Web-based ENSDF editor

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Topics:

1. **Concept of Web-editors**
2. **Light EXFOR and ENSDF Editors Projects**
3. **ENSDF Web Viewers and Editor**
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   - ENSDF interactive tree (ensdf±)
   - ENSDF web-editor (ensdf++)
4. **Implementation of editing**
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   - Editing on the main window (build-in frame)
   - Editing original ENSDF and interpreted information
   - Integrated editing (e.g. parallel datasets, all levels)
5. **Concluding remarks**

Concept

- Basic nuclear data formats (EXFOR, ENSDF, ENDF) are implemented as 80 columns formatted text files. From another hand, structure of information has hierarchical logic.
- Nowadays hierarchical documents allow advanced interpretation in modern forms of information systems (e.g. using XML language, graphical presentations, etc.).
- EXFOR and ENSDF files are presented by Web-viewers as an interactive graph-tree (iTree).
- X4± and ensdf± are extended with edit-mode (top-menu, commands on nodes, editing data using dictionaries and help system, running checking and utility codes, save file original format, undo and other operations)

EXFOR → View X4± → Edit X4± → EXFOR

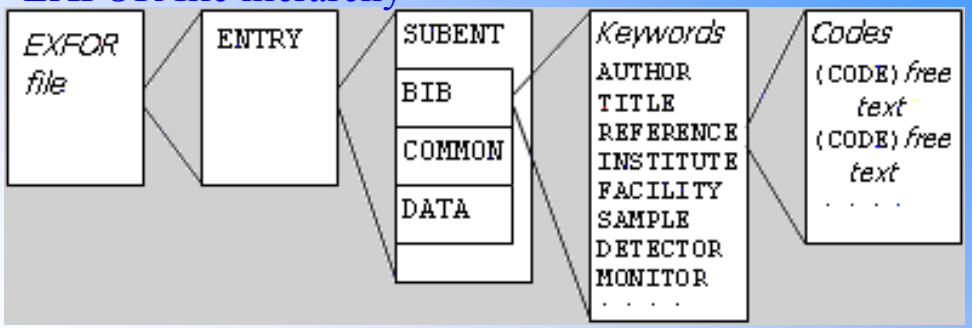
EXFOR file

```
ENTRY
SUBENT
BIB
AUTHOR
TITLE
REFERENCE
......
ENDBIB
......
ENDSUNEBT
SUBENT
......
ENDENTRY
ENTRY
......
```

EXFOR logic

```
ENTRY
  SUBENT
    BIB
      AUTHOR
      TITLE
      REFERENCE
      ......
    ENDBIB
    ......
  ENDSUBENT
  SUBENT
  ......
ENDENTRY
ENTRY
......
```

EXFOR file hierarchy



View EXFOR: X4±

ENTRY A1495 1956, J.P.Schiffer+ last-updated: 2003-10-13
- SUBENT A1495001 last-updated: 2003-10-13
- SUBENT A1495003 last-updated: 2003-10-13
  - BIB #bibliographic and descriptive information
    - REACTION
      - (3-LI-6(HE3,P)4-BE-8,PAR,DA)
    - SAMPLE
    - ERR-ANALYS
    - EN-SEC
    - STATUS
  - COMMON 4x1 #Constant parameters
    - Legend
    - Data

EN-ERR	E-LVL	DATA-ERR	DATA-ERR1
MEV	MEV	MB/SR	PER-CENT
0.0040	2.9	0.012	20.0

  - DATA 3x191
    - Legend

EN	Energy of Incident Projectile, Laboratory System
ANG	Angle, Laboratory System
DATA	Partial differential cross section d/dA

    - Data

EN	ANG	DATA
MEV	ADEG	MB/SR
0.8989	150.0	0.7892

Edit EXFOR: X4±

File Edit View Tools Help About

Edit EXFOR File. Request
- ENTRY A1495 1956, J.P.Schiffer+ last-updated: 2014-02-26
  - SUBENT A1495001 last-updated: 2014-02-26
    - BIB #bibliographic and descriptive information
      - TITLE
        - Study of the reaction mechanism for (He3,p) reactions with Li-6, B-10, and C-13
      - AUTHOR
      - INSTITUTE
        - *Acc=[A1495001] Kw=[INSTITUTE] Code:#0 [Edit] [Delete-Code]*
        - (1USARIC) #Rice University, Houston, TX, United States of America
      - REFERENCE
      - FACILITY
      - SAMPLE
      - METHOD
      - DETECTOR
      - HISTORY
    - NOCOMMON
  - SUBENT A1495002 last-updated: 2014-02-26
    - BIB #bibliographic and descriptive information
      - REACTION

