Release notes for ENDF/B Development photoat-064_Gd_000 evaluation

October 13, 2016

- `checkr` Warnings:

  1. A previous error halted parsing of the current section
     MAT=6400, MF= 1, MT=451 (1): Parsing stopped

     ```
     ERROR(S) FOUND IN MAT=6400, MF= 1, MT=451
        SECTION CANNOT BE CHECKED FROM SEQUENCE NUMBER      165 TO     199
     ```

- `checkr` Errors:

  1. A variable is outside the allowed ENDF range
     MAT=6400, MF= 1, MT=451 (0): Variable range

     ```
     ERROR(S) FOUND IN MAT=6400, MF= 1, MT=451
        MOD =     3 OUT OF RANGE     0 -     1           RECORD NUMBER     165
     ```

  2. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=6400, MF=23, MT=501 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=6400, MF=23, MT=501
        SECTION 23/501 NOT IN DIRECTORY                 RECORD NUMBER     201
     ```

  3. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=6400, MF=23, MT=502 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=6400, MF=23, MT=502
        SECTION 23/502 NOT IN DIRECTORY                 RECORD NUMBER    1166
     ```

  4. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=6400, MF=23, MT=504 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=6400, MF=23, MT=504
        SECTION 23/504 NOT IN DIRECTORY                 RECORD NUMBER    1627
     ```

  5. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=6400, MF=23, MT=515 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=6400, MF=23, MT=515
        SECTION 23/515 NOT IN DIRECTORY                 RECORD NUMBER    1668
     ```

  6. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=6400, MF=23, MT=516 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=6400, MF=23, MT=516
        SECTION 23/516 NOT IN DIRECTORY                 RECORD NUMBER    1702
     ```

  7. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=6400, MF=23, MT=517 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=517
   SECTION 23/517 NOT IN DIRECTORY                  RECORD NUMBER    1756
```

8. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=6400, MF=23, MT=522 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=522
   SECTION 23/522 NOT IN DIRECTORY                  RECORD NUMBER    1797
```

9. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=6400, MF=23, MT=534 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=534
   SECTION 23/534 NOT IN DIRECTORY                  RECORD NUMBER    2233
```

10. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=535 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=535
   SECTION 23/535 NOT IN DIRECTORY                  RECORD NUMBER    2254
```

11. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=536 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=536
   SECTION 23/536 NOT IN DIRECTORY                  RECORD NUMBER    2279
```

12. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=537 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=537
   SECTION 23/537 NOT IN DIRECTORY                  RECORD NUMBER    2304
```

13. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=538 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=538
   SECTION 23/538 NOT IN DIRECTORY                  RECORD NUMBER    2329
```

14. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=539 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=539
   SECTION 23/539 NOT IN DIRECTORY                  RECORD NUMBER    2356
```

15. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=540 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=540
   SECTION 23/540 NOT IN DIRECTORY                RECORD NUMBER    2386
```

16. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=541 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=541
   SECTION 23/541 NOT IN DIRECTORY                RECORD NUMBER    2417
```

17. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=542 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=542
   SECTION 23/542 NOT IN DIRECTORY                RECORD NUMBER    2451
```

18. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=543 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=543
   SECTION 23/543 NOT IN DIRECTORY                RECORD NUMBER    2483
```

19. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=544 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=544
   SECTION 23/544 NOT IN DIRECTORY                RECORD NUMBER    2513
```

20. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=545 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=545
   SECTION 23/545 NOT IN DIRECTORY                RECORD NUMBER    2547
```

21. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=546 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=546
   SECTION 23/546 NOT IN DIRECTORY                RECORD NUMBER    2583
```

22. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=547 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=547
   SECTION 23/547 NOT IN DIRECTORY                RECORD NUMBER    2639
```

23. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=23, MT=548 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=548
   SECTION 23/548 NOT IN DIRECTORY                  RECORD NUMBER    2695
```

24. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=6400, MF=23, MT=549 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=549
   SECTION 23/549 NOT IN DIRECTORY                  RECORD NUMBER    2751
```

25. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=6400, MF=23, MT=550 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=550
   SECTION 23/550 NOT IN DIRECTORY                  RECORD NUMBER    2808
```

26. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=6400, MF=23, MT=551 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=551
   SECTION 23/551 NOT IN DIRECTORY                  RECORD NUMBER    2846
```

27. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=6400, MF=23, MT=552 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=552
   SECTION 23/552 NOT IN DIRECTORY                  RECORD NUMBER    2889
```

28. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=6400, MF=23, MT=553 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=553
   SECTION 23/553 NOT IN DIRECTORY                  RECORD NUMBER    2933
```

29. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=6400, MF=23, MT=554 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=554
   SECTION 23/554 NOT IN DIRECTORY                  RECORD NUMBER    2998
```

30. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=6400, MF=23, MT=559 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=23, MT=559
   SECTION 23/559 NOT IN DIRECTORY                  RECORD NUMBER    3063
```

31. Missing a section in directory so your directory is messed up. This error will break everything else
MAT=6400, MF=27, MT=502 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=27, MT=502
   SECTION 27/502 NOT IN DIRECTORY                RECORD NUMBER    3112
```

32. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=27, MT=504 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=27, MT=504
   SECTION 27/504 NOT IN DIRECTORY                RECORD NUMBER    3166
```

33. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=27, MT=505 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=27, MT=505
   SECTION 27/505 NOT IN DIRECTORY                RECORD NUMBER    3221
```

34. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=6400, MF=27, MT=506 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=6400, MF=27, MT=506
   SECTION 27/506 NOT IN DIRECTORY                RECORD NUMBER    3418
```

- `fudge-4.0` Warnings:

1. generic warning message
   reaction label 0: Gd + gamma [coherent] / Product: gamma (Error # 0): Warning

```
WARNING: coherentScattering is not a valid distribution component for 2-body reaction
```

2. FIXME: Generic fudge unimplemented message
   reaction label 0: Gd + gamma [coherent] / Product: gamma (Error # 2): Generic unimp (c)

```
WARNING: Checking not yet implemented for pointwise type data
```

3. generic warning message
   reaction label 1: Gd + gamma [incoherent] / Product: gamma (Error # 0): Warning

```
WARNING: incoherentScattering is not a valid distribution component for 2-body reaction
```

4. FIXME: Generic fudge unimplemented message
   reaction label 1: Gd + gamma [incoherent] / Product: gamma (Error # 2): Generic unimp (c)

```
WARNING: Checking not yet implemented for piecewise type data
```

5. Cross sections do not correctly sum up properly according to an ENDF (or equivalent) sumrule
   summedReaction label 26: total (Error # 0): Sumrule

```
WARNING: Cross section does not match sum of linked reaction cross sections! Max diff: 100.00%
```

6. Cross sections do not correctly sum up properly according to an ENDF (or equivalent) sumrule
   summedReaction label 28: photoelectric absorption (Error # 0): Sumrule

```
WARNING: Cross section does not match sum of linked reaction cross sections! Max diff: 69.30%
```

- `fudge-4.0` Errors:

  1. Calculated and tabulated thresholds don't agree
     reaction label 0: Gd + gamma [coherent] / Cross section: (Error # 0): Threshold mismatch

     ```
     WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1. eV!
     ```

  2. 2-body reaction not in center-of-mass frame
     reaction label 0: Gd + gamma [coherent] / Product: gamma (Error # 1): 2-body not in COM

     ```
     WARNING: 2-body reaction not in center-of-mass frame!
     ```

  3. Calculated and tabulated thresholds don't agree
     reaction label 1: Gd + gamma [incoherent] / Cross section: (Error # 0): Threshold mismatch

     ```
     WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1. eV!
     ```

  4. 2-body reaction not in center-of-mass frame
     reaction label 1: Gd + gamma [incoherent] / Product: gamma (Error # 1): 2-body not in COM

     ```
     WARNING: 2-body reaction not in center-of-mass frame!
     ```

  5. Energy range of data set does not match cross section range
     reaction label 1: Gd + gamma [incoherent] / Product: gamma / Distribution incoherentScattering - piecewise: (Error # 0): Domain mismatch (a)

     ```
     WARNING: Domain doesn't match the cross section domain: (0.0 -> 1000000000.0) vs (1.0 -> 1e+11)
     ```

  6. Calculated and tabulated thresholds don't agree
     reaction label 2: e- + e+ + Gd [electron field] / Cross section: (Error # 0): Threshold mismatch

     ```
     WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 2.044e6 eV!
     ```

  7. Calculated and tabulated thresholds don't agree
     reaction label 3: e- + e+ + Gd [nuclear field] / Cross section: (Error # 0): Threshold mismatch

     ```
     WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1.022e6 eV!
     ```

