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Proposed Generalized Header File for TSLs

Chris W. Chapman[1], Doro Wiarda[1]

[1]Oak Ridge National Laboratory

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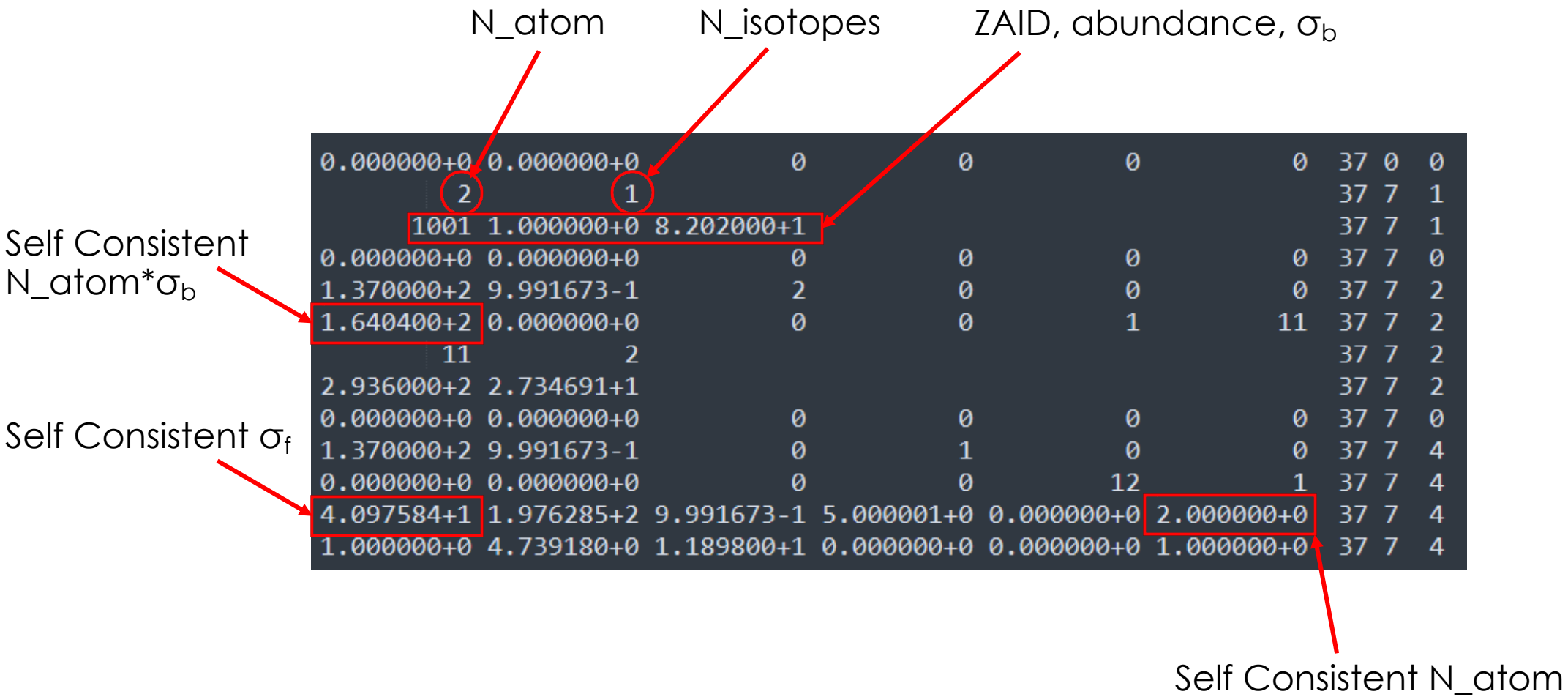
Overview

- Several recent issues have been raised over the past few years regarding:
  1. Inconsistent definitions for number of scattering atoms between incoherent elastic and inelastic (MT2 and MT4 files, respectively) in the same MF7 file
  2. Isotopic distribution of primary scattering atoms
- Processing codes handle these potential issues in different ways
  1. NJOY internally corrects for number of scattering atoms in MT2 by reading in flag from MT4
  2. NJOY and AMPX both manually define isotopes to link TSL files
- Preferred solution would be to automate this to reduce possibility of user error

Proposed Solution – MF7/MT1 file

- A generalized 'header' file for ENDF6-format TSL files
- Would contain pertinent information for the scattering atom
  - Number of scattering atoms in molecule (2 for H in polyethylene, 8 for H in Lucite, etc.)
  - Isotopic distribution within scattering atom (100% ^{238}U for U-in-UO_2, natural Silicon for Si-in-SiC, etc.)
- Should not require significant changes to processing codes or to other sections in MF7 file
  - Some information would be redundant (e.g., scattering atoms in molecule is defined in MT4) and *could* be consolidated into MT1 file