Light EXFOR and ENSDF Editors Projects

- Light EXFOR Editor, 2010-2015 _____/frozen/
  - Web-viewer X4± presents information from EXFOR file as an interactive tree with interpreting codes and data according to EXFOR rules and dictionaries, using also information from NSR database and other sources.
  - Web editor built on top of X4± Web-viewer: nodes of the tree are extended with commands for editing.
  - Editing is implemented via pop-up windows.
- Light ENSDF Editor, 2015-2016 _____/active/
  - ENSDF file is presented as hierarchical document (ensdf±) - interactive tree (graph) with possibility to open/collapse branches and with commands associated with the nodes.
  - User can remove/add/edit nodes, call checking and utility codes, do other useful operations.
  - Editing is implemented via pop-up windows and internal frames.
  - The Editor is called from MyEnsdf Web tool for ENSDF evaluators.
  - Using AJAX technology sharing software infrastructure with Light EXFOR Editor.

ENSDF Web Viewers and Editor

1. ensdf+ interpreted ENSDF cards
2. ensdf± interactive tree-graph
3. ensdf++ web editor

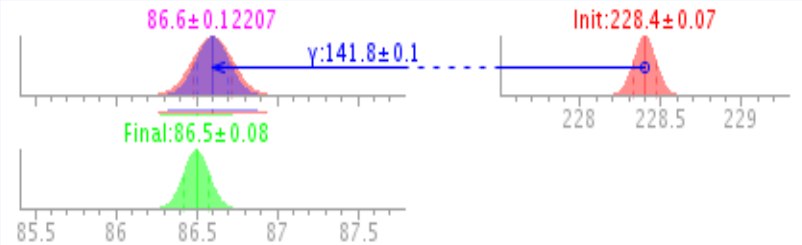
ENSDF Interpreted (ensdf+)

Original ENSDF text

```
184AU  G 141.8     1  32      4(E1+M2)    0.39          2.42
184AUS G KC=1.725 25$LC=0.526 8$MC=0.1314 19$NC+=0.0394 6
184AUS G NC=0.0331 5$OC=0.00595 9$PC=0.000346 5
184AU cG M         |a(K)exp=1.8 {I5}, (|a(L1)exp+|a(L2)exp)=0.45 {I9},
184AU2cG |a(L3)exp=0.09 {I4} (2005Sa40). M1+E2 (|d=0.59) also possible, but
184AUxcG |D|p=yes from level scheme.
184AU cG           E|g=141.6 {I3}, I|g=19 {I3} (1978Ne10).
```

Interpretation

#Record 2/4 Gamma "141.8" Line:150[7]
Energy=141.8(±.1)keV
init.Level:L_6:Energy=228.40(±.07)keV Jπ=3- final.Level:L_3:Energy=86.50(±.08)keV
Jπ=(2,3)+ [E_6-E_3=141.9; E_6-E_3-Eγ=0.1∈0.5σ]



