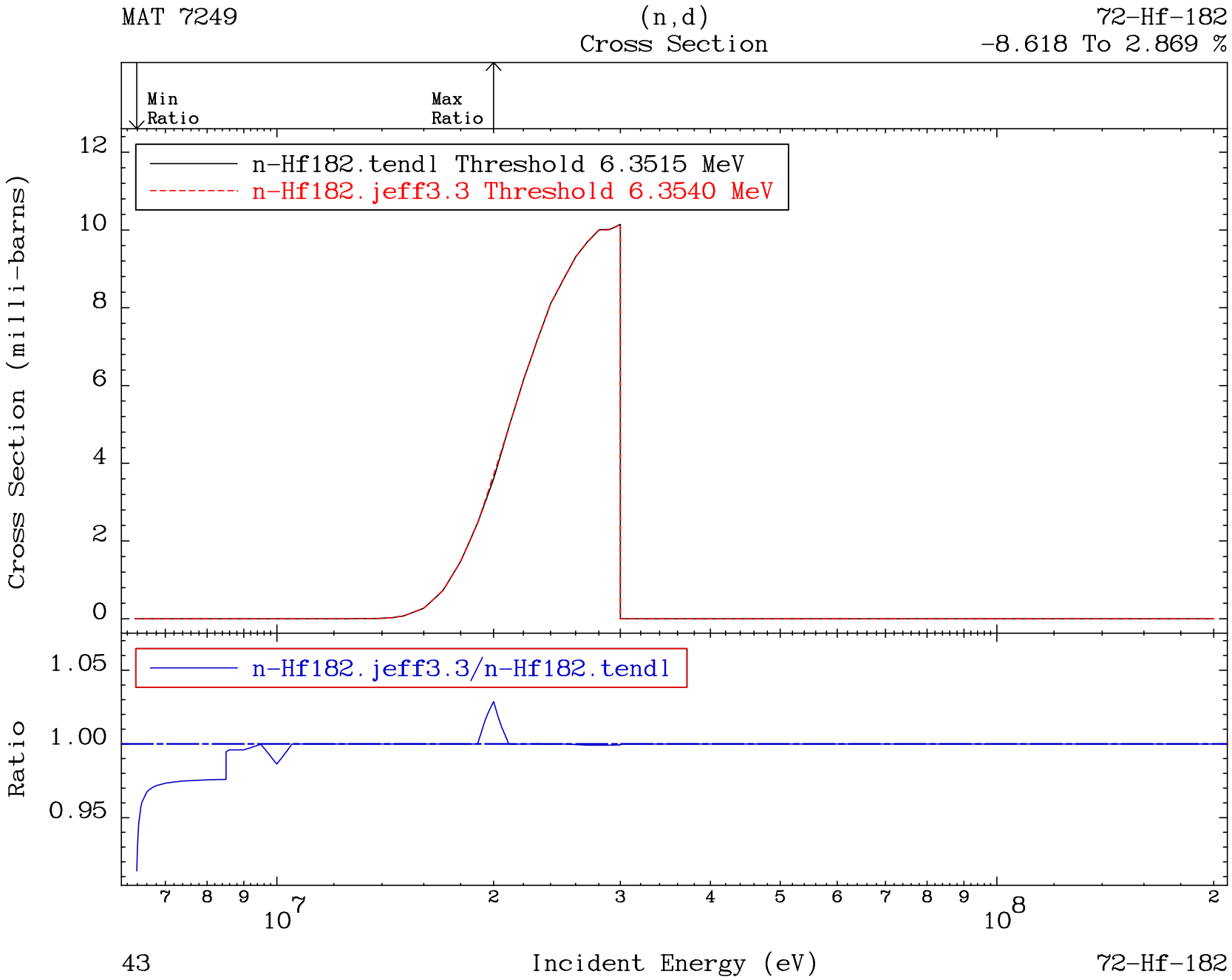

MAT 7249
MT= 72 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.066 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 2.2263 MeV
n-Hf182.jeff3.3 Threshold 2.2263 MeV
Cross Section (milli-barns)
120
100
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
3 4 5 6 7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
38
Incident Energy (eV)
72-Hf-182

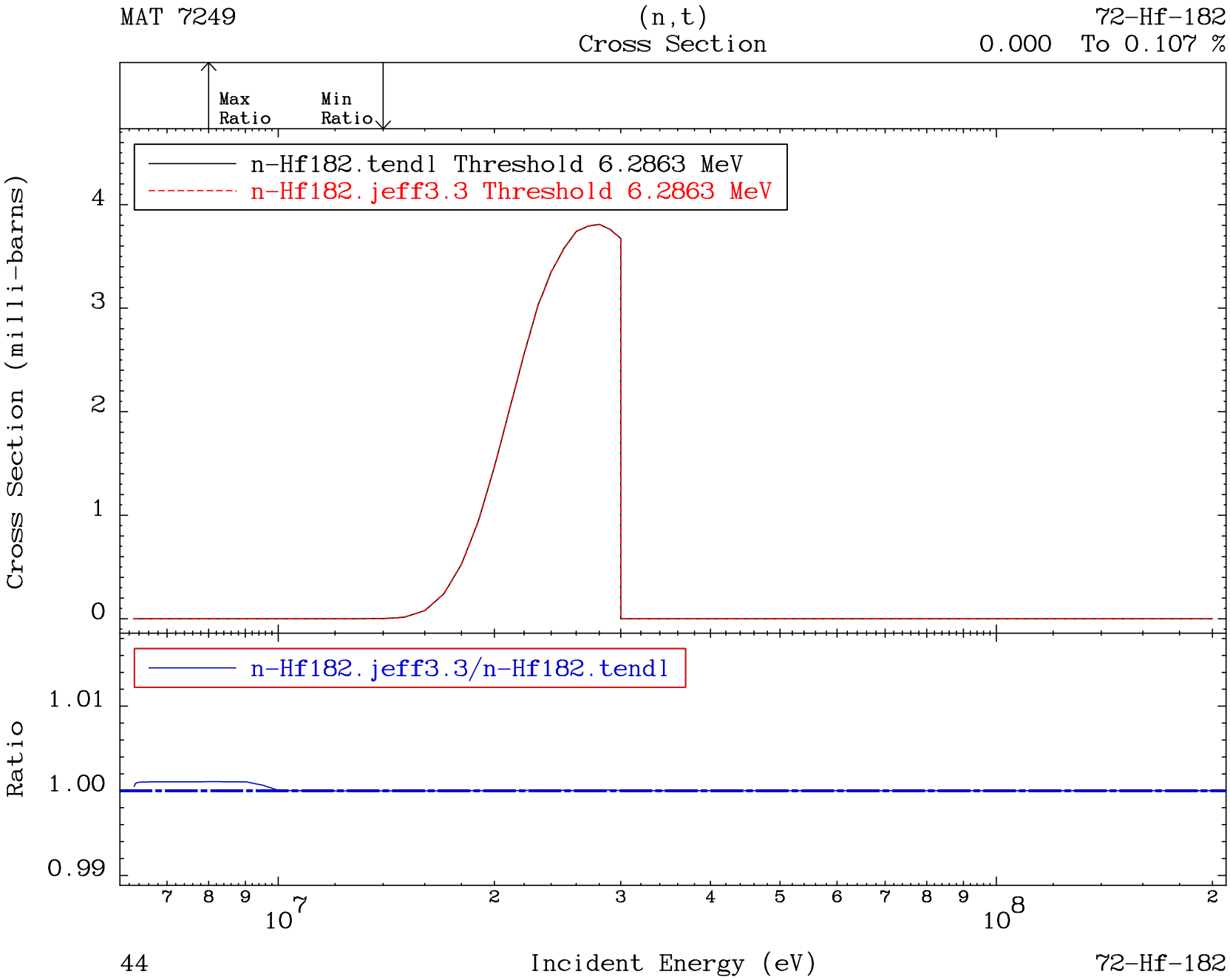

MAT 7249
MT= 73 (n,n') Level
Cross Section
72-Hf-182
0.000 To 0.069 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 2.2926 MeV
n-Hf182.jeff3.3 Threshold 2.2926 MeV
Cross Section (milli-barns)
140
120
100
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
3 4 5 6 7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
39
Incident Energy (eV)
72-Hf-182

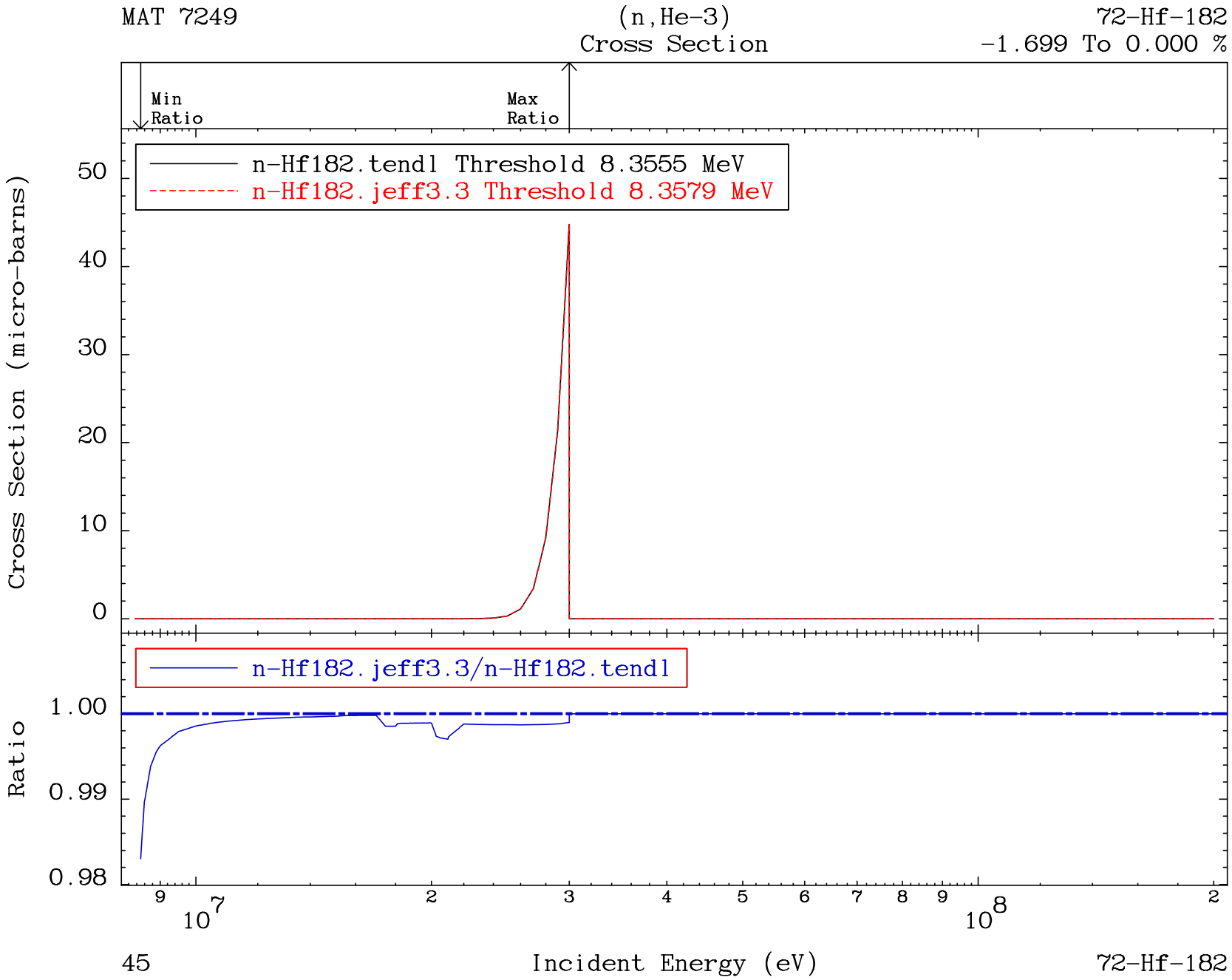

MAT 7249
(n,n') Continuum
Cross Section
72-Hf-182
-0.029 To 0.051 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 2.2926 MeV
n-Hf182.jeff3.3 Threshold 2.2926 MeV
Cross Section (barns)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
3 4 5 6 7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
40
Incident Energy (eV)
72-Hf-182

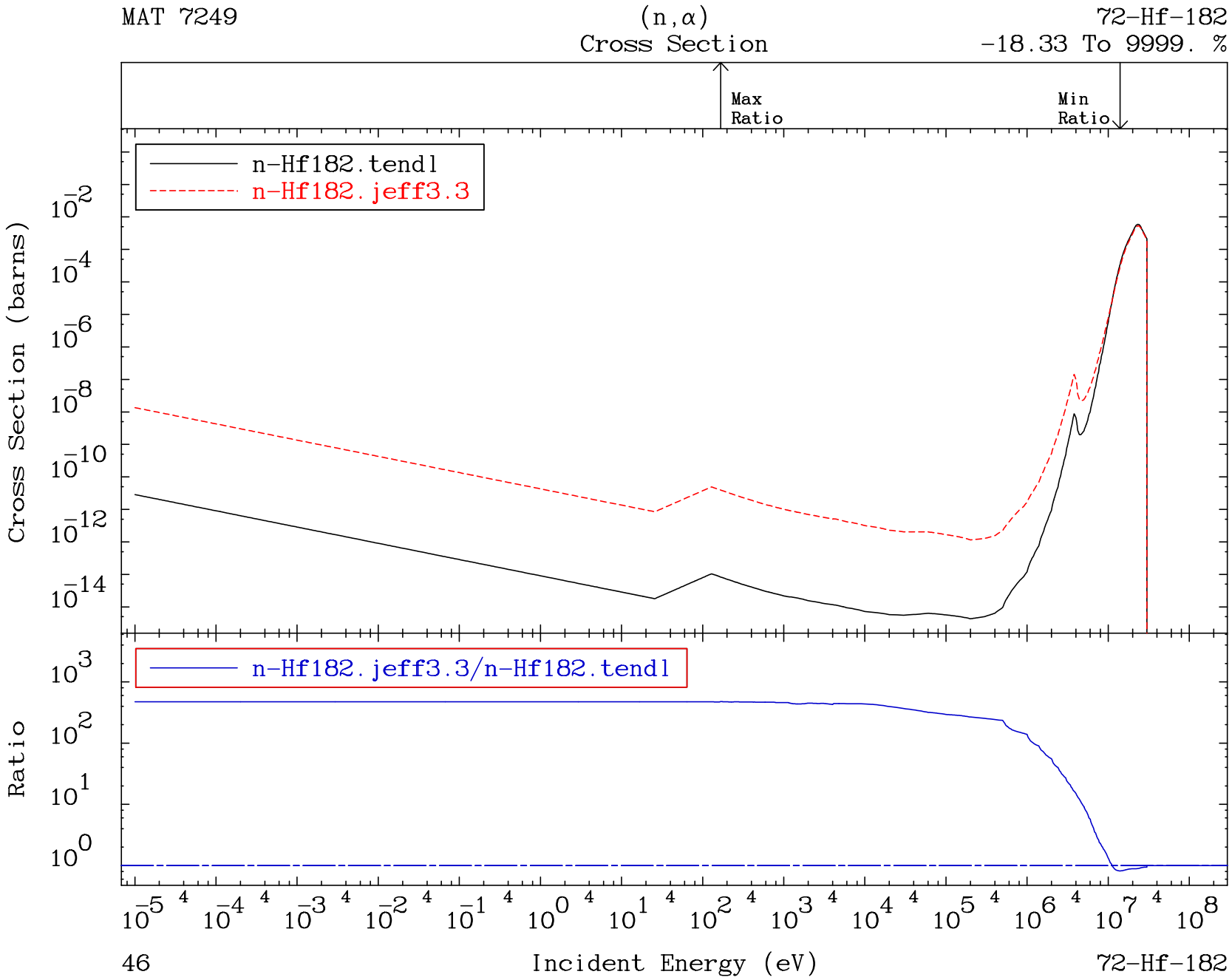

MAT 7249
(n,γ)
Cross Section
72-Hf-182
-100.0 To 9999. %
Min Ratio
Max Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
41
72-Hf-182