  8. Calculated and tabulated thresholds don't agree
     reaction label 4: e- + Gd1s1/2 / Cross section: (Error # 0): Threshold mismatch

     ```
     WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 50303. eV!
     ```

  9. Calculated and tabulated thresholds don't agree
     reaction label 5: e- + Gd2s1/2 / Cross section: (Error # 0): Threshold mismatch

     ```
     WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 8349.799999999999 eV!
     ```

10. Calculated and tabulated thresholds don't agree
    reaction label 6: e- + Gd2p1/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 7947. eV!
    ```

11. Calculated and tabulated thresholds don't agree
    reaction label 7: e- + Gd2p3/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 7242.7 eV!
    ```

12. Calculated and tabulated thresholds don't agree
    reaction label 8: e- + Gd3s1/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1864.6 eV!
    ```

13. Calculated and tabulated thresholds don't agree
    reaction label 9: e- + Gd3p1/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1686.9 eV!
    ```

14. Calculated and tabulated thresholds don't agree
    reaction label 10: e- + Gd3p3/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1541.8 eV!
    ```

15. Calculated and tabulated thresholds don't agree
    reaction label 11: e- + Gd3d3/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1231.6 eV!
    ```

16. Calculated and tabulated thresholds don't agree
    reaction label 12: e- + Gd3d5/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1199.8 eV!
    ```

17. Calculated and tabulated thresholds don't agree
    reaction label 13: e- + Gd4s1/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 381.39 eV!
    ```

18. Calculated and tabulated thresholds don't agree
    reaction label 14: e- + Gd4p1/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 311.3 eV!
    ```

19. Calculated and tabulated thresholds don't agree
    reaction label 15: e- + Gd4p3/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 278.86 eV!
    ```

20. Calculated and tabulated thresholds don't agree
    reaction label 16: e- + Gd4d3/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 162.16 eV!
    ```

21. Calculated and tabulated thresholds don't agree
reaction label 17: e- + Gd4d5/2 / Cross section: (Error # 0): Threshold mismatch

```
WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 156.3 eV!
```

22. Calculated and tabulated thresholds don't agree
reaction label 18: e- + Gd4f5/2 / Cross section: (Error # 0): Threshold mismatch

```
WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 17.03 eV!
```

23. Calculated and tabulated thresholds don't agree
reaction label 19: e- + Gd4f7/2 / Cross section: (Error # 0): Threshold mismatch

```
WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 16.2 eV!
```

24. Calculated and tabulated thresholds don't agree
reaction label 20: e- + Gd5s1/2 / Cross section: (Error # 0): Threshold mismatch

```
WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 54.66 eV!
```

25. Calculated and tabulated thresholds don't agree
reaction label 21: e- + Gd5p1/2 / Cross section: (Error # 0): Threshold mismatch

```
WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 34.83 eV!
```

26. Calculated and tabulated thresholds don't agree
reaction label 22: e- + Gd5p3/2 / Cross section: (Error # 0): Threshold mismatch

```
WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 30.18 eV!
```

27. Calculated and tabulated thresholds don't agree
reaction label 23: e- + Gd5d3/2 / Cross section: (Error # 0): Threshold mismatch

```
WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 5.19 eV!
```

28. Calculated and tabulated thresholds don't agree
reaction label 24: e- + Gd5d5/2 / Cross section: (Error # 0): Threshold mismatch

```
WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 4.85 eV!
```

29. Calculated and tabulated thresholds don't agree
reaction label 25: e- + Gd6s1/2 / Cross section: (Error # 0): Threshold mismatch

```
WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 5.71 eV!
```

30. Calculated and tabulated thresholds don't agree
summedReaction label 26: total / Cross section: (Error # 0): Threshold mismatch

```
WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1. eV!
```

31. Calculated and tabulated thresholds don't agree
summedReaction label 27: pair product / Cross section: (Error # 0): Threshold mismatch

```
WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 1.022e6 eV!
```

32. Calculated and tabulated thresholds don't agree
    summedReaction label 28: photoelectric absorption / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 4.85 eV!
    ```

- `xsectplotter` Warnings:

  1. Encountered runtime warning in xsectplotter or Fudge or matplotlib
     Error: RuntimeWarning

     ```
     stderr while processing crossSection

     /usr/local/lib/python2.7/site-packages/matplotlib-1.3.1-py2.7-linux-x86_64.egg/matplotlib/pyplot.py:412: Runtime
     ... [3 more lines]
     ```