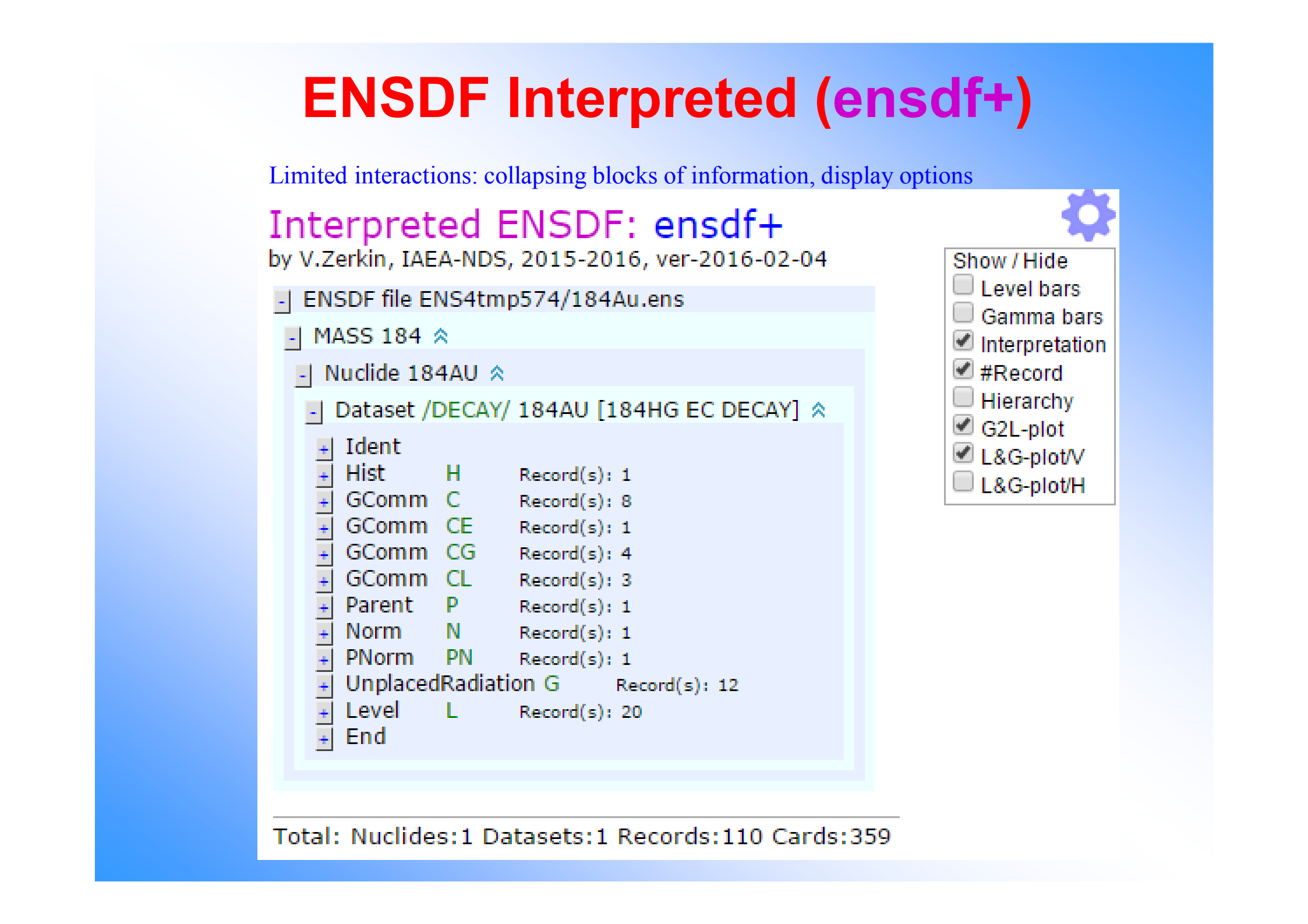
.....help1:[228.4,0.07,141.8,0.1,86.5,0.08]
Relative photon intensity:RI=32(4)
Multipolarity of transaction:M=(E1+M2)
Mixing Ratio:MR=0.39
Total conversion coeff.:CC=2.42
#KC=1.725 25
#LC=0.526 8
#MC=0.1314 19
#NC+=0.0394 6 NC=0.0331 5
#OC=0.00595 9
#PC=0.000346 5

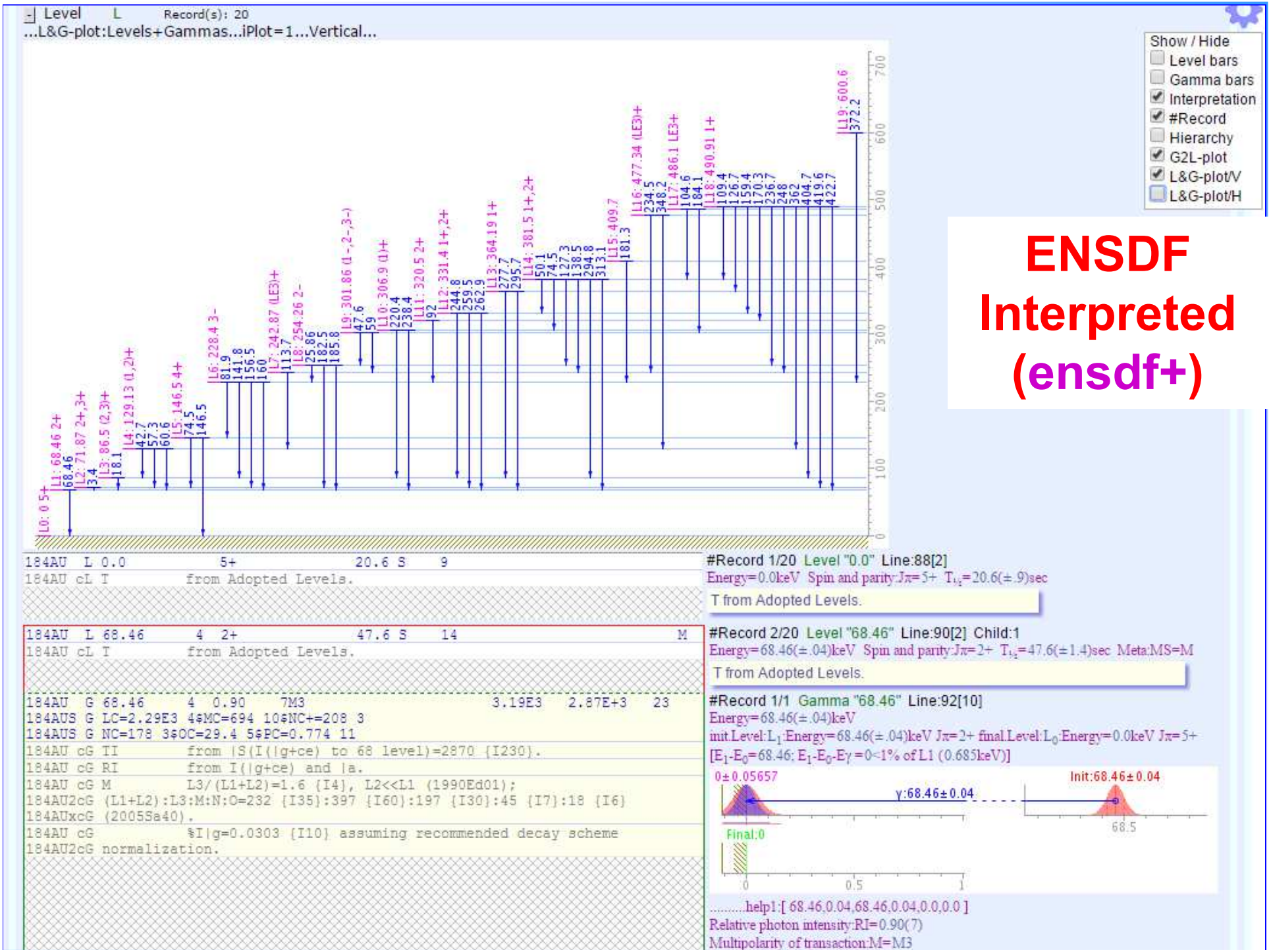
M α(K)exp=1.8 {I5}, (α(L1)exp+α(L2)exp)=0.45 {I9}, α(L3)exp=0.09 {I4} (2005Sa40). M1+E2 (δ=0.59) also possible, but Δπ=yes from level scheme.