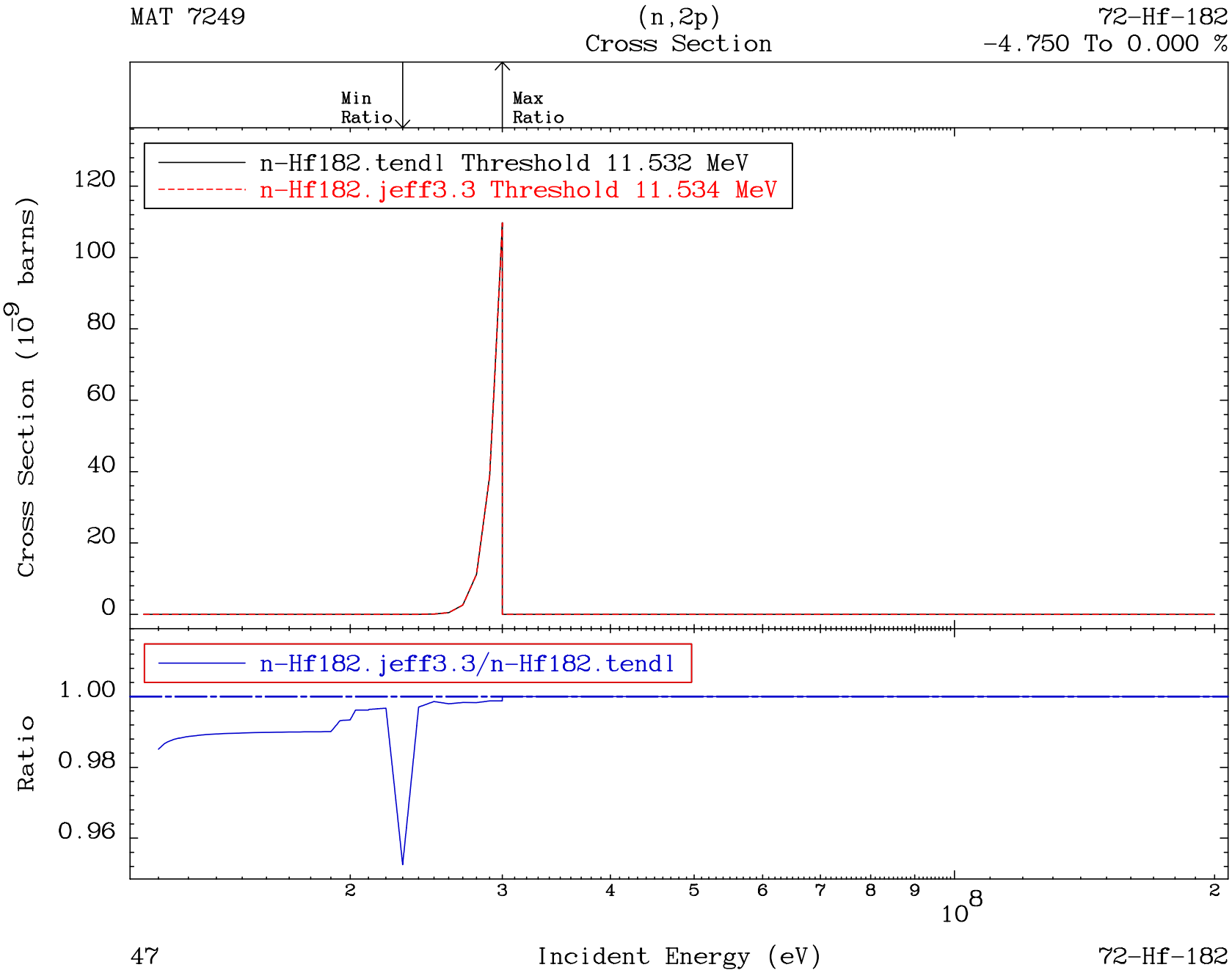

MAT 7249
(n,p)
Cross Section
72-Hf-182
-5.729 To 0.072 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 3.4059 MeV
n-Hf182.jeff3.3 Threshold 3.4084 MeV
Cross Section (milli-barns)
14
12
10
8
6
4
2
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.00
0.98
0.96
0.94
4 5 6 7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
42
Incident Energy (eV)
72-Hf-182

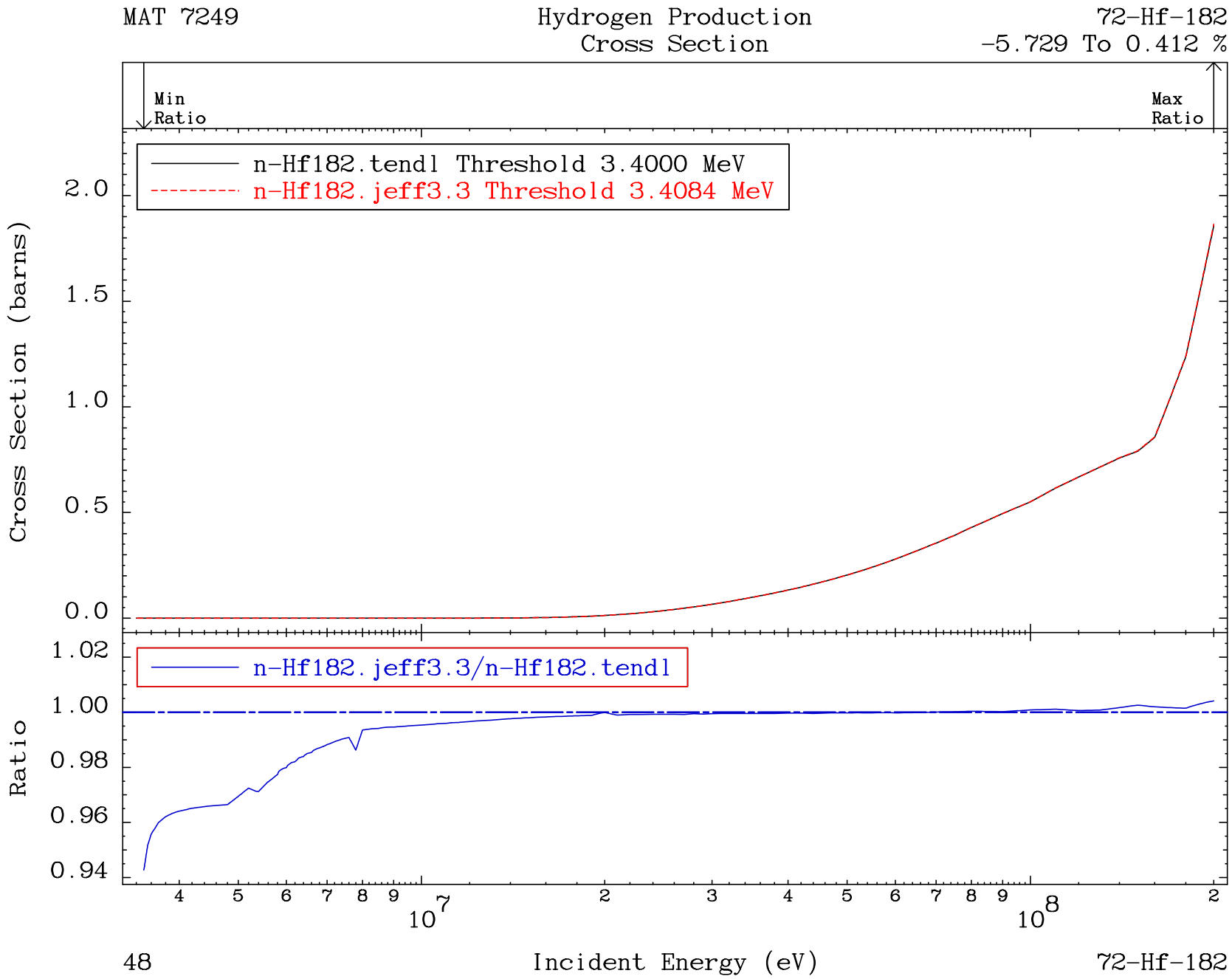

MAT 7249
(n,d)
Cross Section
72-Hf-182
-8.618 To 2.869 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 6.3515 MeV
n-Hf182.jeff3.3 Threshold 6.3540 MeV
Cross Section (milli-barns)
12
10
8
6
4
2
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.05
1.00
0.95
7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
43
Incident Energy (eV)
72-Hf-182

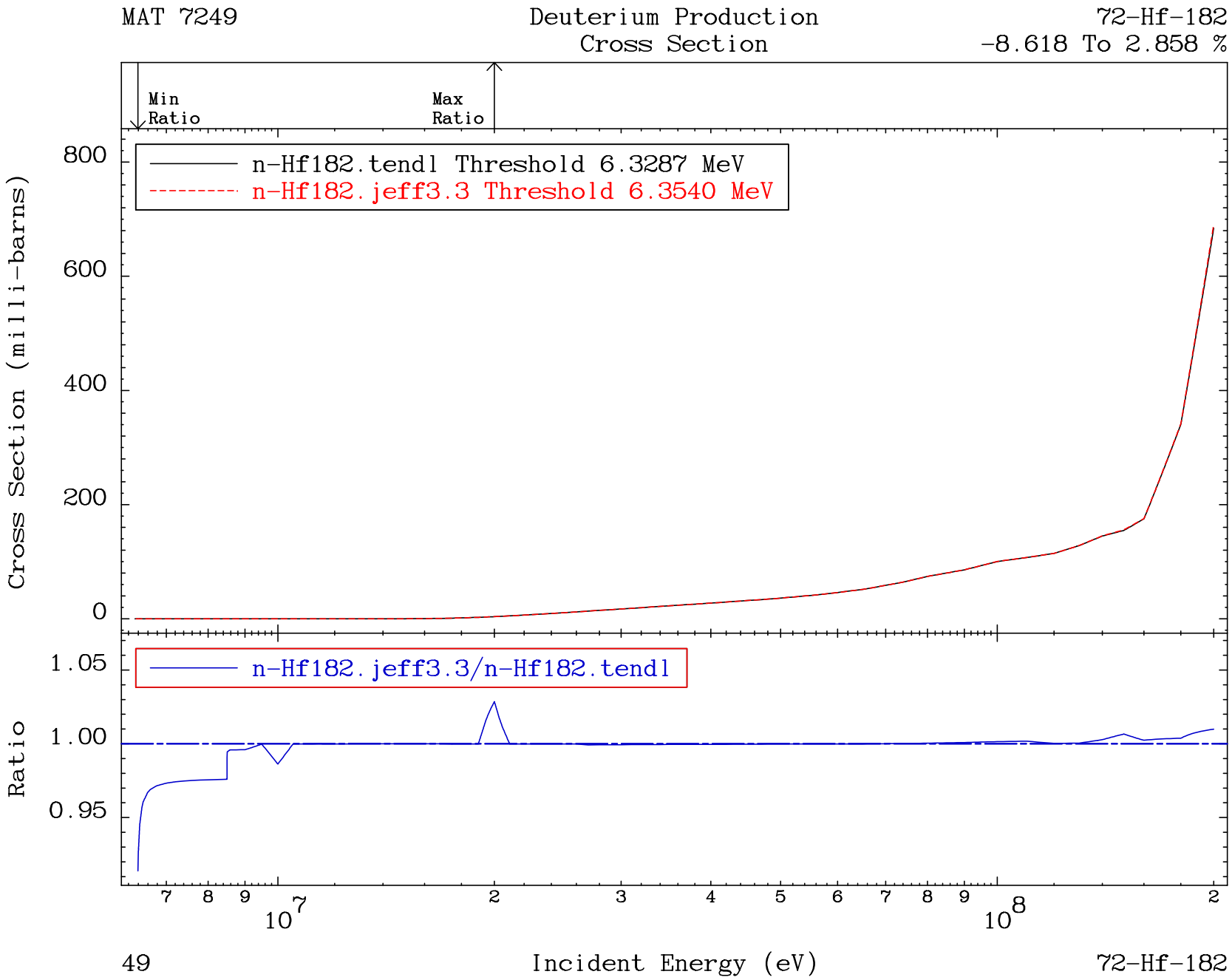

MAT 7249
(n,t)
Cross Section
72-Hf-182
0.000 To 0.107 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 6.2863 MeV
n-Hf182.jeff3.3 Threshold 6.2863 MeV
Cross Section (milli-barns)
0
1
2
3
4
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
0.99
1.00
1.01
7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
44
Incident Energy (eV)
72-Hf-182

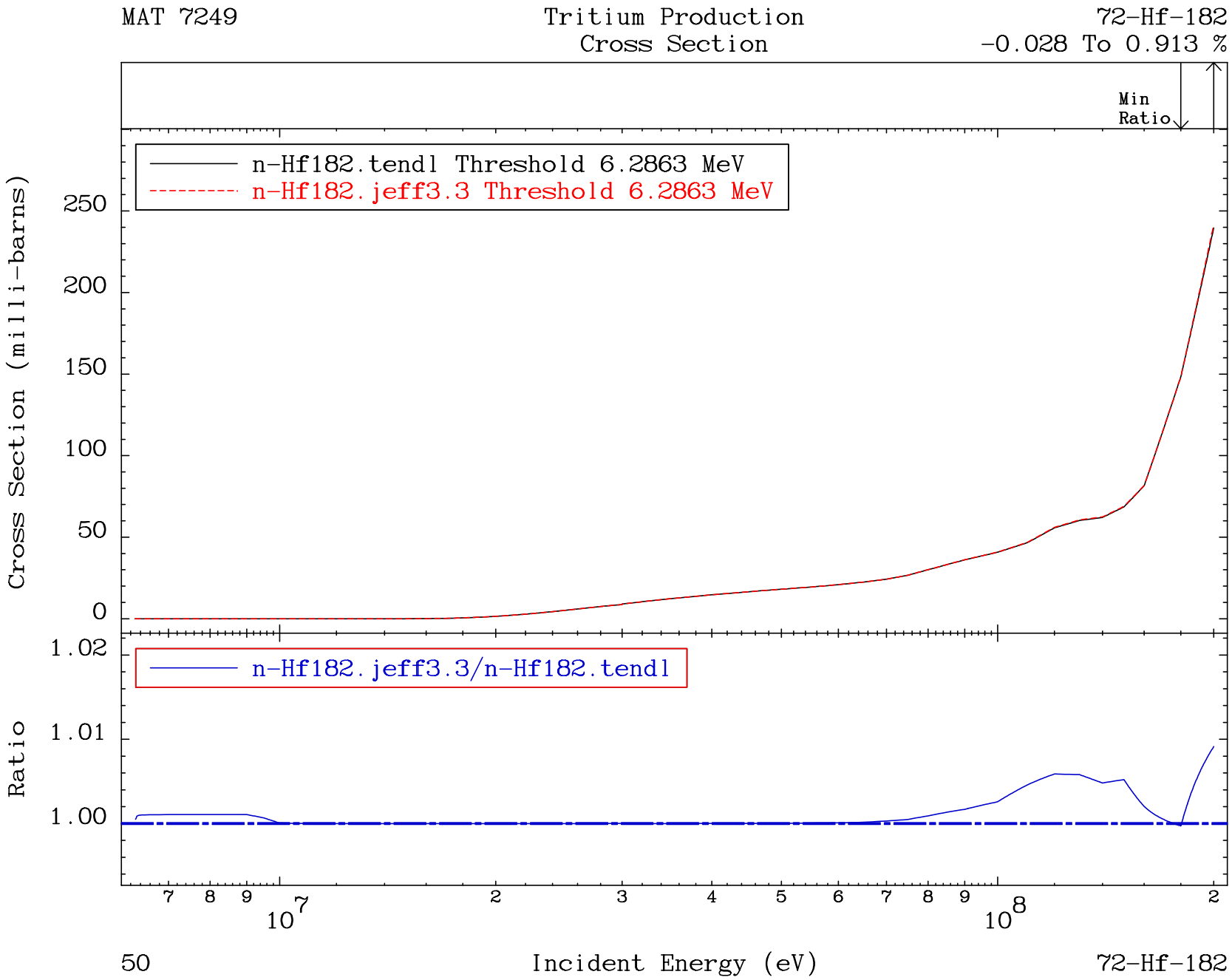

MAT 7249
(n,He-3)
Cross Section
72-Hf-182
-1.699 To 0.000 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 8.3555 MeV
n-Hf182.jeff3.3 Threshold 8.3579 MeV
Cross Section (micro-barns)
50
40
30
20
10
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.00
0.99
0.98
9
10^7
2
3
4
5
6
7
8
9
10^8
2
45
Incident Energy (eV)
72-Hf-182

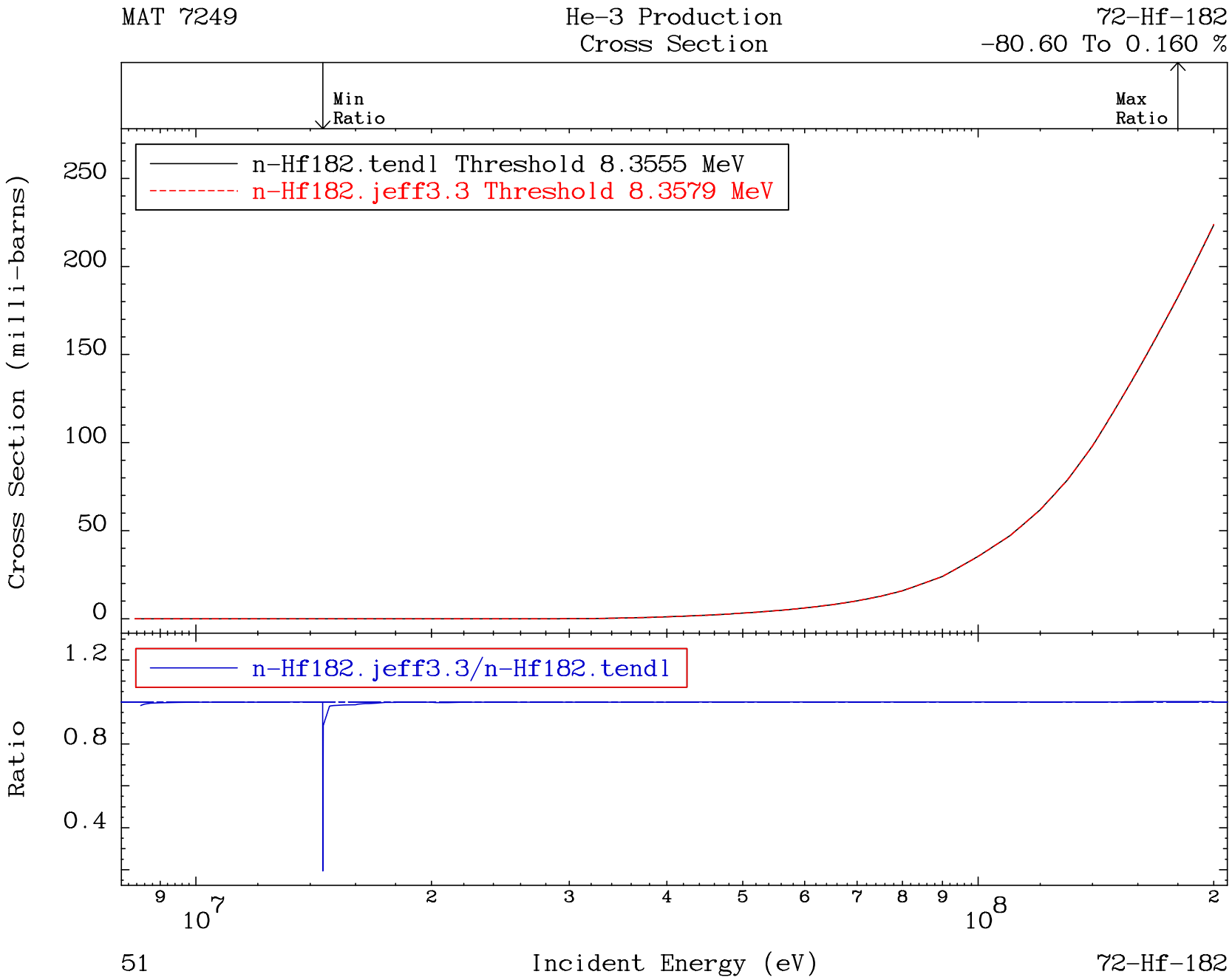

MAT 7249
(n,α)
Cross Section
72-Hf-182
-18.33 To 9999. %
Max Ratio
Min Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
46
72-Hf-182

