



IAEA

60 Years

Atoms for Peace and Development

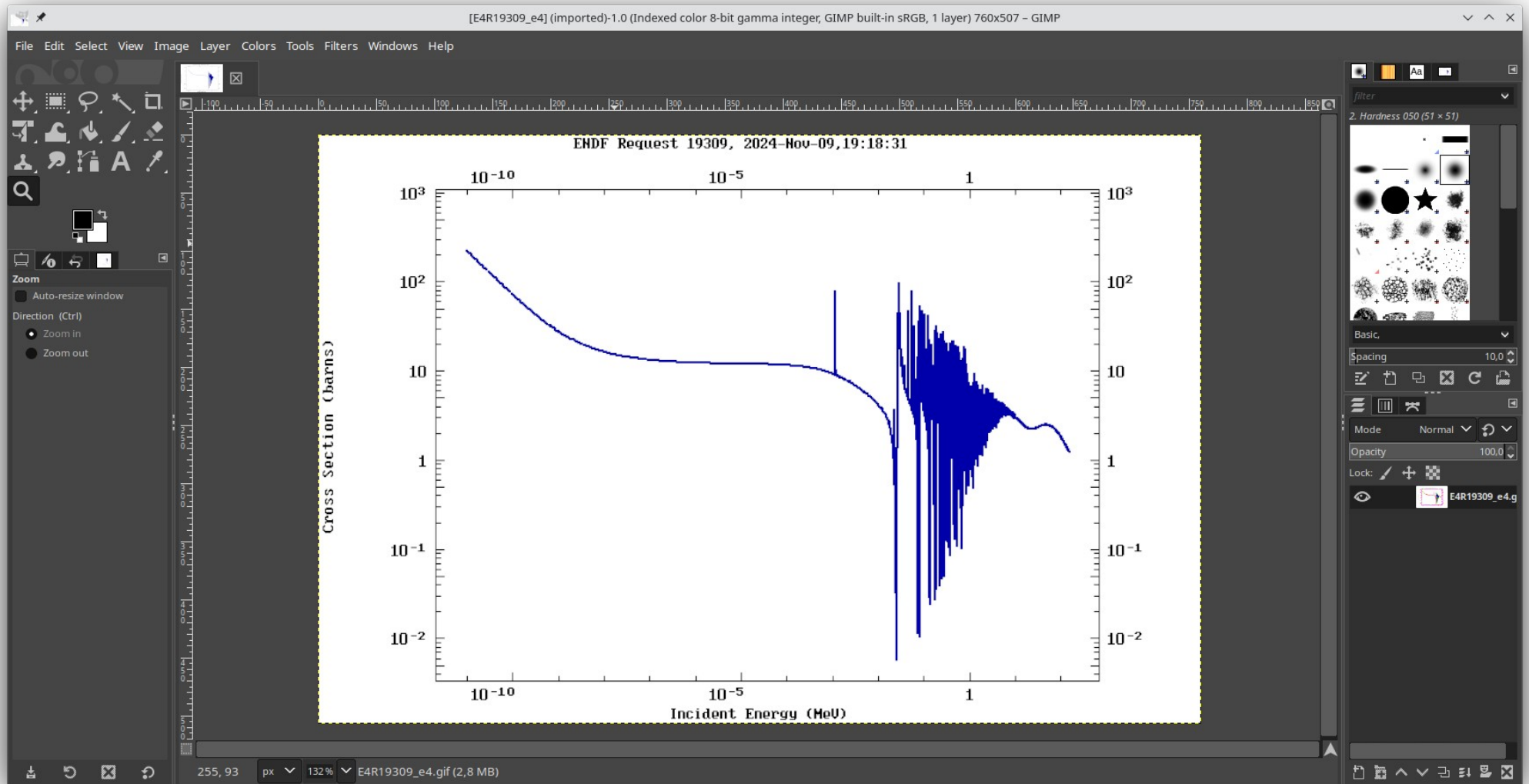
endf-parserpy

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Department for Nuclear Sciences and Applications
IAEA, Vienna