Preliminary Examples – H in CH2



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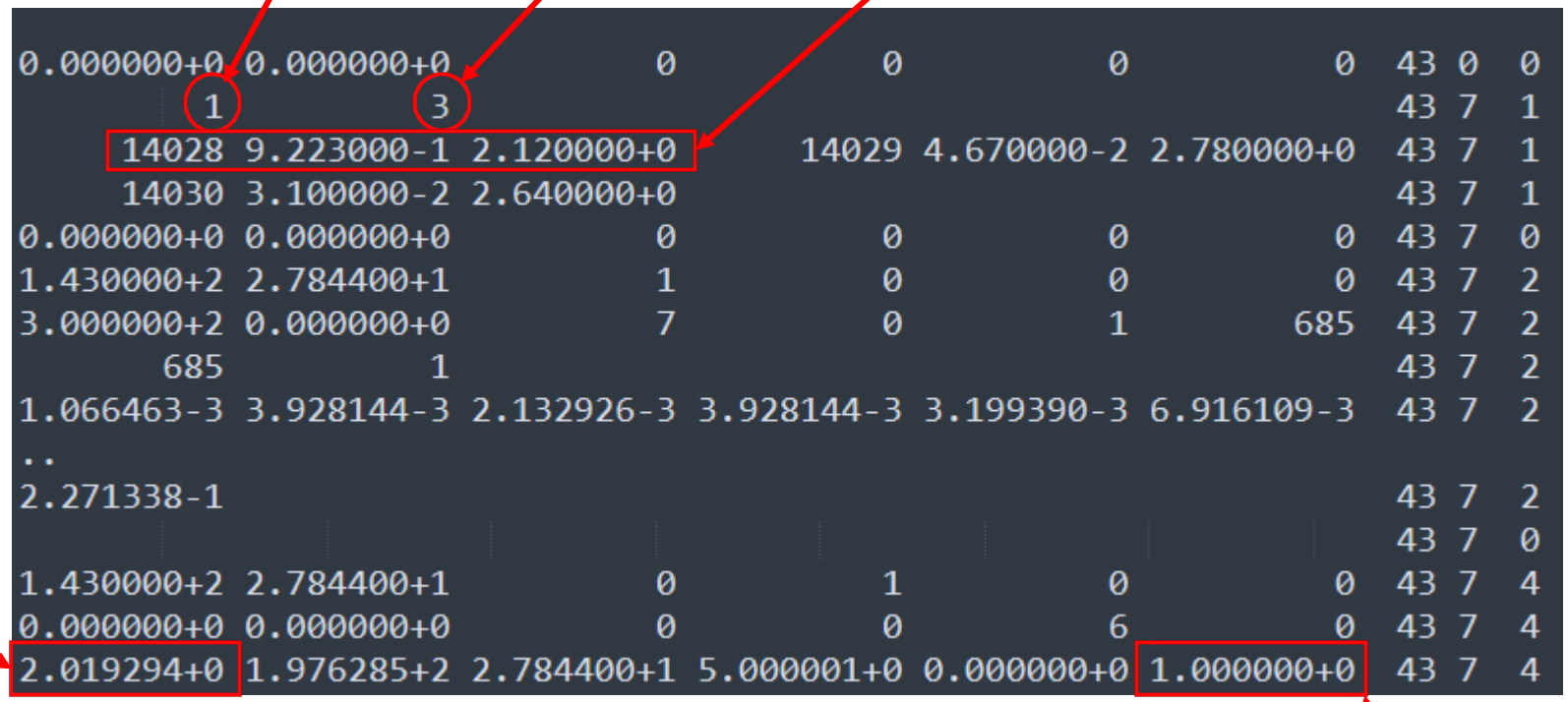
Preliminary Examples – Si in SiC




```
0.000000+0 0.000000+0          0          0          0          0  43 0  0
         1          3                                                43 7  1
     14028 9.223000-1 2.120000+0      14029 4.670000-2 2.780000+0  43 7  1
     14030 3.100000-2 2.640000+0                                   43 7  1
0.000000+0 0.000000+0          0          0          0          0  43 7  0
1.430000+2 2.784400+1          1          0          0          0  43 7  2
3.000000+2 0.000000+0          7          0          1        685  43 7  2
       685          1                                             43 7  2
1.066463-3 3.928144-3 2.132926-3 3.928144-3 3.199390-3 6.916109-3  43 7  2
..
2.271338-1                                                       43 7  2
                                                                 43 7  0
1.430000+2 2.784400+1          0          1          0          0  43 7  4
0.000000+0 0.000000+0          0          0          6          0  43 7  4
2.019294+0 1.976285+2 2.784400+1 5.000001+0 0.000000+0 1.000000+0  43 7  4
```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Discussion

- Is this something the community would like?
  - These issues are not present in GNDS
- How should checking codes be changed to account for potential duplicate information?
- What other information should be included?

Acknowledgements

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