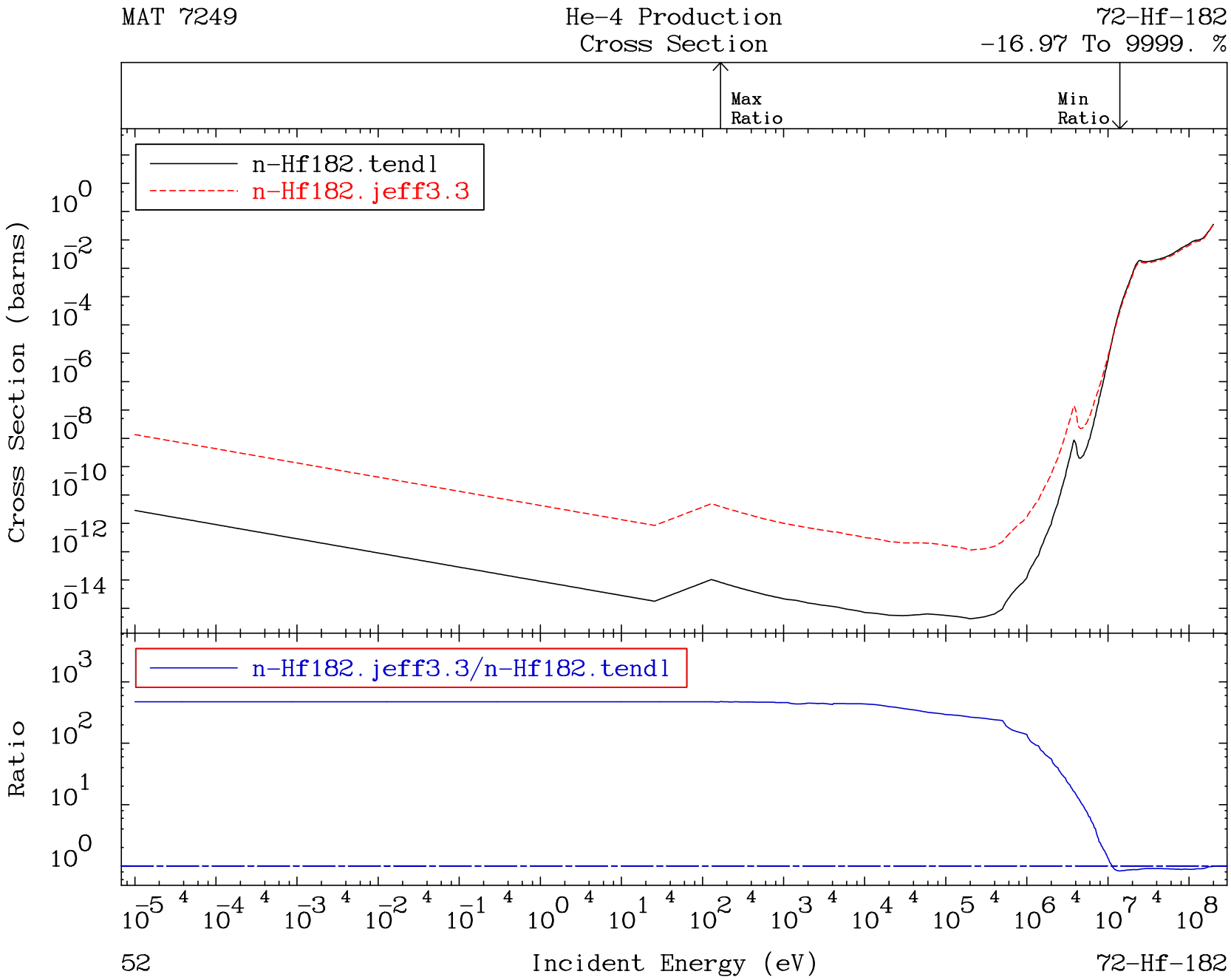

MAT 7249
(n,2p)
Cross Section
72-Hf-182
-4.750 To 0.000 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 11.532 MeV
n-Hf182.jeff3.3 Threshold 11.534 MeV
Cross Section (10^{-9} barns)
120
100
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.00
0.98
0.96
2
3
4
5
6
7
8
9
10^8
2
47
Incident Energy (eV)
72-Hf-182

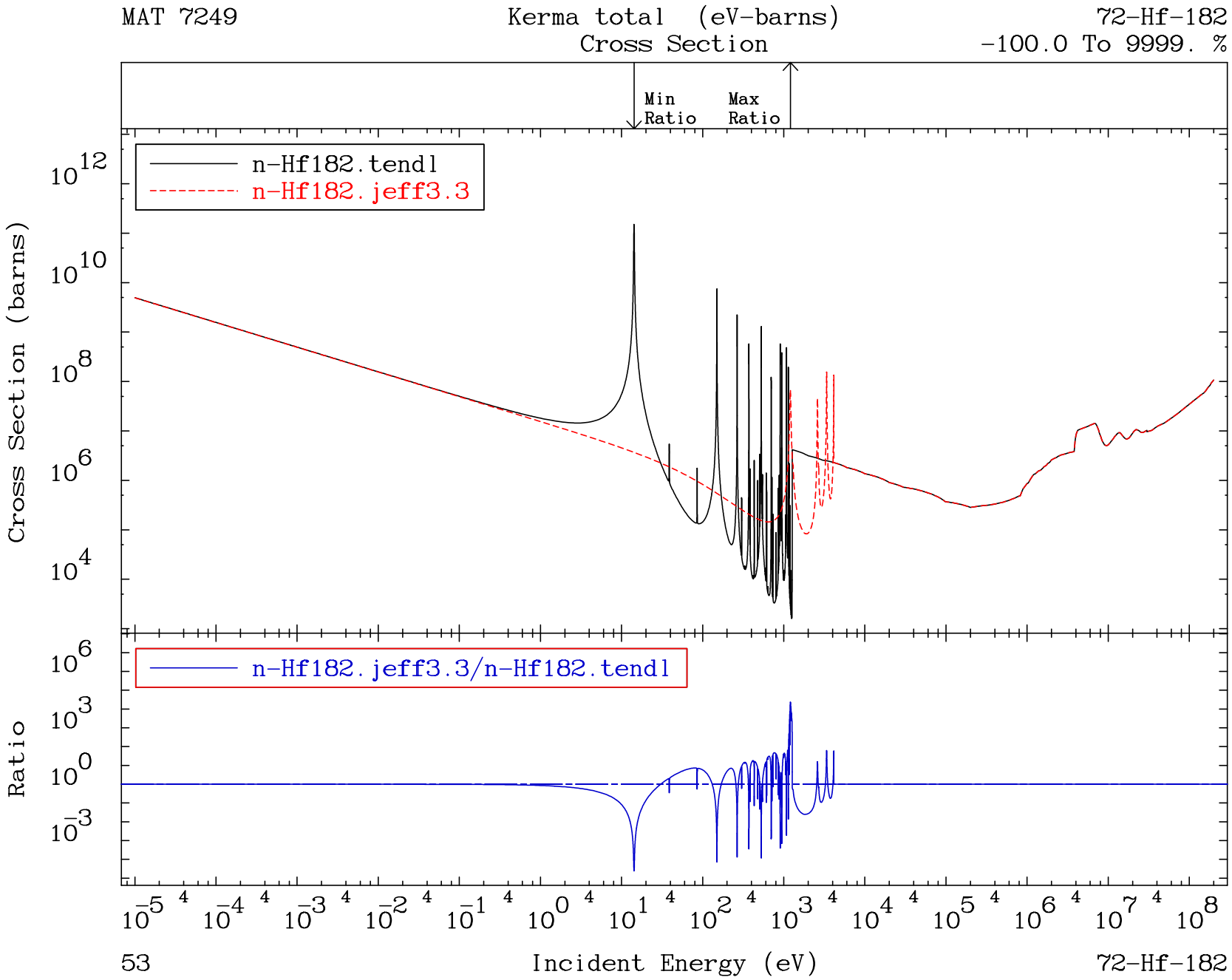

MAT 7249
Hydrogen Production
Cross Section
72-Hf-182
-5.729 To 0.412 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 3.4000 MeV
n-Hf182.jeff3.3 Threshold 3.4084 MeV
Cross Section (barns)
2.0
1.5
1.0
0.5
0.0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.02
1.00
0.98
0.96
0.94
4 5 6 7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
48
Incident Energy (eV)
72-Hf-182

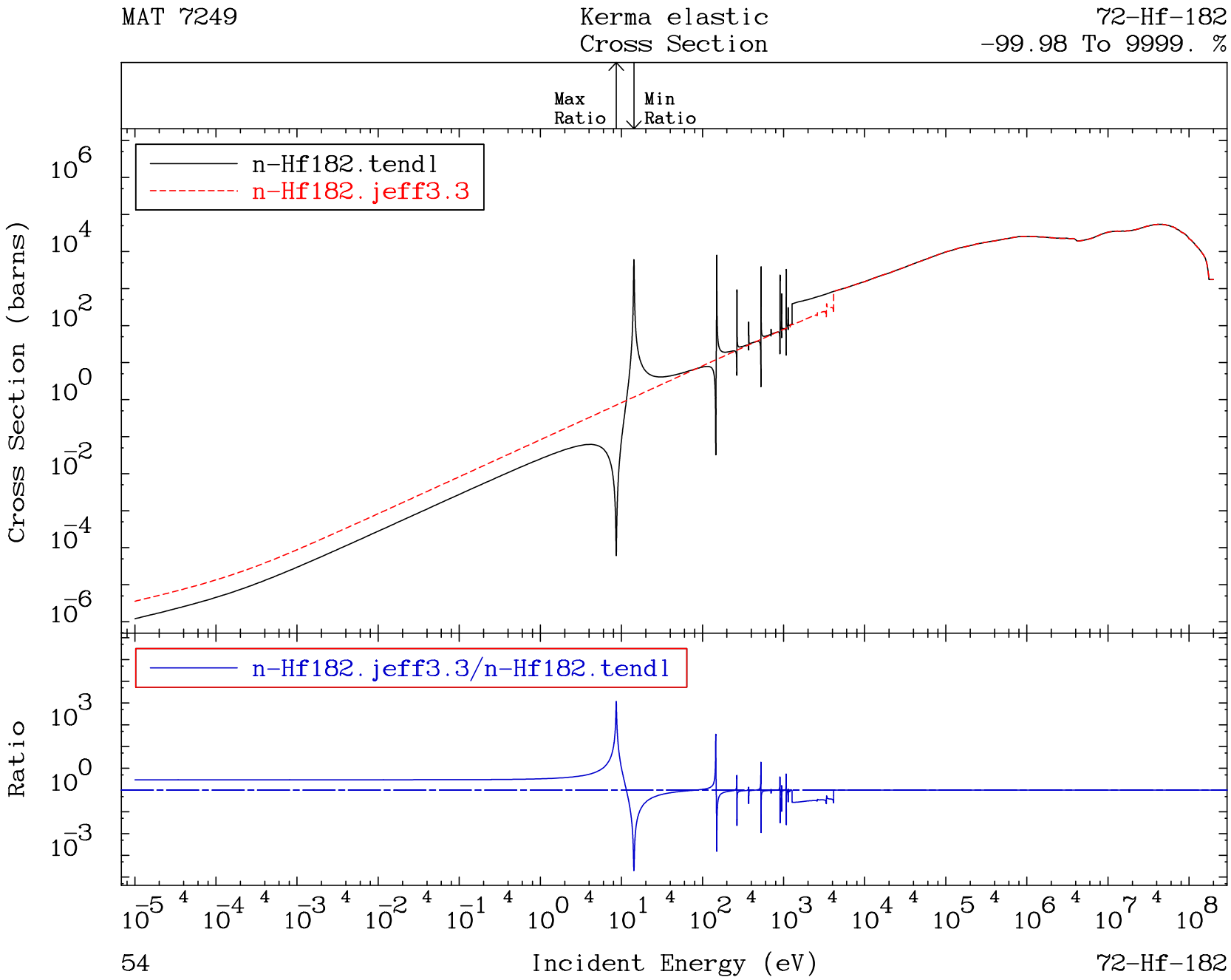

MAT 7249
Deuterium Production
Cross Section
72-Hf-182
-8.618 To 2.858 %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 6.3287 MeV
n-Hf182.jeff3.3 Threshold 6.3540 MeV
Cross Section (milli-barns)
800
600
400
200
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.05
1.00
0.95
7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
49
Incident Energy (eV)
72-Hf-182

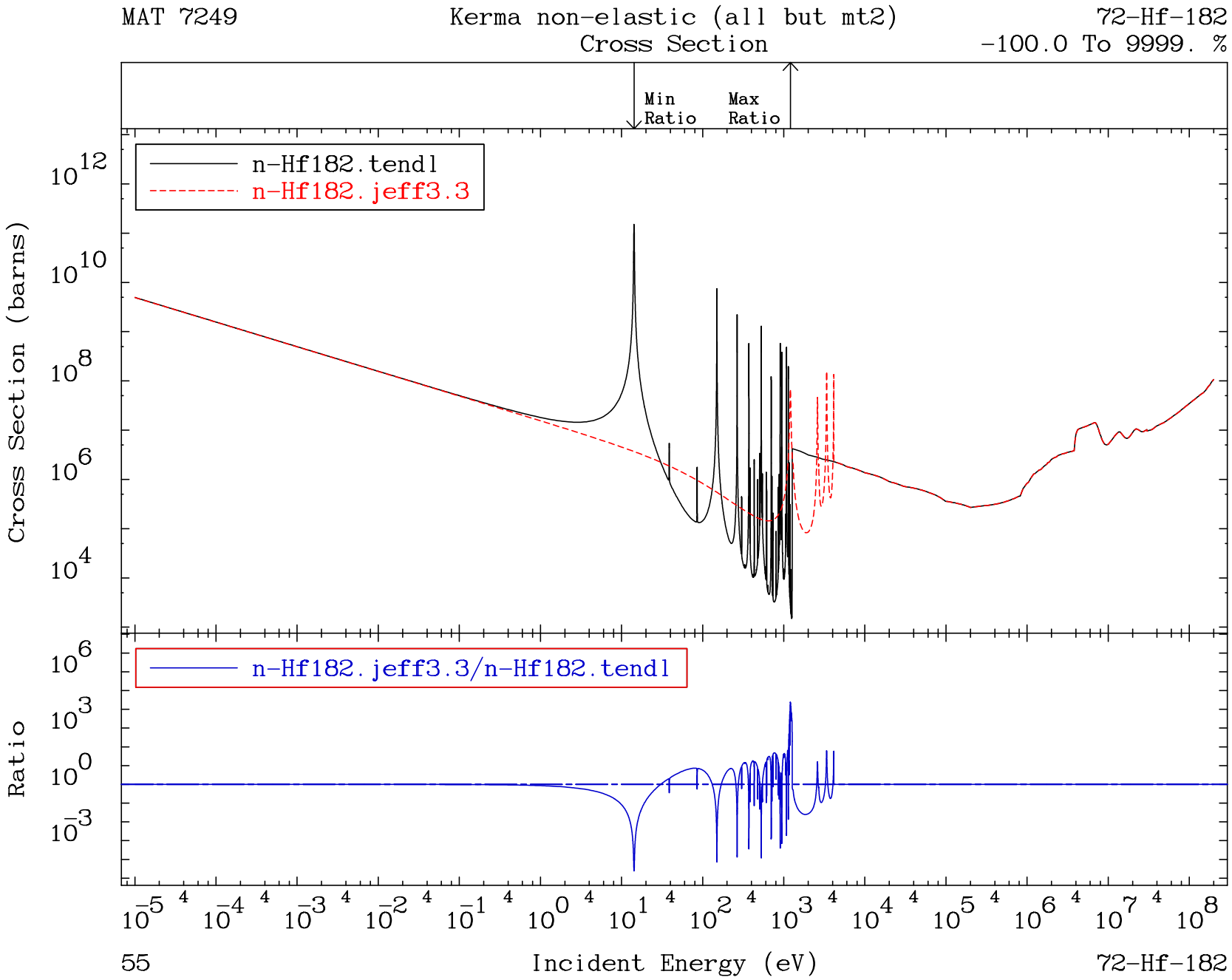

MAT 7249
Tritium Production
Cross Section
72-Hf-182
-0.028 To 0.913 %
Min
Ratio
n-Hf182.tendl Threshold 6.2863 MeV
n-Hf182.jeff3.3 Threshold 6.2863 MeV
Cross Section (milli-barns)
250
200
150
100
50
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.02
1.01
1.00
7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
50
Incident Energy (eV)
72-Hf-182