TM on Nuclear Retrieval, Dissemination, and Data Portals

11 November 2024



Enter the matrix, really?

```
8.201440+5 2.500000+0 1.704000+2 7.200000-1 0.000000+0 0.000000+02631 2151 320
8.286320+5 2.500000+0 6.790000+2 7.200000-1 0.000000+0 0.000000+02631 2151 321
8.357980+5 2.500000+0 5.364000+2 7.200000-1 0.000000+0 0.000000+02631 2151 322
8.383400+5 2.500000+0 4.450000+1 7.200000-1 0.000000+0 0.000000+02631 2151 323
8.454520+5 2.500000+0 8.830000+2 7.200000-1 0.000000+0 0.000000+02631 2151 324
8.503770+5 2.500000+0 6.340000+1 7.200000-1 0.000000+0 0.000000+02631 2151 325
8.519200+5 2.500000+0 4.060000+1 7.200000-1 0.000000+0 0.000000+02631 2151 326
8.654000+5 2.500000+0 2.673330+2 7.200000-1 0.000000+0 0.000000+02631 2151 327
0.000000+0 0.000000+0 0 0 0 02631 2 099999
0.000000+0 0.000000+0 0 0 0 02631 0 0
2.605600+4 5.545440+1 0 0 0 02631 3 1
0.000000+0 0.000000+0 0 0 1 118862631 3 1
11886 2 2631 3 1
1.000000-5 0.000000+0 8.500000+5 0.000000+0 8.500000+5 1.501370+02631 3 1
8.501600+5 1.621200+0 8.502720+5 1.830530+0 8.503280+5 1.991440+02631 3 1
8.503840+5 2.266760+0 8.504960+5 3.105180+0 8.505520+5 3.398490+02631 3 1
8.506080+5 3.240010+0 8.506640+5 2.706120+0 8.507200+5 2.269630+02631 3 1
8.508320+5 1.644860+0 8.508890+5 1.420670+0 8.509450+5 1.409280+02631 3 1
8.510010+5 1.224200+0 8.510570+5 1.257110+0 8.512250+5 1.190450+02631 3 1
8.515050+5 1.016710+0 8.516740+5 1.147350+0 8.517300+5 1.399960+02631 3 1
8.517860+5 1.710880+0 8.518420+5 2.202990+0 8.519540+5 3.723320+02631 3 1
8.520100+5 4.412230+0 8.520670+5 4.549740+0 8.521230+5 4.276150+02631 3 1
8.522350+5 3.192380+0 8.523470+5 2.571110+0 8.525160+5 1.867240+02631 3 1
8.525720+5 1.798760+0 8.526850+5 1.560780+0 8.528530+5 1.583620+02631 3 1
8.529100+5 1.417930+0 8.530220+5 1.282760+0 8.530780+5 1.381970+02631 3 1
8.531350+5 1.183290+0 8.533600+5 1.115840+0 8.536410+5 9.088520-12631 3 1
8.538660+5 1.015650+0 8.539230+5 8.782260-1 8.540350+5 8.654520-12631 3 1
8.540920+5 7.611950-1 8.543170+5 7.053160-1 8.543740+5 8.481200-12631 3 1
8.544860+5 8.733950-1 8.546560+5 6.495240-1 8.549940+5 6.797920-12631 3 1
8.550510+5 7.410150-1 8.551070+5 6.239980-1 8.552770+5 7.379170-12631 3 1
8.556150+5 8.505940-1 8.560110+5 1.205440+0 8.561240+5 1.366770+02631 3 1
8.561810+5 1.343680+0 8.564640+5 1.917050+0 8.568600+5 2.501140+02631 3 1
8.569170+5 2.523750+0 8.573130+5 3.187040+0 8.577670+5 3.452750+02631 3 1
8.581640+5 3.595140+0 8.586750+5 3.461960+0 8.589020+5 4.070410+02631 3 1
8.590730+5 4.755850+0 8.592430+5 4.043290+0 8.593000+5 3.663900+02631 3 1
8.593570+5 3.626010+0 8.594140+5 3.518320+0 8.598120+5 3.168320+02631 3 1
8.599260+5 3.156840+0 8.599830+5 3.040850+0 8.600400+5 3.161470+02631 3 1
8.600970+5 3.007280+0 8.602680+5 3.095120+0 8.603250+5 2.966430+02631 3 1
8.603820+5 3.057550+0 8.605530+5 2.975790+0 8.607810+5 2.898040+02631 3 1
8.612370+5 2.614040+0 8.613510+5 2.682170+0 8.614080+5 2.580580+02631 3 1
8.615800+5 2.506820+0 8.616370+5 2.566630+0 8.618650+5 2.417590+02631 3 1
8.620000+5 2.418840+0 8.621510+5 2.420220+0 8.622700+5 2.622580+02631 3 1
```

Objective

Create a tool that facilitates working with ENDF-6 files

ENDF-6 Formats Manual

Data Formats and Procedures for the Evaluated Nuclear Data Files
ENDF/B-VI, ENDF/B-VII and ENDF/B-VIII

