Release notes for ENDF/B Development photoat-016_S_000 evaluation

October 13, 2016

- `checkr` Warnings:

  1. A previous error halted parsing of the current section
     MAT=1600, MF= 1, MT=451 (1): Parsing stopped

     ```
     ERROR(S) FOUND IN MAT=1600, MF= 1, MT=451
        SECTION CANNOT BE CHECKED FROM SEQUENCE NUMBER      150 TO     169
     ```

- `checkr` Errors:

  1. A variable is outside the allowed ENDF range
     MAT=1600, MF= 1, MT=451 (0): Variable range

     ```
     ERROR(S) FOUND IN MAT=1600, MF= 1, MT=451
        MOD =     3 OUT OF RANGE     0 -     1           RECORD NUMBER     150
     ```

  2. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=1600, MF=23, MT=501 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=1600, MF=23, MT=501
        SECTION 23/501 NOT IN DIRECTORY                 RECORD NUMBER     171
     ```

  3. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=1600, MF=23, MT=502 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=1600, MF=23, MT=502
        SECTION 23/502 NOT IN DIRECTORY                 RECORD NUMBER     689
     ```

  4. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=1600, MF=23, MT=504 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=1600, MF=23, MT=504
        SECTION 23/504 NOT IN DIRECTORY                 RECORD NUMBER     922
     ```

  5. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=1600, MF=23, MT=515 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=1600, MF=23, MT=515
        SECTION 23/515 NOT IN DIRECTORY                 RECORD NUMBER     963
     ```

  6. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=1600, MF=23, MT=516 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=1600, MF=23, MT=516
        SECTION 23/516 NOT IN DIRECTORY                 RECORD NUMBER     996
     ```

  7. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=1600, MF=23, MT=517 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=23, MT=517
   SECTION 23/517 NOT IN DIRECTORY                  RECORD NUMBER    1045
```

8. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=1600, MF=23, MT=522 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=23, MT=522
   SECTION 23/522 NOT IN DIRECTORY                  RECORD NUMBER    1083
```

9. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=1600, MF=23, MT=534 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=23, MT=534
   SECTION 23/534 NOT IN DIRECTORY                  RECORD NUMBER    1302
```

10. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1600, MF=23, MT=535 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=23, MT=535
   SECTION 23/535 NOT IN DIRECTORY                  RECORD NUMBER    1328
```

11. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1600, MF=23, MT=536 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=23, MT=536
   SECTION 23/536 NOT IN DIRECTORY                  RECORD NUMBER    1361
```

12. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1600, MF=23, MT=537 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=23, MT=537
   SECTION 23/537 NOT IN DIRECTORY                  RECORD NUMBER    1402
```

13. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1600, MF=23, MT=538 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=23, MT=538
   SECTION 23/538 NOT IN DIRECTORY                  RECORD NUMBER    1443
```

14. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1600, MF=23, MT=539 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=23, MT=539
   SECTION 23/539 NOT IN DIRECTORY                  RECORD NUMBER    1492
```

15. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1600, MF=23, MT=540 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=23, MT=540
   SECTION 23/540 NOT IN DIRECTORY                 RECORD NUMBER    1551
```

16. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1600, MF=27, MT=502 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=27, MT=502
   SECTION 27/502 NOT IN DIRECTORY                 RECORD NUMBER    1612
```

17. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1600, MF=27, MT=504 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=27, MT=504
   SECTION 27/504 NOT IN DIRECTORY                 RECORD NUMBER    1666
```

18. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1600, MF=27, MT=505 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=27, MT=505
   SECTION 27/505 NOT IN DIRECTORY                 RECORD NUMBER    1721
```

19. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1600, MF=27, MT=506 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1600, MF=27, MT=506
   SECTION 27/506 NOT IN DIRECTORY                 RECORD NUMBER    1815
```

- `fudge-4.0` Warnings:

1. generic warning message
   reaction label 0: S + 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: S + 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: S + 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: S + 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 11: 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 13: photoelectric absorption (Error # 0): Sumrule

   ```
   WARNING: Cross section does not match sum of linked reaction cross sections! Max diff: 81.47%
   ```

- `fudge-4.0` Errors:

1. Calculated and tabulated thresholds don't agree
   reaction label 0: S + 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: S + 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: S + 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: S + 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: S + 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+ + S [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+ + S [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- + S1s1/2 / Cross section: (Error # 0): Threshold mismatch

   ```
   WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 2455.9 eV!
   ```

9. Calculated and tabulated thresholds don't agree
   reaction label 5: e- + S2s1/2 / Cross section: (Error # 0): Threshold mismatch

   ```
   WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 225.97 eV!
   ```

10. Calculated and tabulated thresholds don't agree
    reaction label 6: e- + S2p1/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 172.73 eV!
    ```

11. Calculated and tabulated thresholds don't agree
    reaction label 7: e- + S2p3/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 171.4 eV!
    ```

12. Calculated and tabulated thresholds don't agree
    reaction label 8: e- + S3s1/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 20.95 eV!
    ```

13. Calculated and tabulated thresholds don't agree
    reaction label 9: e- + S3p1/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 10.34 eV!
    ```

14. Calculated and tabulated thresholds don't agree
    reaction label 10: e- + S3p3/2 / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 10.25 eV!
    ```

15. Calculated and tabulated thresholds don't agree
    summedReaction label 11: total / Cross section: (Error # 0): Threshold mismatch

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

16. Calculated and tabulated thresholds don't agree
    summedReaction label 12: pair product / Cross section: (Error # 0): Threshold mismatch

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

17. Calculated and tabulated thresholds don't agree
    summedReaction label 13: photoelectric absorption / Cross section: (Error # 0): Threshold mismatch

    ```
    WARNING: Calculated and tabulated thresholds disagree: 1.e-5 eV vs 10.25 eV!
    ```