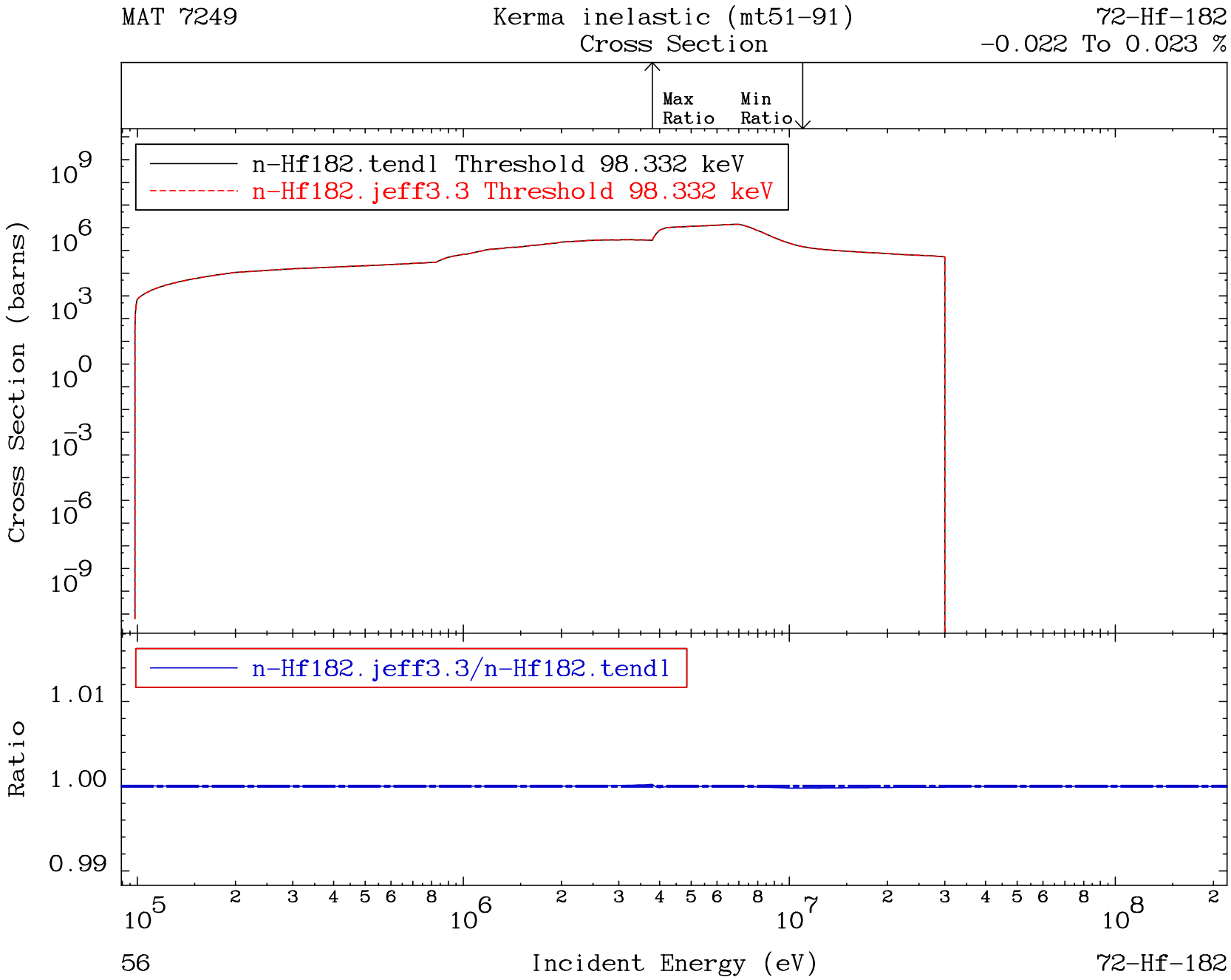

MAT 7249
He-3 Production
Cross Section
72-Hf-182
-80.60 To 0.160 %
Min
Ratio
Max
Ratio
n-Hf182.tendl Threshold 8.3555 MeV
n-Hf182.jeff3.3 Threshold 8.3579 MeV
Cross Section (milli-barns)
250
200
150
100
50
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.2
0.8
0.4
9
10^7
2
3
4
5
6
7
8
9
10^8
2
51
Incident Energy (eV)
72-Hf-182

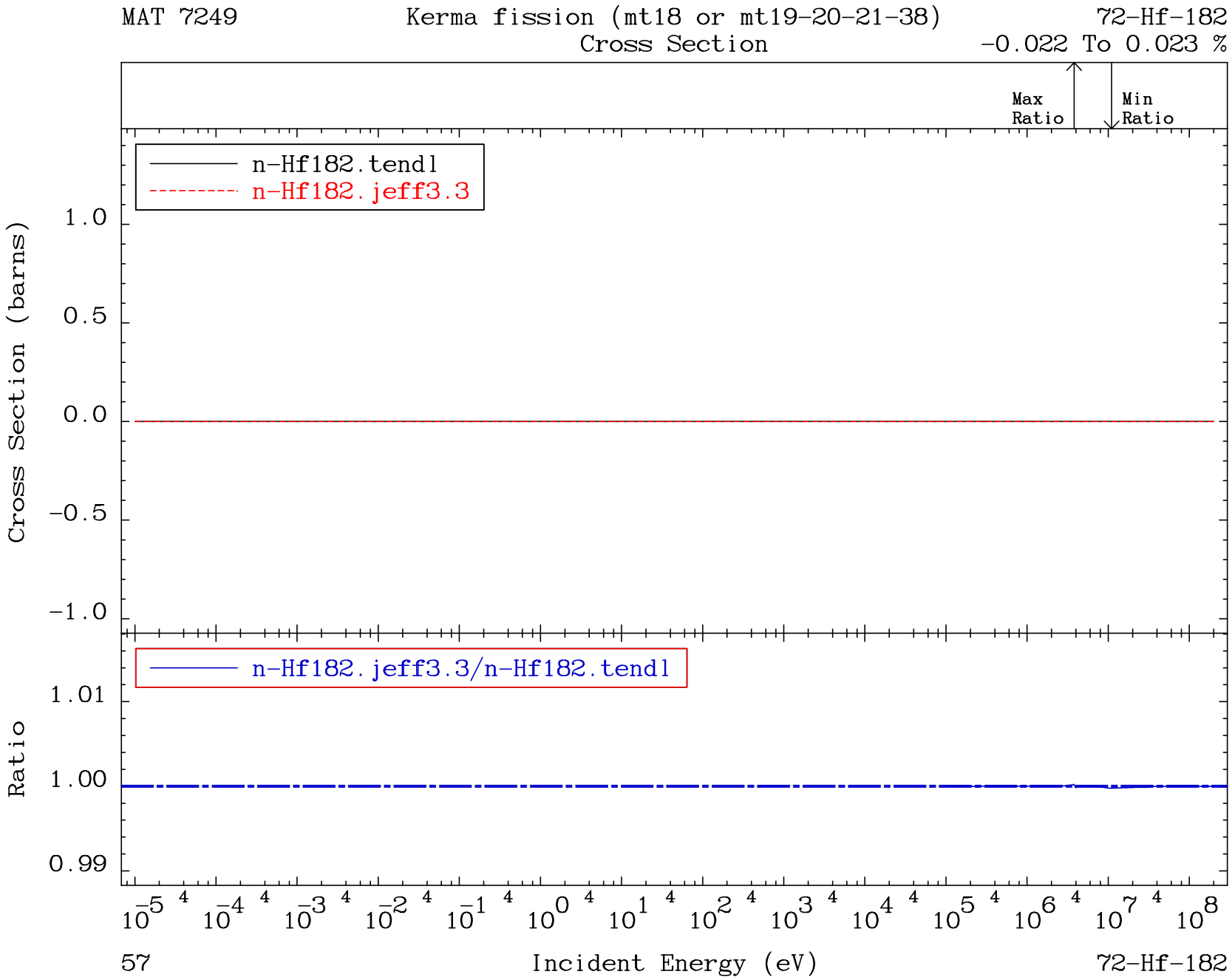

MAT 7249
He-4 Production
Cross Section
72-Hf-182
-16.97 To 9999. %
Max
Ratio
Min
Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
52
72-Hf-182

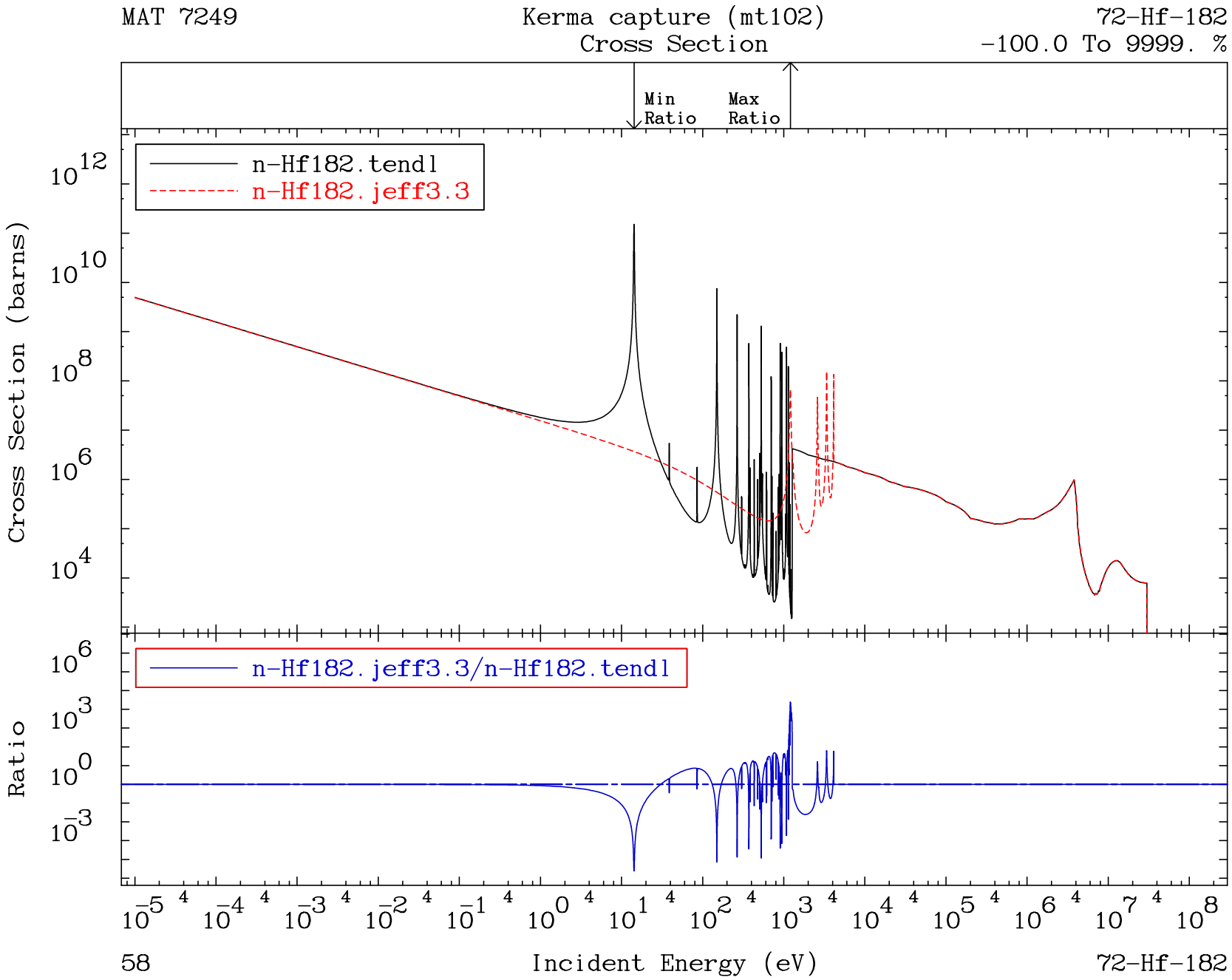

MAT 7249
Kerma total (eV-barns)
Cross Section
72-Hf-182
-100.0 To 9999. %
Min Ratio
Max Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
53
72-Hf-182

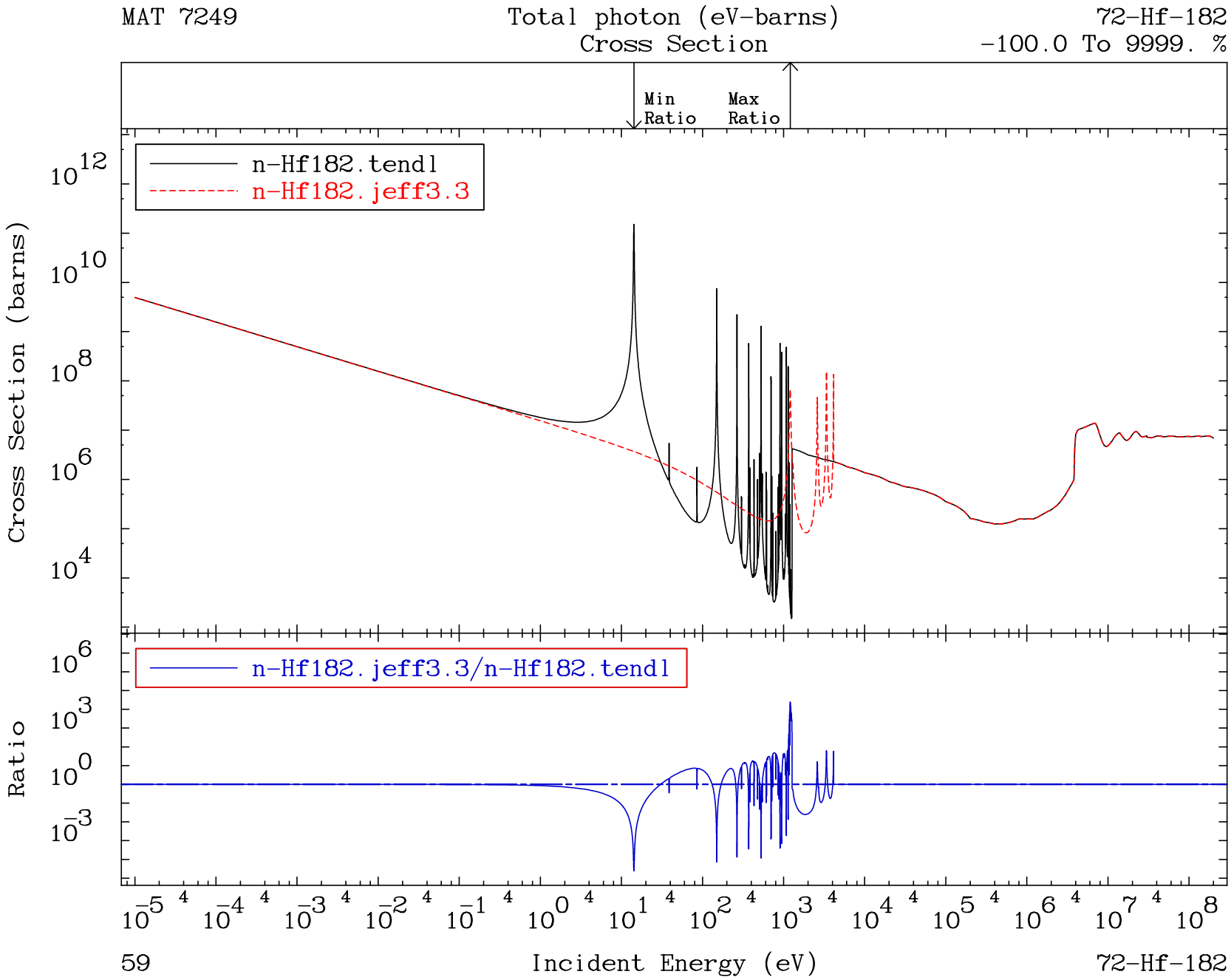

MAT 7249
Kerma elastic
Cross Section
72-Hf-182
-99.98 To 9999. %
Max
Ratio
Min
Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
54
Incident Energy (eV)
72-Hf-182