Written by the Members of the Cross Sections Evaluation Working Group

Edited by
D. A. Brown

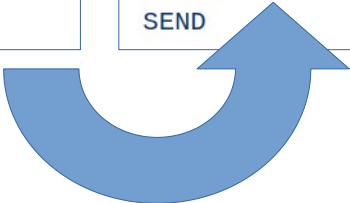
September 28, 2023

National Nuclear Data Center
Brookhaven National Laboratory
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www.nndc.bnl.gov

Notice: The work at Brookhaven National Laboratory was sponsored by the Office of Nuclear Physics, Office of Science of the U.S. Department of Energy under Contract No. DE-AC02-98CH10886 with Brookhaven Science Associates, LLC. This work was also supported by the Nuclear Criticality Safety Program, funded and managed by the National Nuclear Security Administration for the Department of Energy.

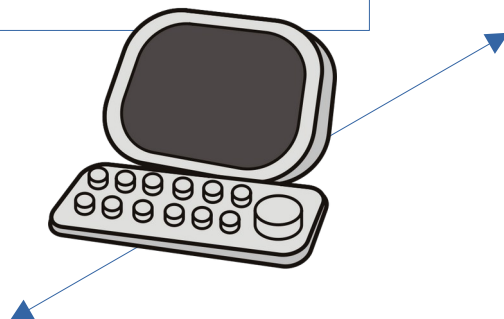
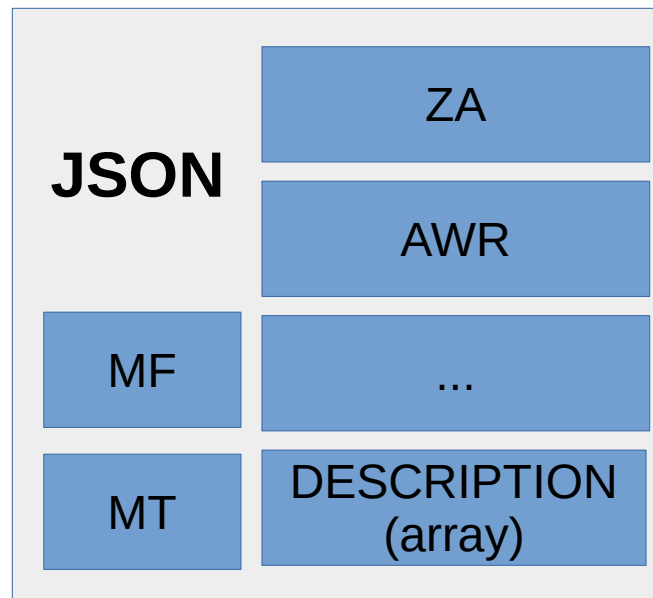
```
[MAT, 1,451/ ZA, AWR, LRP, LFI, NLIB, NMOD]HEAD
[MAT, 1,451/ ELIS, STA, LIS, LISO, 0, NFOR]CONT
[MAT, 1,451/ AWI, EMAX, LREL, 0, NSUB, NVER]CONT
[MAT, 1,451/ TEMP, 0.0, LDRV, 0, NWD, NXC]CONT

[MAT, 1,451/ ZSYMAM{11}, ALAB{11}, EDATE{10}, {1}, AUTH{33} ]TEXT
[MAT, 1,451/ {1}, REF{21}, DDATE{10}, {1},
                RDATE{10}, {12}, ENDATE{8}, {3} ]TEXT
for i=1 to 3:
    [MAT, 1,451/ HSUB[i]] TEXT
endfor
for i=1 to NWD-5:
    [MAT, 1,451/ DESCRIPTION[i]]TEXT
endfor
for i=1 to NXC:
    [MAT, 1,451/ blank, blank, MFx[i], MTx[i], NCx[i], MOD[i]]DIR
endfor
SEND
```