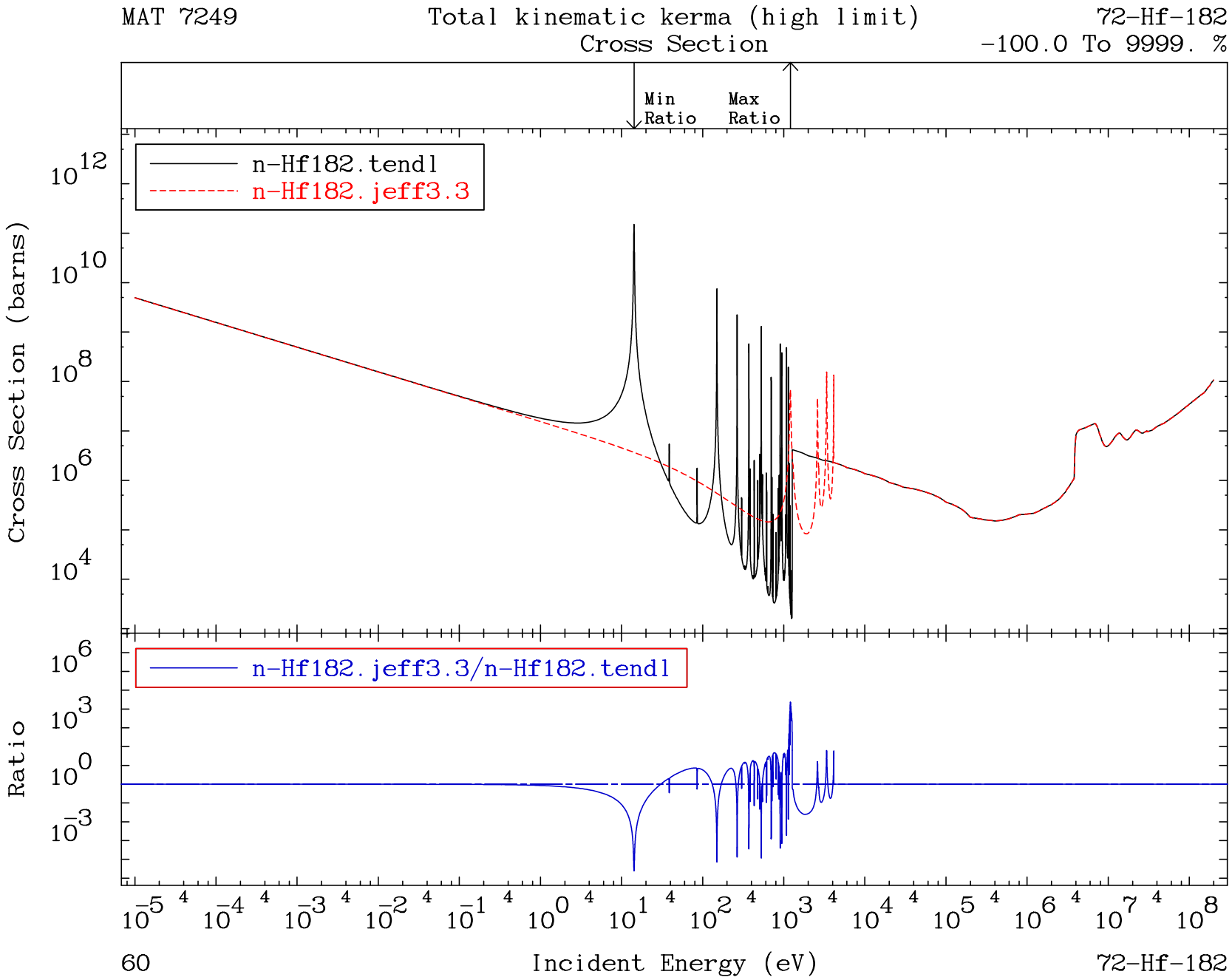

MAT 7249
Kerma non-elastic (all but mt2)
Cross Section
72-Hf-182
-100.0 To 9999. %
Min Ratio
Max Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
55
72-Hf-182

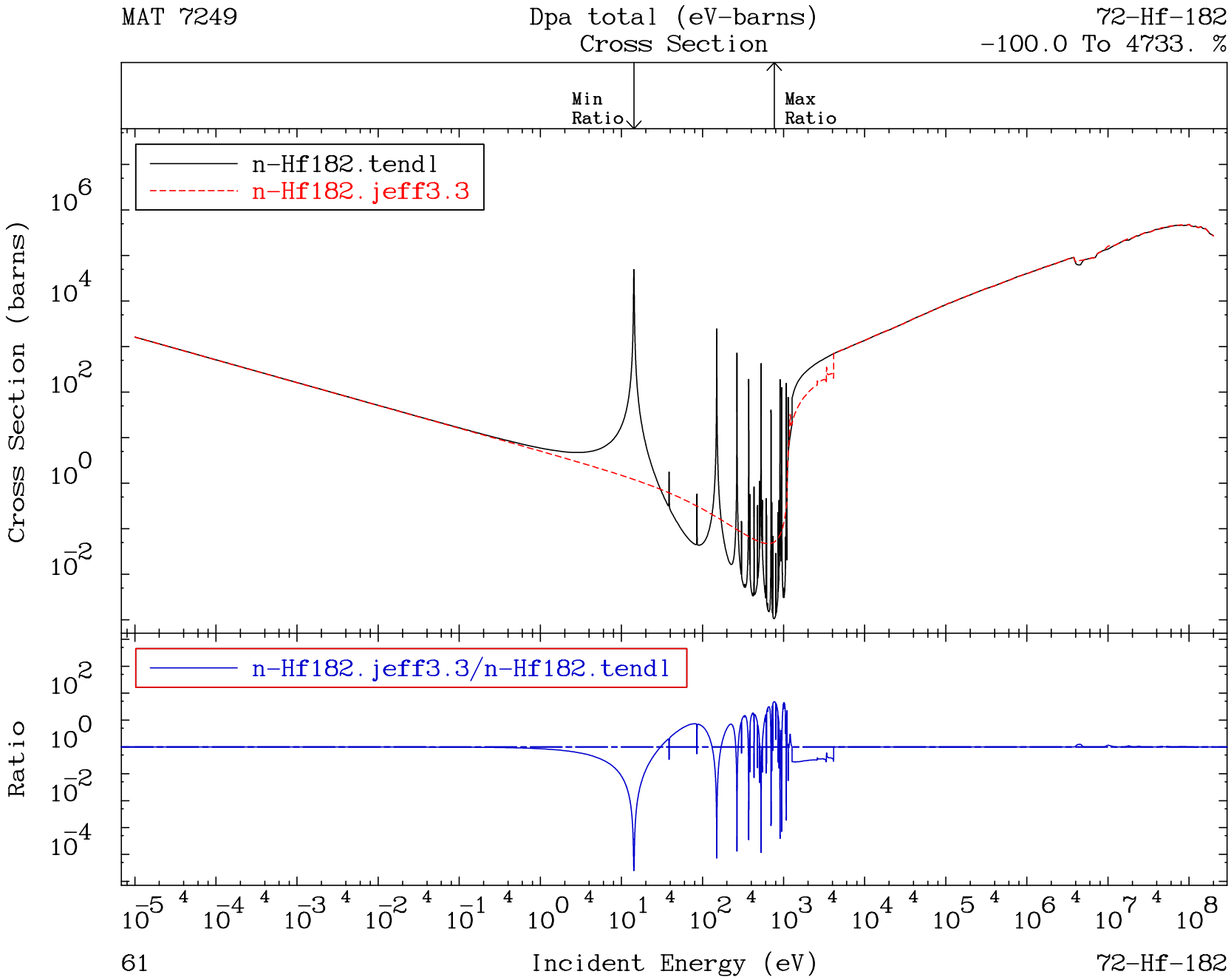

MAT 7249
Kerma inelastic (mt51-91)
Cross Section
72-Hf-182
-0.022 To 0.023 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 98.332 keV
n-Hf182.jeff3.3 Threshold 98.332 keV
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
56
72-Hf-182

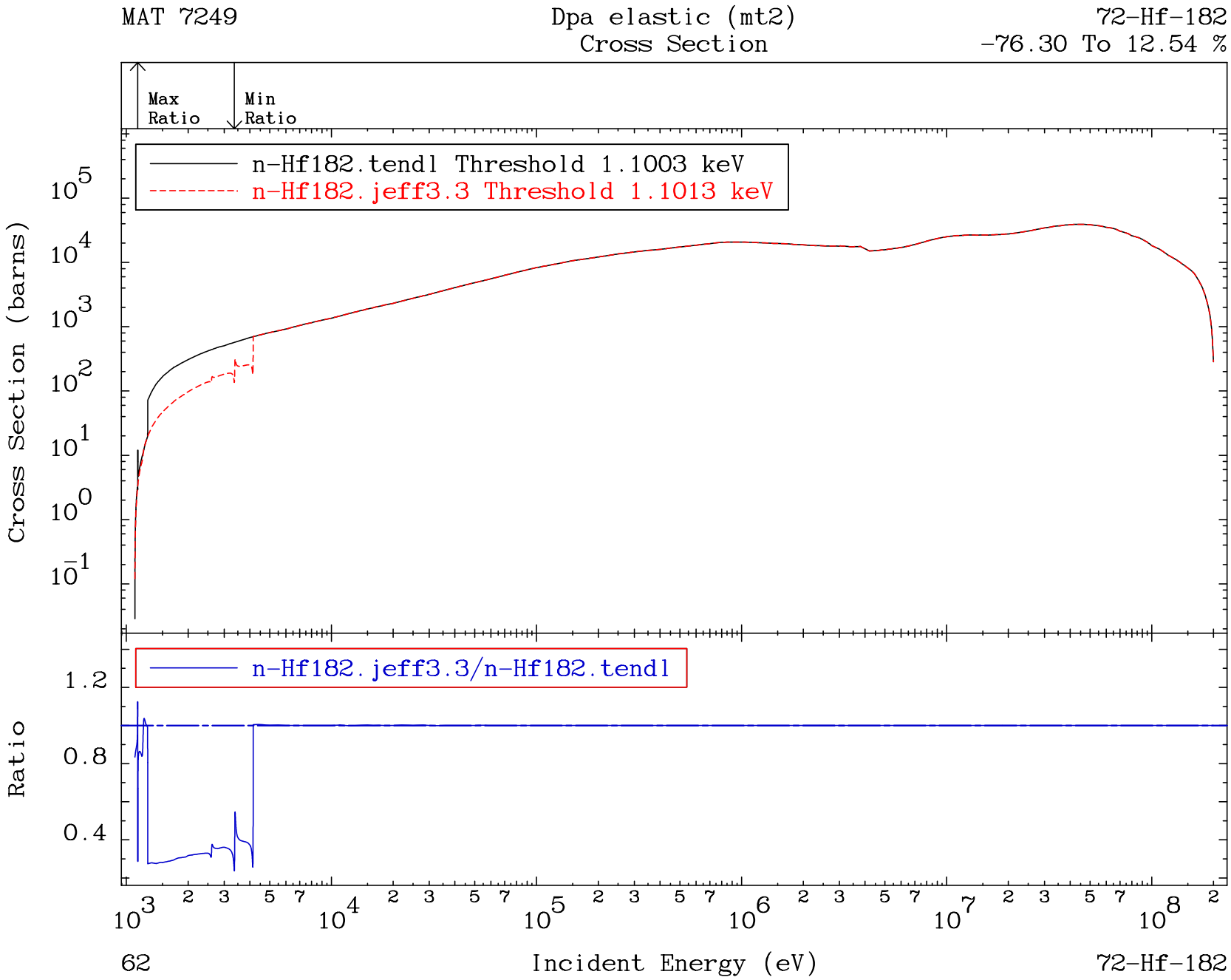

MAT 7249
Kerma fission (mt18 or mt19-20-21-38)
Cross Section
72-Hf-182
-0.022 To 0.023 %
Max Ratio
Min Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
1.0
0.5
0.0
-0.5
-1.0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
10^-5 10^-4 10^-3 10^-2 10^-1 10^0 10^1 10^2 10^3 10^4 10^5 10^6 10^7 10^8
57
Incident Energy (eV)
72-Hf-182

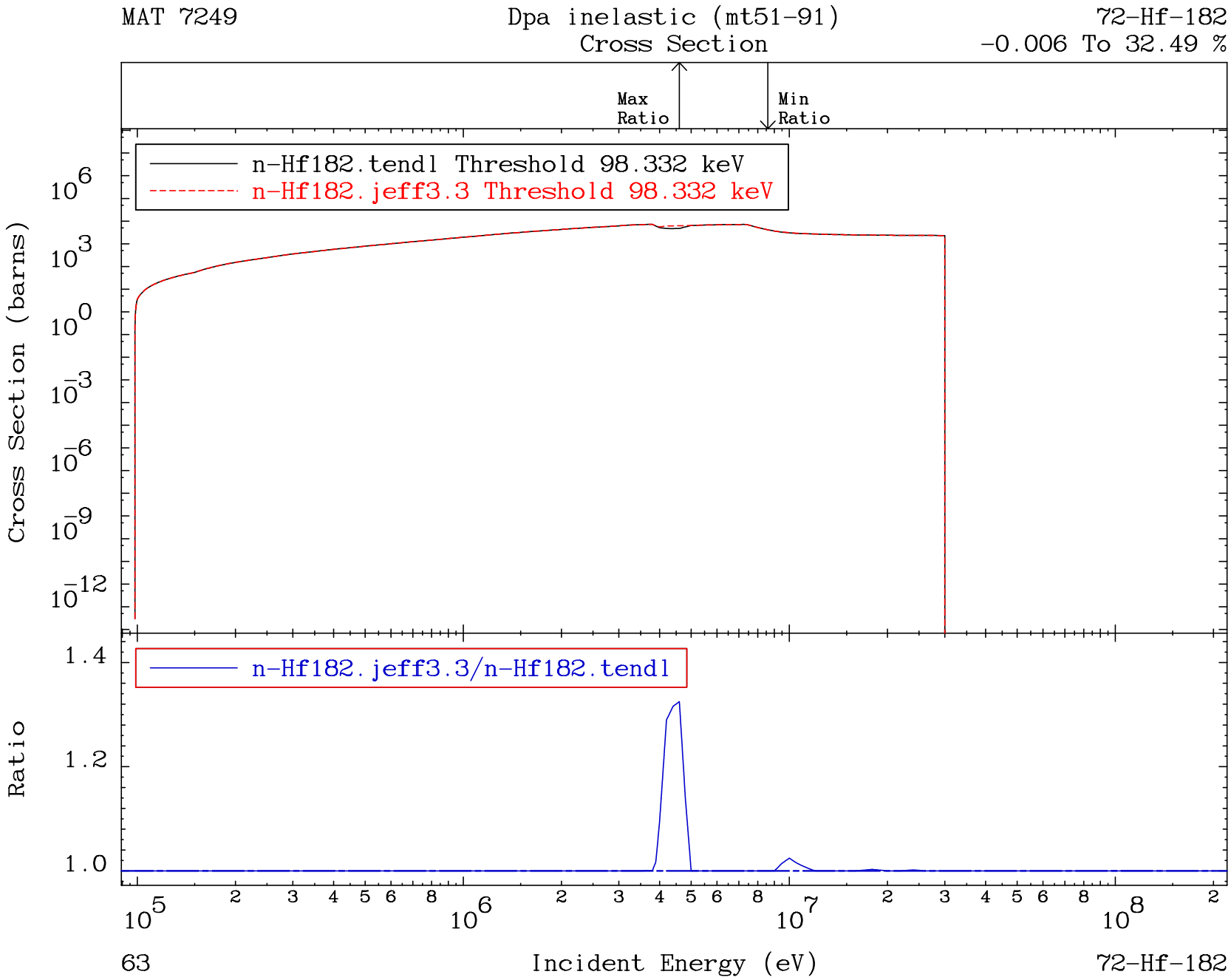

MAT 7249
Kerma capture (mt102)
Cross Section
72-Hf-182
-100.0 To 9999. %
Min Ratio
Max Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
Ratio
n-Hf182.jeff3.3/n-Hf182.tendl
Incident Energy (eV)
58
72-Hf-182

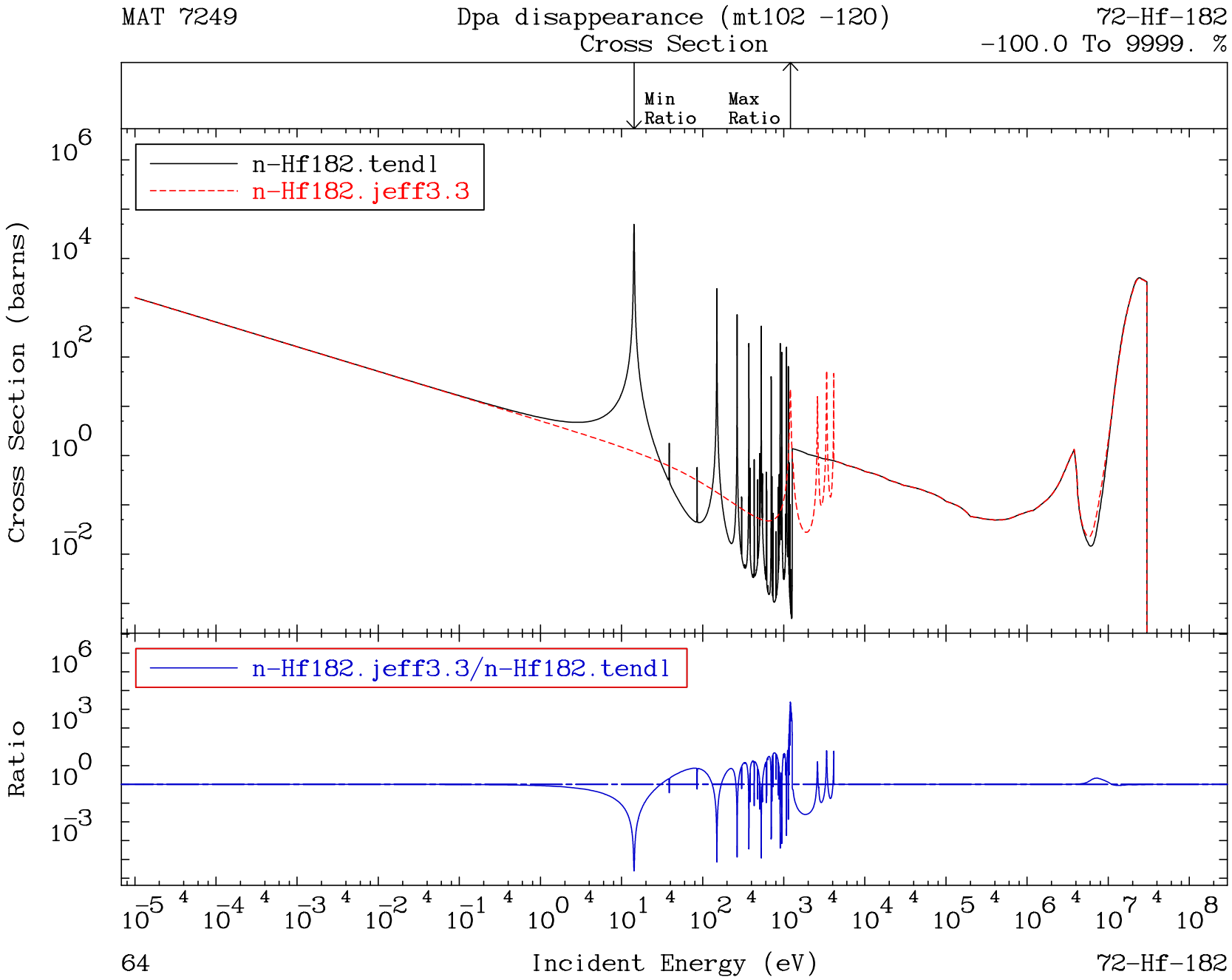

MAT 7249
Total photon (eV-barns)
Cross Section
72-Hf-182
-100.0 To 9999. %
Min Ratio
Max Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
59
72-Hf-182

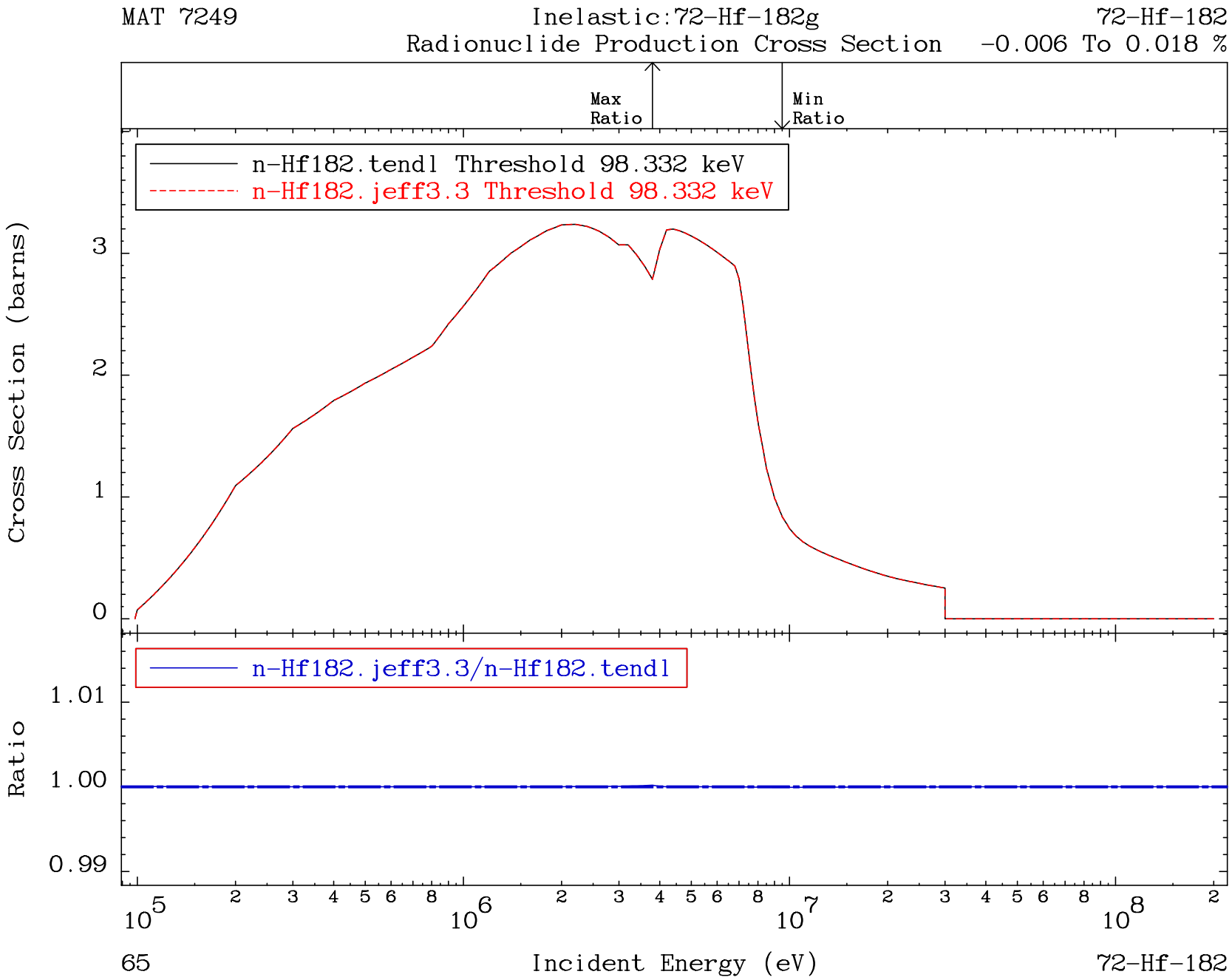

MAT 7249
Total kinematic kerma (high limit)
Cross Section
72-Hf-182
-100.0 To 9999. %
Min Ratio
Max Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
60
72-Hf-182

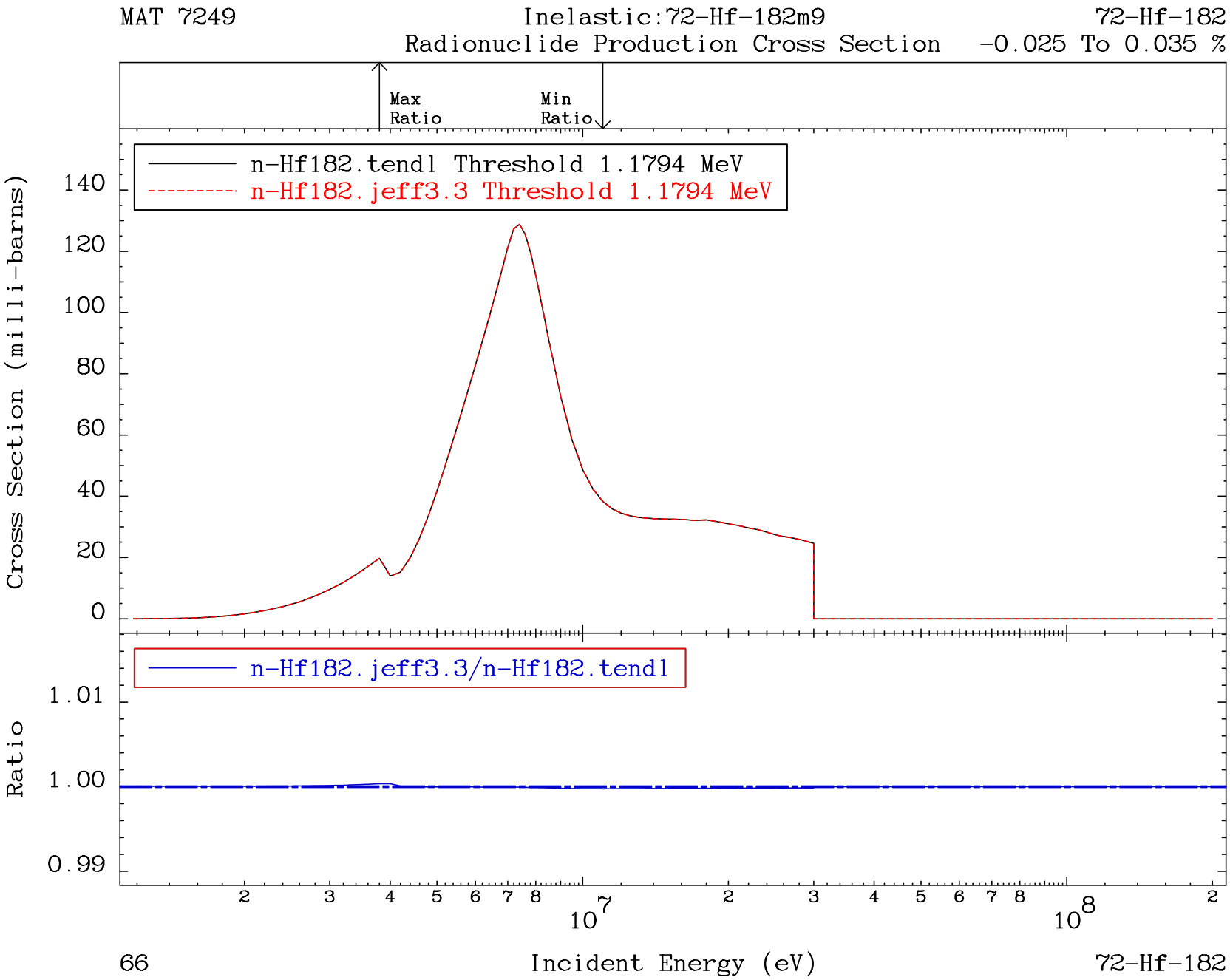

MAT 7249
Dpa total (eV-barns)
Cross Section
72-Hf-182
-100.0 To 4733. %
Min Ratio
Max Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
61
Incident Energy (eV)
72-Hf-182

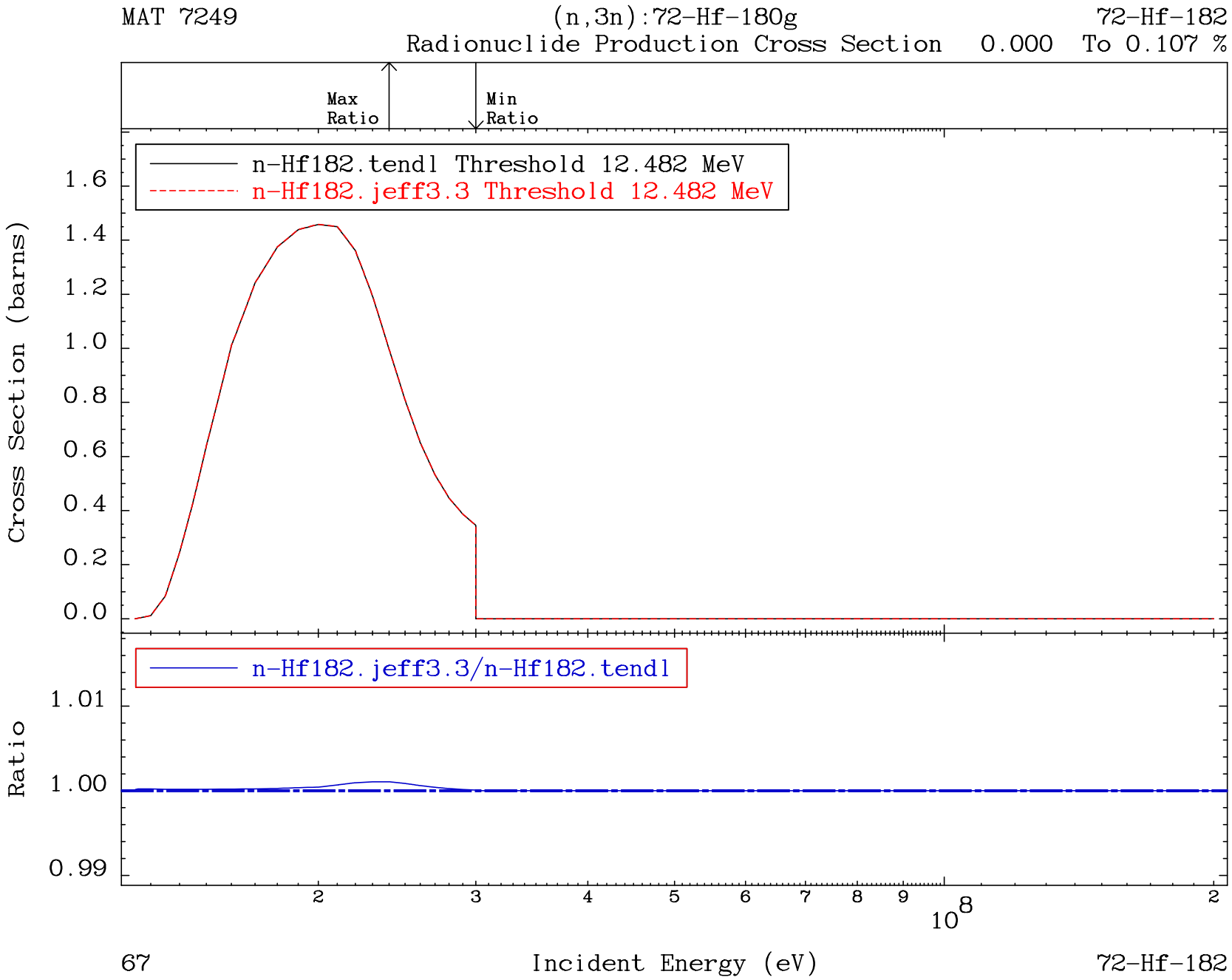

MAT 7249
Dpa elastic (mt2)
Cross Section
72-Hf-182
-76.30 To 12.54 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.1003 keV
n-Hf182.jeff3.3 Threshold 1.1013 keV
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
62
72-Hf-182

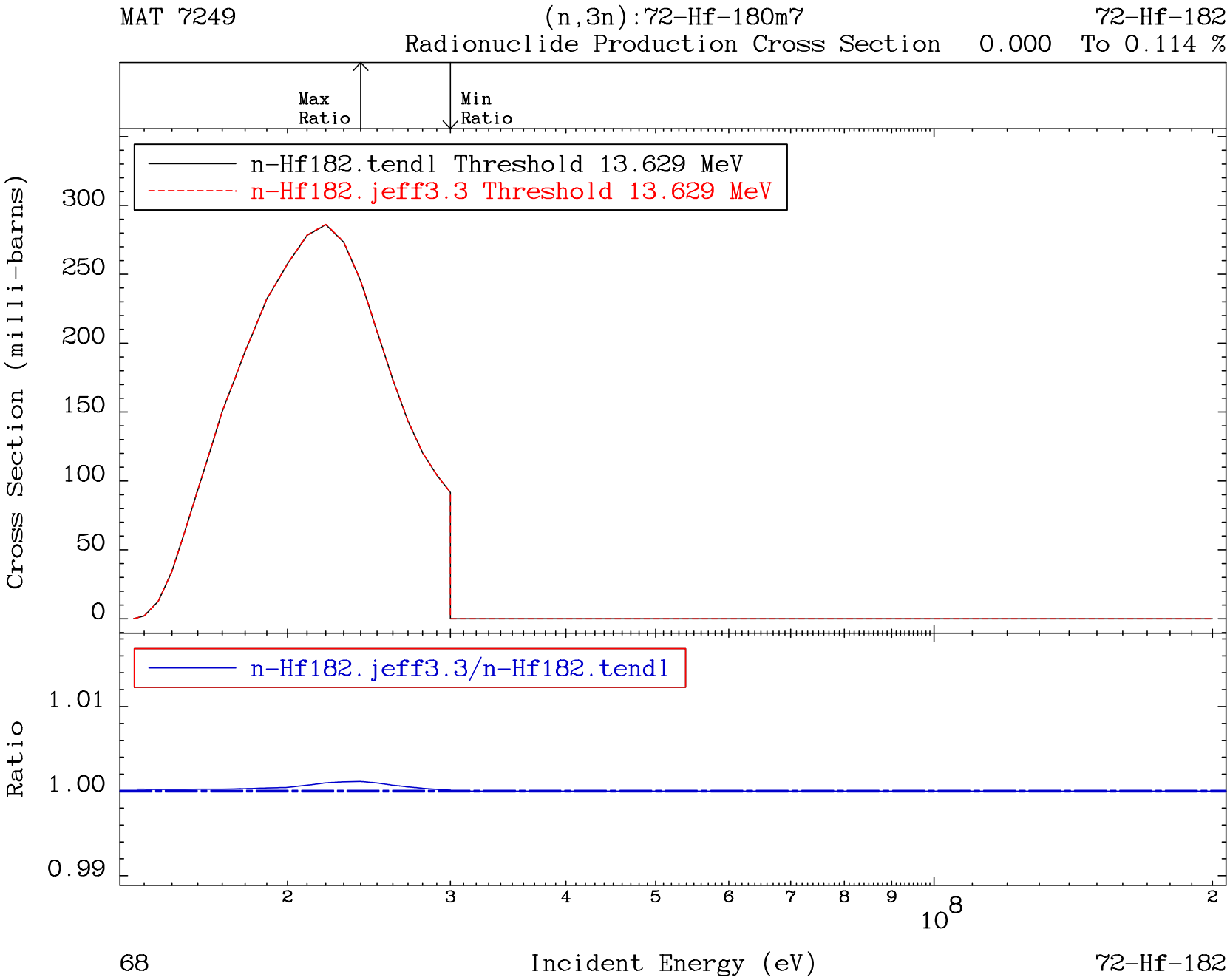

MAT 7249
Dpa inelastic (mt51-91)
Cross Section
72-Hf-182
-0.006 To 32.49 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 98.332 keV
n-Hf182.jeff3.3 Threshold 98.332 keV
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
63
72-Hf-182