Bijjective Mapping: ENDF-6 ↔ Dictionary

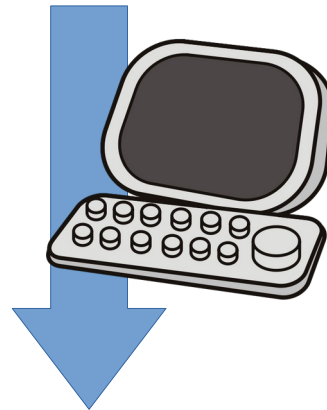
```
[MAT, 1,451/ ZA, AWR, LRP, LFI, NLIB, NMOD]HEAD
[MAT, 1,451/ ELIS, STA, LIS, LISO, 0, NFOR]CONT
[MAT, 1,451/ AWI, EMAX, LREL, 0, NSUB, NVER]CONT
[MAT, 1,451/ TEMP, 0.0, LDRV, 0, NWD, NXC]CONT
for i=1 to NWD:
    [MAT, 1,451/ DESCRIPTION[i]]TEXT
endfor
```



```
2.906300+4 6.238900+1      1      0      0      52925 1451
0.000000+0 0.000000+0      0      0      0      62925 1451
1.000000+0 1.500000+8      8      0     10      72925 1451
0.000000+0 0.000000+0      0      0     481     1152925 1451
29-Cu- 63 LANL,ORNL  EVAL-FEB98 A.Koning,M.Chadwick,Hetrick      2925 1451
CH98,CH99      DIST-DEC06 REV4-      20011108      2925 1451
----ENDF/B-VII      MATERIAL 2925      REVISION 4      2925 1451
-----INCIDENT NEUTRON DATA      2925 1451
-----ENDF-6 FORMAT      2925 1451
```

C++ Code Generation

```
[MAT, 1,451/ ZA, AWR, LRP, LFI, NLIB, NMOD]HEAD  
[MAT, 1,451/ ELIS, STA, LIS, LISO, 0, NFOR]CONT  
[MAT, 1,451/ AWI, EMAX, LREL, 0, NSUB, NVER]CONT  
[MAT, 1,451/ TEMP, 0.0, LDRV, 0, NWD, NXC]CONT  
for i=1 to NWD:  
    [MAT, 1,451/ DESCRIPTION[i]]TEXT  
endfor
```



ENDF-6

C++ Code

Dictionary /
JSON

IAEA-NDS / endf-parserpy Public

Notifications Fork 4 Star 10

Code Issues Pull requests Actions Projects Security Insights

main Go to file Code

gschnabel bump requests package version to 2... ✓ 36d4eee · last month 1,216 Commits

.github/workflows	convert multiline command to single...	4 months ago
.pre-commit-hooks	add precommit hook to sync package...	4 months ago
docs	bump requests package version to 2...	last month
endf_parserpy	more cross-referencing in documenta...	2 months ago
examples	add eaf2007_abridged.endf to exampl...	2 months ago
tests	implement tests for ignore_missing_t...	2 months ago
.gitattributes	move .gitattributes to top-level	6 months ago
.gitignore	working commit with super code stru...	2 years ago
.pre-commit-config.yaml	add precommit hook to sync package...	4 months ago
.readthedocs.yaml	add draft .readthedocs.yaml file	10 months ago
CHANGELOG.md	update CHANGELOG	2 months ago
LICENSE	include IAEA clause in LICENSE	6 months ago
README.md	include IAEA clause in LICENSE	6 months ago
build.py	remove non-working version update ...	4 months ago
create_release_tag.py	add helper script to generate release ...	4 months ago
poetry.lock	bump requests package version to 2...	last month
pyproject.toml	bump requests package version to 2...	last month

About

Python package for reading, writing, verifying and translating ENDF-6 formatted files

- Readme
- View license
- Activity
- Custom properties
- 10 stars
- 3 watching
- 4 forks

Report repository

Releases

15 tags

Packages

No packages published

Contributors 2

- gschnabel** Georg Schnabel
- marquejz** Jose Ignacio Marquez Dam...

Languages

- Python 100.0%

Reading & Writing

```
from endf_parserpy import EndfParser
parser = EndfParser()
endf_dict = parser.parsefile('input.endf')
endf_dict[3][1]['AWR'] = 99.99
parser.writefile('output.endf', endf_dict)
```

JSON Translation

```
from endf_parserpy import EndfParser
import json
parser = EndfParser()
endf_dict = parser.parsefile('input.endf')
with open('output.json', 'w') as f:
    json.dump(endf_dict, f, indent=2)
```