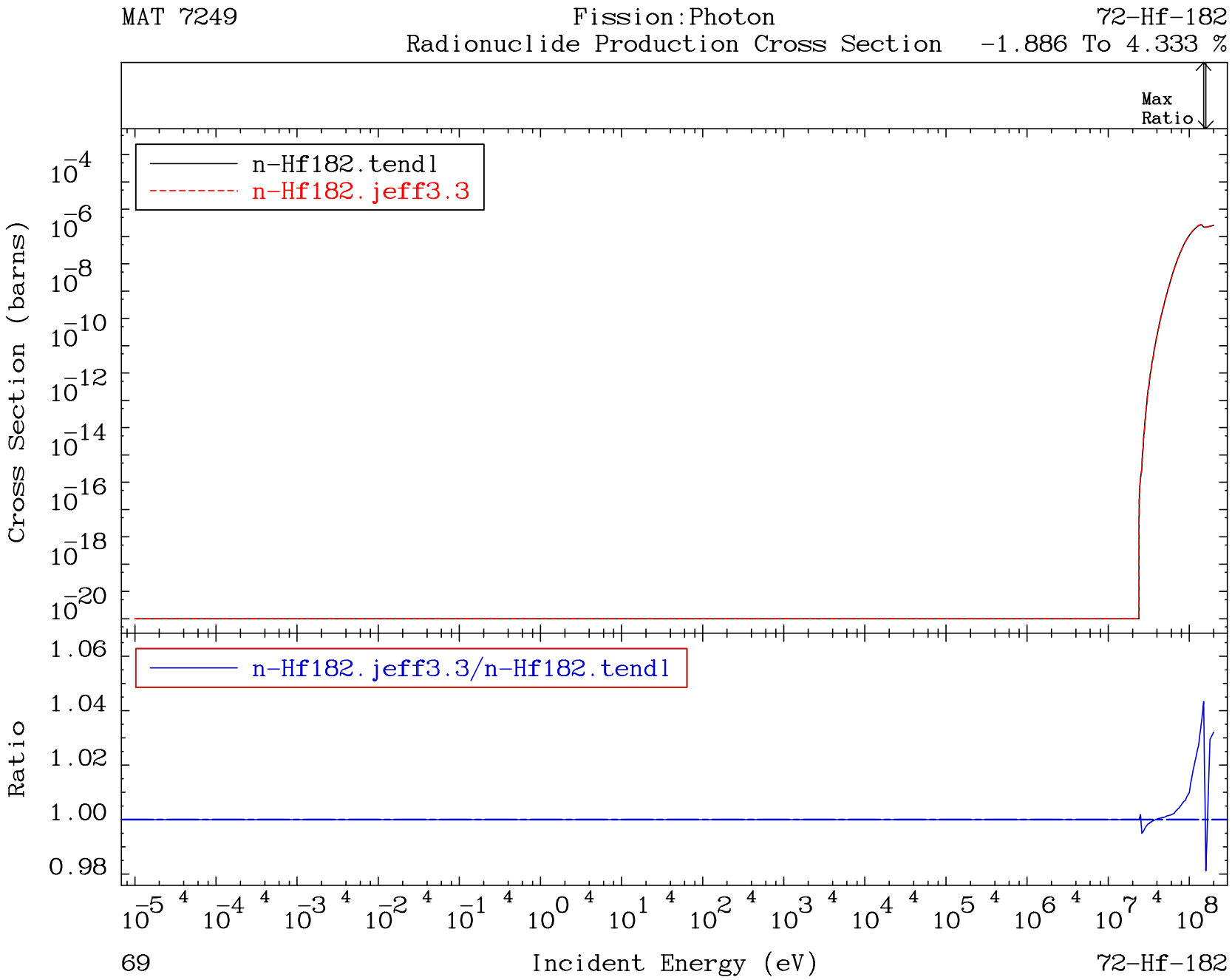

MAT 7249
Dpa disappearance (mt102 -120)
Cross Section
72-Hf-182
-100.0 To 9999. %
Min Ratio
Max Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
Incident Energy (eV)
64
72-Hf-182

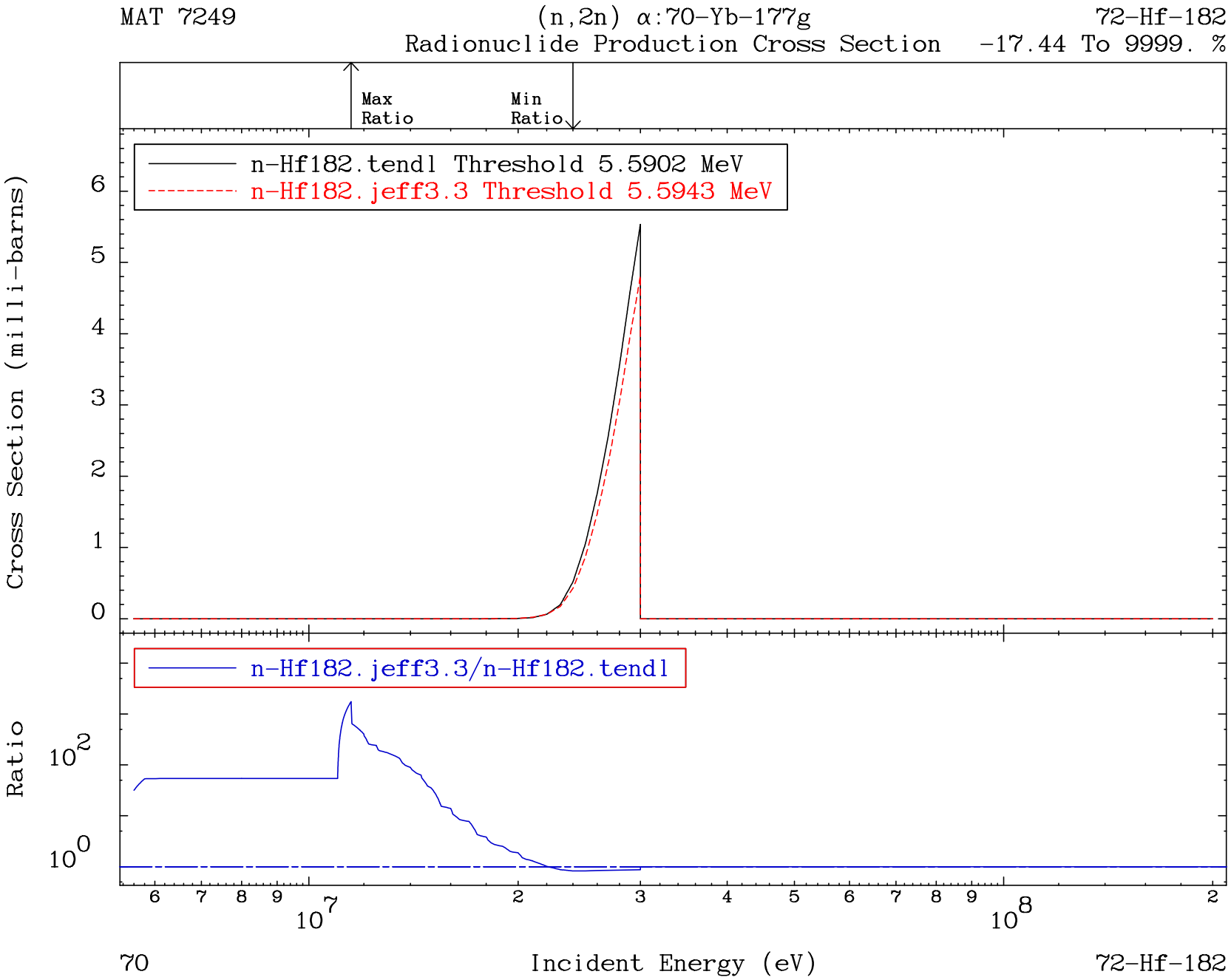

MAT 7249
Inelastic:72-Hf-182g
72-Hf-182
Radionuclide Production Cross Section
-0.006 To 0.018 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 98.332 keV
n-Hf182.jeff3.3 Threshold 98.332 keV
Cross Section (barns)
0
1
2
3
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
0.99
1.00
1.01
10^5
10^6
10^7
10^8
65
Incident Energy (eV)
72-Hf-182

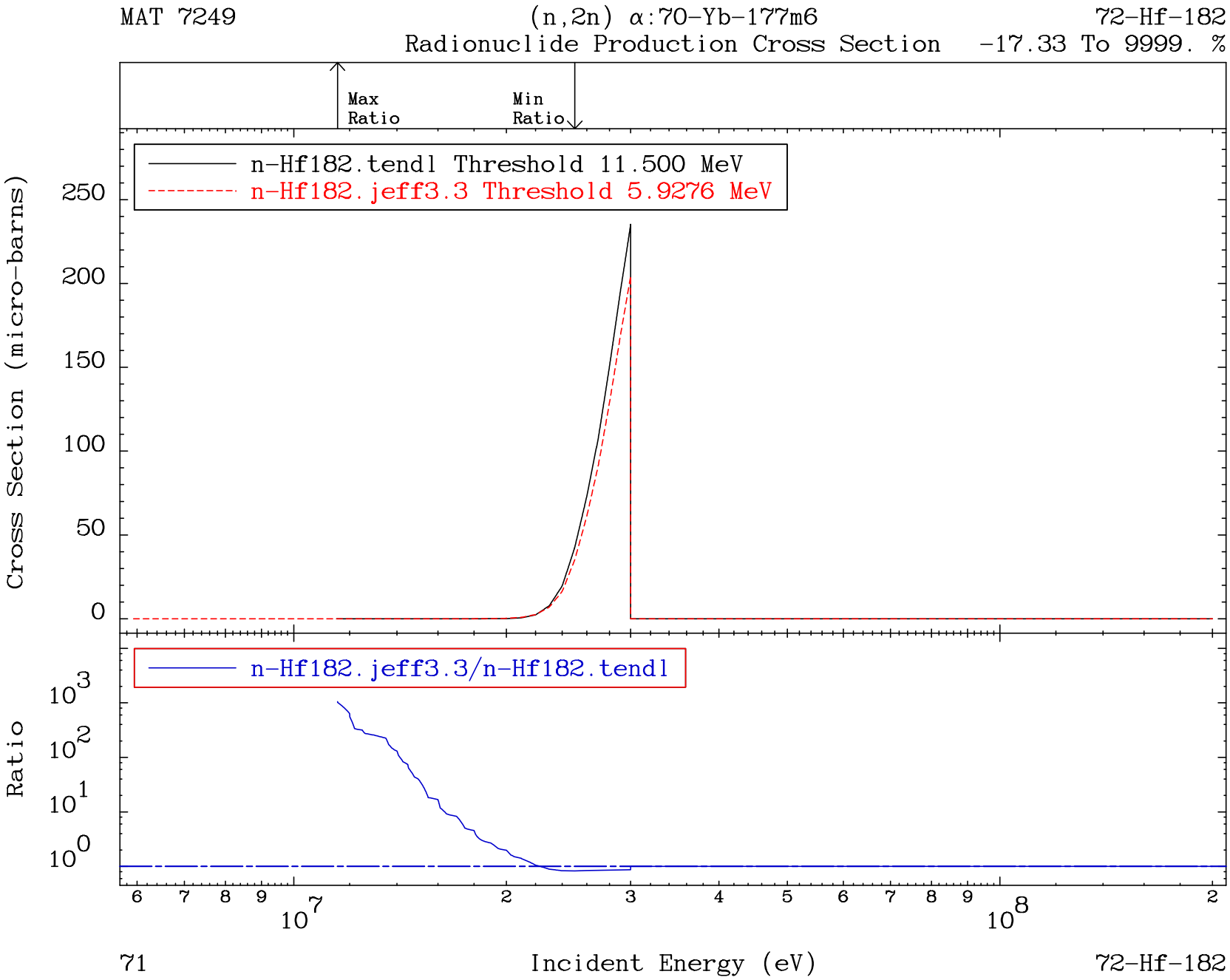

MAT 7249
Inelastic:72-Hf-182m9
72-Hf-182
Radionuclide Production Cross Section
-0.025 To 0.035 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 1.1794 MeV
n-Hf182.jeff3.3 Threshold 1.1794 MeV
Cross Section (milli-barns)
140
120
100
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2 3 4 5 6 7 8
10^7
2 3 4 5 6 7 8
10^8
2
66
Incident Energy (eV)
72-Hf-182

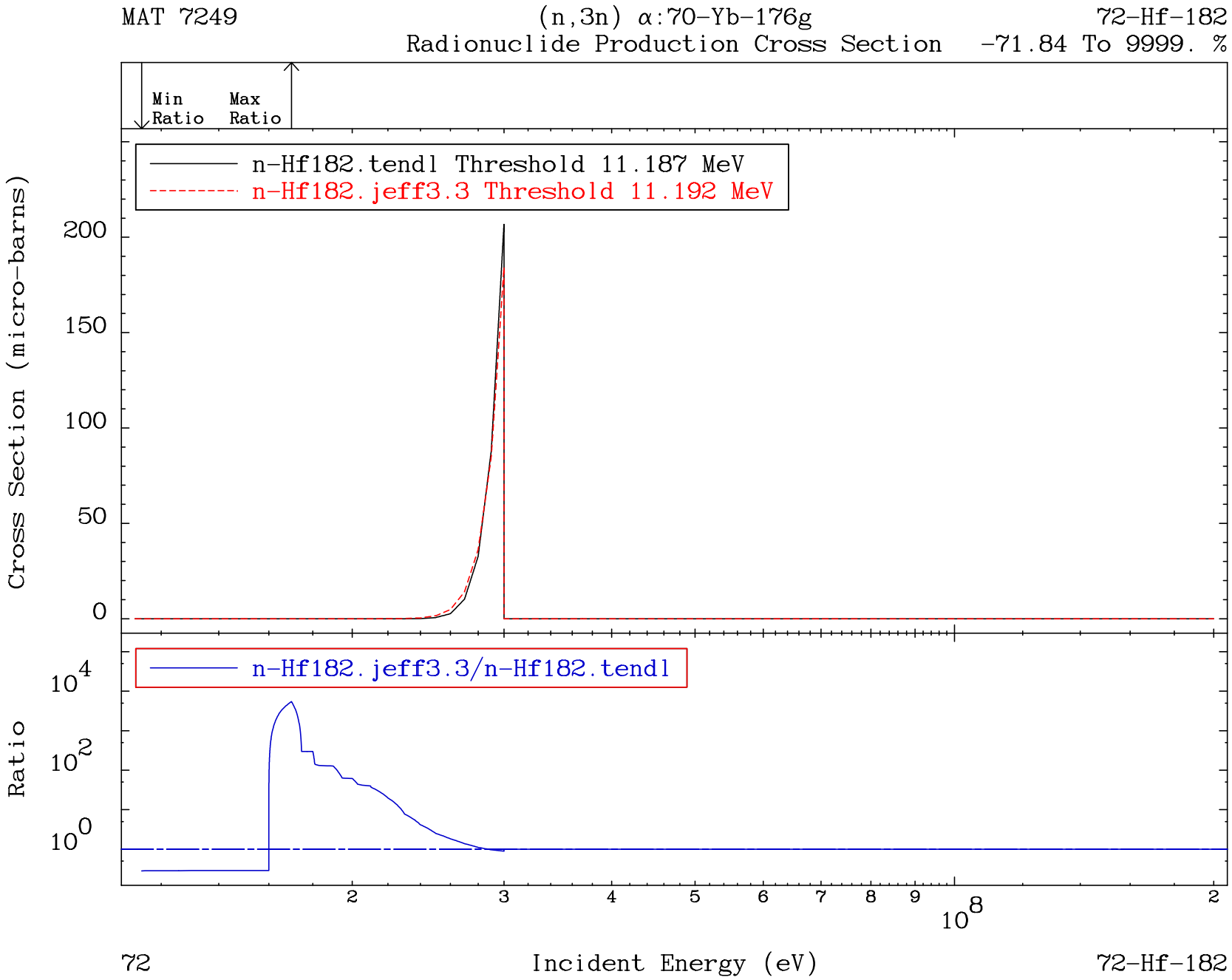

MAT 7249
(n,3n):72-Hf-180g
72-Hf-182
Radionuclide Production Cross Section 0.000 To 0.107 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 12.482 MeV
n-Hf182.jeff3.3 Threshold 12.482 MeV
Cross Section (barns)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2
3
4
5
6
7
8
9
10^8
2
67
Incident Energy (eV)
72-Hf-182

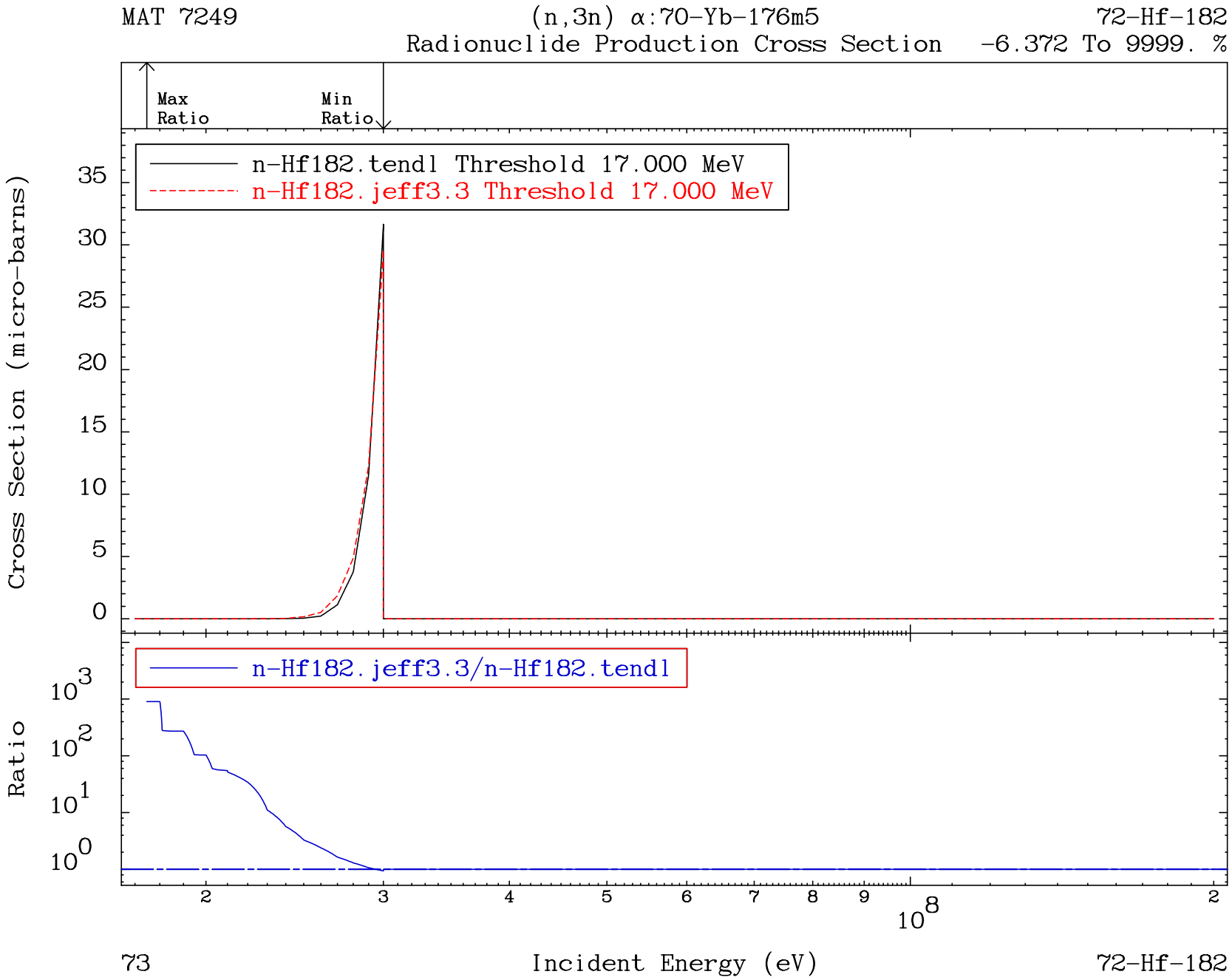

MAT 7249
(n,3n):72-Hf-180m7
72-Hf-182
Radionuclide Production Cross Section 0.000 To 0.114 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 13.629 MeV
n-Hf182.jeff3.3 Threshold 13.629 MeV
Cross Section (milli-barns)
300
250
200
150
100
50
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2
3
4
5
6
7
8
9
10^8
2
68
Incident Energy (eV)
72-Hf-182

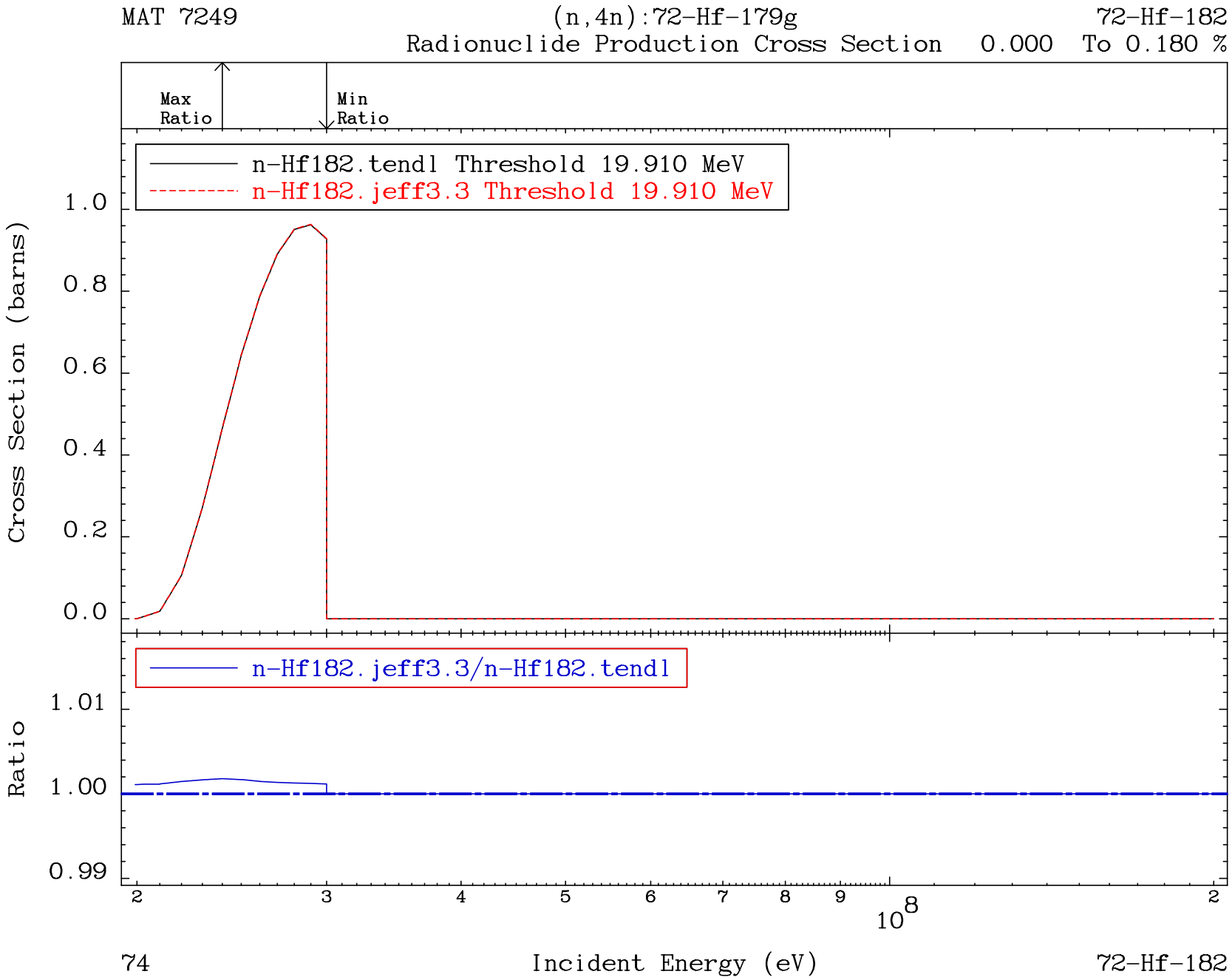

MAT 7249
Fission:Photon
72-Hf-182
Radionuclide Production Cross Section
-1.886 To 4.333 %
Max Ratio
n-Hf182.tendl
n-Hf182.jeff3.3
Cross Section (barns)
10^-4
10^-6
10^-8
10^-10
10^-12
10^-14
10^-16
10^-18
10^-20
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.06
1.04
1.02
1.00
0.98
10^-5 10^-4 10^-3 10^-2 10^-1 10^0 10^1 10^2 10^3 10^4 10^5 10^6 10^7 10^8
69
Incident Energy (eV)
72-Hf-182

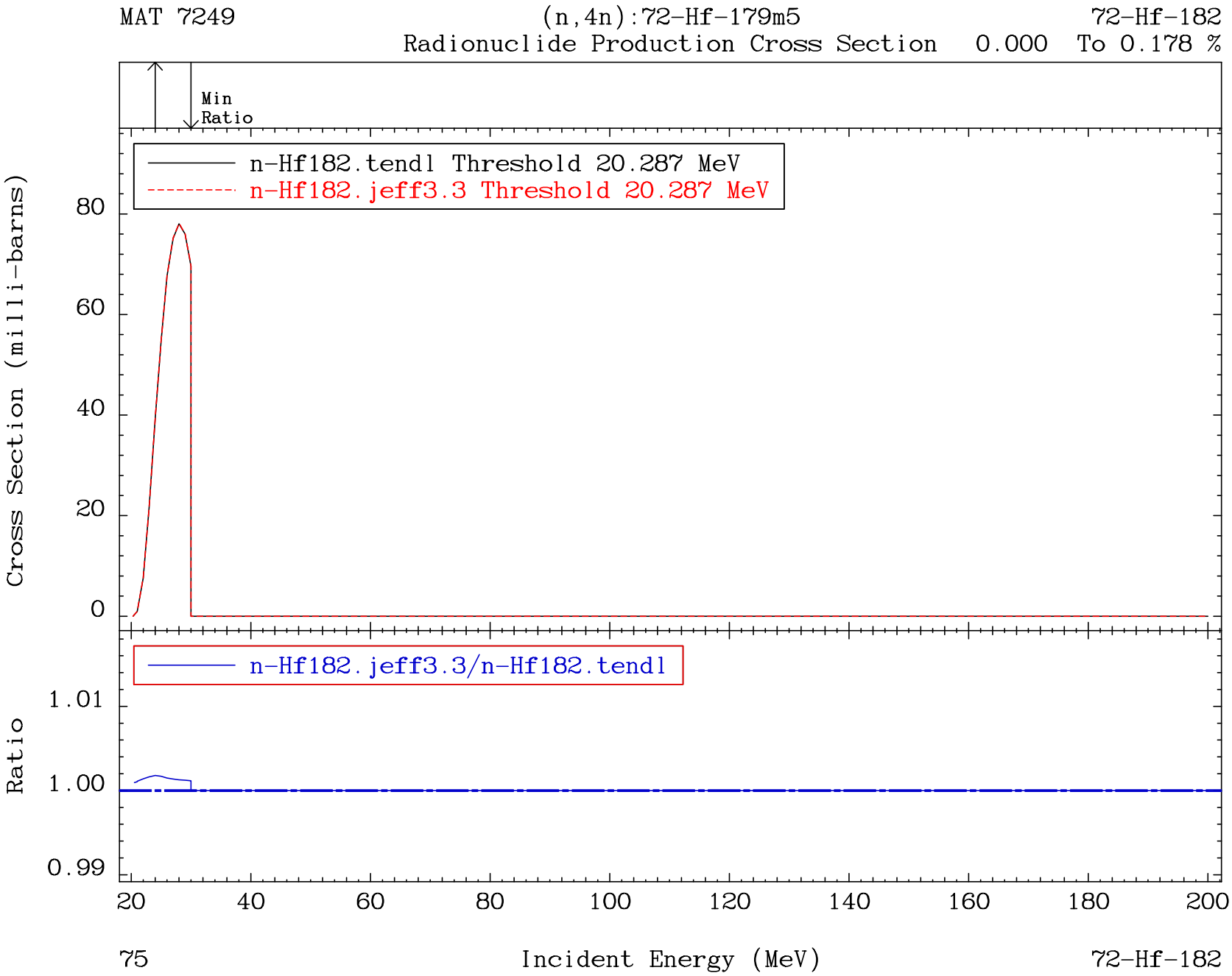

MAT 7249
(n,2n) α:70-Yb-177g
72-Hf-182
Radionuclide Production Cross Section -17.44 To 9999. %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 5.5902 MeV
n-Hf182.jeff3.3 Threshold 5.5943 MeV
Cross Section (milli-barns)
0
1
2
3
4
5
6
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
10^2
10^0
6 7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
70
Incident Energy (eV)
72-Hf-182

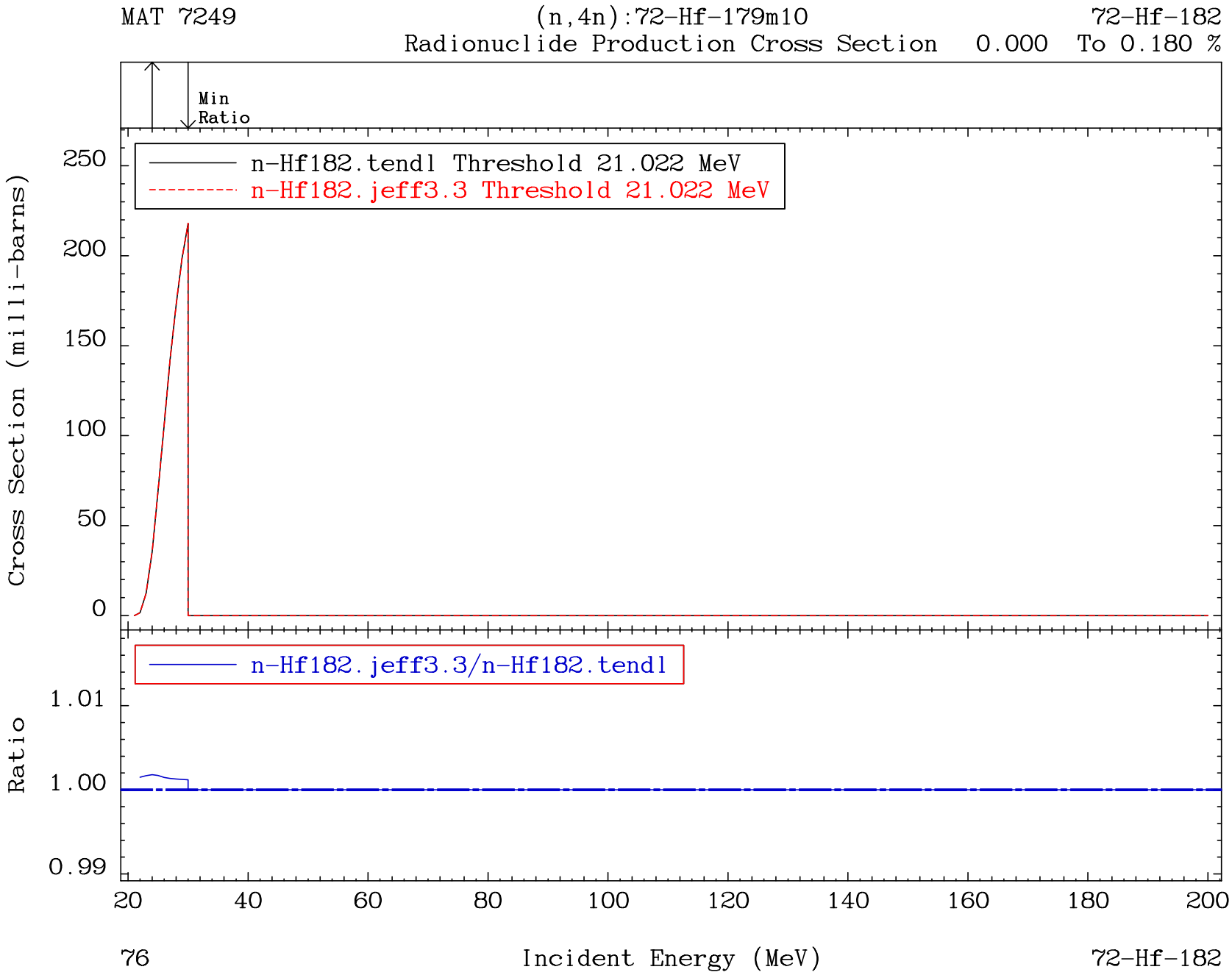

MAT 7249
(n,2n) α:70-Yb-177m6
72-Hf-182
Radionuclide Production Cross Section -17.33 To 9999. %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 11.500 MeV
n-Hf182.jeff3.3 Threshold 5.9276 MeV
Cross Section (micro-barns)
250
200
150
100
50
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
10^3
10^2
10^1
10^0
6 7 8 9 10^7 2 3 4 5 6 7 8 9 10^8 2
71
Incident Energy (eV)
72-Hf-182


MAT 7249
(n,3n) α:70-Yb-176g
72-Hf-182
Radionuclide Production Cross Section -71.84 To 9999. %
Min Ratio
Max Ratio
n-Hf182.tendl Threshold 11.187 MeV
n-Hf182.jeff3.3 Threshold 11.192 MeV
Cross Section (micro-barns)
200
150
100
50
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
10^4
10^2
10^0
2
3
4
5
6
7
8
9
10^8
2
72
Incident Energy (eV)
72-Hf-182


MAT 7249
(n,3n) α:70-Yb-176m5
72-Hf-182
Radionuclide Production Cross Section -6.372 To 9999. %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 17.000 MeV
n-Hf182.jeff3.3 Threshold 17.000 MeV
Cross Section (micro-barns)
35
30
25
20
15
10
5
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
10^3
10^2
10^1
10^0
2
3
4
5
6
7
8
9
10^8
2
73
Incident Energy (eV)
72-Hf-182


MAT 7249
(n,4n):72-Hf-179g
72-Hf-182
Radionuclide Production Cross Section 0.000 To 0.180 %
Max Ratio
Min Ratio
n-Hf182.tendl Threshold 19.910 MeV
n-Hf182.jeff3.3 Threshold 19.910 MeV
Cross Section (barns)
1.0
0.8
0.6
0.4
0.2
0.0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
2
3
4
5
6
7
8
9
10^8
2
74
Incident Energy (eV)
72-Hf-182


MAT 7249
(n,4n):72-Hf-179m5
72-Hf-182
Radionuclide Production Cross Section 0.000 To 0.178 %
Min Ratio
n-Hf182.tendl Threshold 20.287 MeV
n-Hf182.jeff3.3 Threshold 20.287 MeV
Cross Section (milli-barns)
80
60
40
20
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
20
40
60
80
100
120
140
160
180
200
75
Incident Energy (MeV)
72-Hf-182


MAT 7249
(n,4n):72-Hf-179m10
72-Hf-182
Radionuclide Production Cross Section 0.000 To 0.180 %
Min
Ratio
n-Hf182.tendl Threshold 21.022 MeV
n-Hf182.jeff3.3 Threshold 21.022 MeV
Cross Section (milli-barns)
250
200
150
100
50
0
n-Hf182.jeff3.3/n-Hf182.tendl
Ratio
1.01
1.00
0.99
20
40
60
80
100
120
140
160
180
200
76
Incident Energy (MeV)
72-Hf-182