Format Validation

```
endf_parserpy.custom_exceptions.InvalidIntegerError:
Here is the parser record log until failure:

----- Line 0 -----
Template: [ MAT , 4 , MT / ZA , AWR , 0 , LTT , 0 , 0 ] HEAD
Line:     " 6.415500+4 1.535920+2          1          1          0          06434 4 2  1"

----- Line 1 -----
Template: [ MAT , 4 , MT / 0.0 , AWR ? , LI , LCT , 0 , 0 ] CONT
Line:     " 0.000000+0 1.535920+2          0          2          441          206434 4 2  2"

----- Line 2 -----
Template: [ MAT , 4 , MT / 0.0 , 0.0 , 0 , 0 , NR , NE / Eint ] TAB2
Line:     " 1.000000+0 4.340500-3 8.478030-6-9.08196-19 0.000000+0 0.000000+06434 4 2  3"

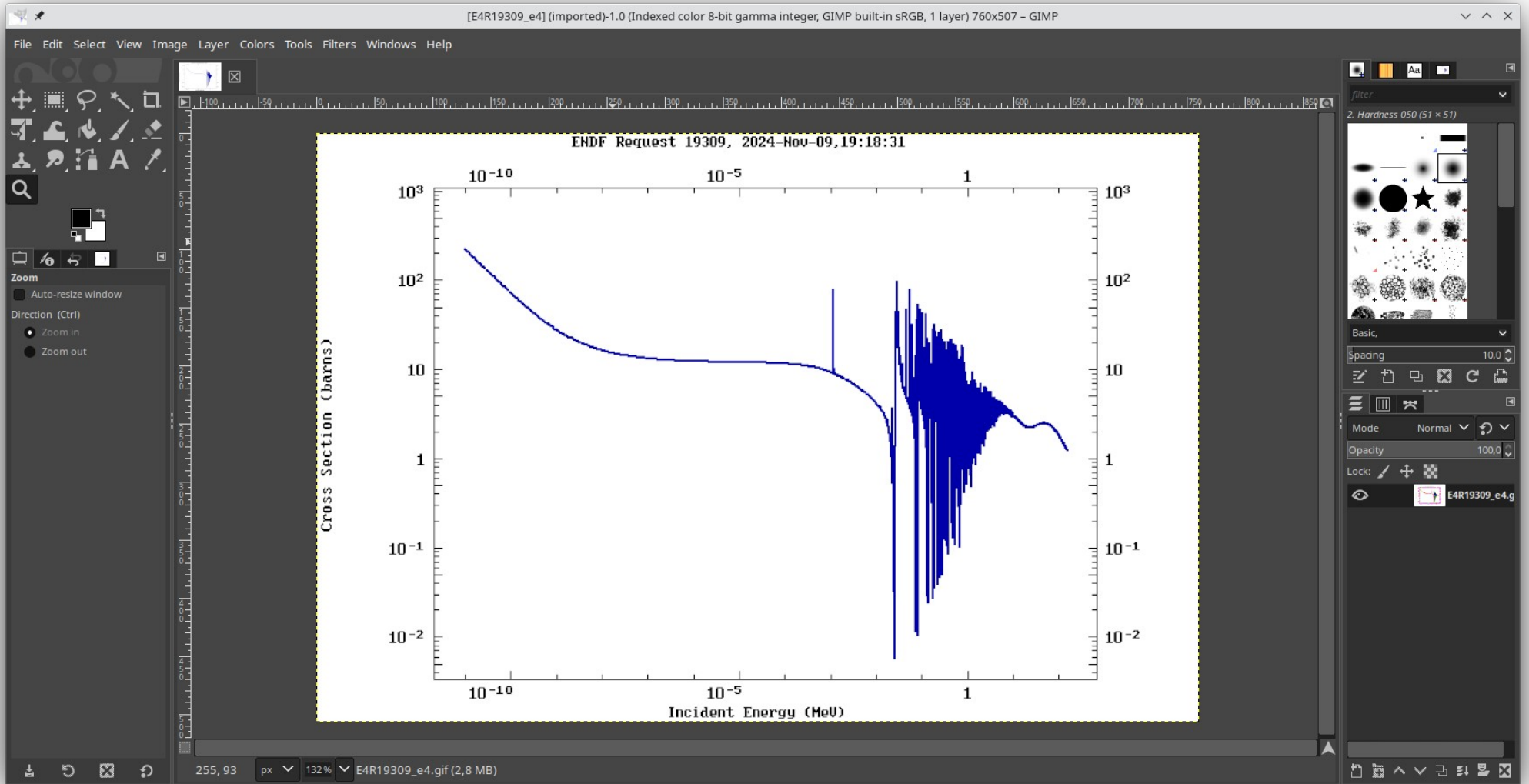
Error message: invalid literal for int() with base 10: ' 8.478030-6'
```

Command-Line Interface

```
> endf-cli show /2/151/isotope/1 n_2925_29-Cu-63.endf
/range: subsection or array
/ZAI:    29063.0
/ABN:    1.0
/LFW:    0
/NER:    1
```

```
> endf-cli match --query /6/*/subsection/*(/LAW==1 & /LANG>0) n_2925_29-Cu-63.endf
match: n_2925_29-Cu-63.endf
6/5/subsection/1/LAW = 1
6/5/subsection/1/LANG = 2
```

Outlook



Thank you