Eγ=141.6 {I3}, Iγ=19 {I3} (1978Ne10).

ENSDF Interpreted (ensdf+)

Limited interactions: collapsing blocks of information, display options




Level L Record(s): 20
...L&G-plot:Levels+Gammas...iPlot=1...Vertical...
Show / Hide
Level bars
Gamma bars
Interpretation
#Record
Hierarchy
G2L-plot
L&G-plot/V
L&G-plot/H
ENSDF
Interpreted
(ensdf+)
184AU L 0.0 5+ 20.6 S 9
184AU cL T from Adopted Levels.
184AU L 68.46 4 2+ 47.6 S 14 M
184AU cL T from Adopted Levels.
184AU G 68.46 4 0.90 7M3 3.19E3 2.87E+3 23
184AUS G LC=2.29E3 4$MC=694 10$NC+=208 3
184AUS G NC=178 3$OC=29.4 5$PC=0.774 11
184AU cG TI from I(|g+ce) to 68 level)=2870 {I230}.
184AU cG RI from I(|g+ce) and |a.
184AU cG M L3/(L1+L2)=1.6 {I4}, L2<<L1 (1990Ed01);
184AU2cG (L1+L2):L3:M:N:O=232 {I35}:397 {I60}:197 {I30}:45 {I7}:18 {I6}
184AUxcG (2005Sa40).
184AU cG %I|g=0.0303 {I10} assuming recommended decay scheme
184AU2cG normalization.
#Record 1/20 Level "0.0" Line:88[2]
Energy=0.0keV Spin and parity:Jπ=5+ T½=20.6(±.9)sec
T from Adopted Levels.
#Record 2/20 Level "68.46" Line:90[2] Child:1
Energy=68.46(±.04)keV Spin and parity:Jπ=2+ T½=47.6(±1.4)sec Meta:MS=M
T from Adopted Levels.
#Record 1/1 Gamma "68.46" Line:92[10]
Energy=68.46(±.04)keV
init.Level:L1:Energy=68.46(±.04)keV Jπ=2+ final.Level:L0:Energy=0.0keV Jπ=5+
[E1-E0=68.46; E1-E0-Eγ=0<1% of L1 (0.685keV)]
0±0.05657
γ:68.46±0.04
Init:68.46±0.04
Final:0
help1:[68.46,0.04,68.46,0.04,0.0,0.0]
Relative photon intensity:RI=0.90(7)
Multipolarity of transaction:M=M3

ENSDF interactive tree (ensdf±)

Welcome to ENSDF-iTree project

V.Zerkin, IAEA-NDS, 2015-2016, ver-2016-03-15

ENSDF file is presented as an interactive tree with nested structure and possibility to hide/show descriptive information and data.

show-hide
- [x] cards
- [ ] bars
- [x] plot
- [x] shift

open: nuc, ds, all

- ENSDF file ENS4tmp574/184Au.ens
  - MASS 184
    - Nuclide 184AU
      - Dataset /DECAY/ 184AU [184HG EC DECAY] #Lines:359 Records:54
        - Record Ident
        - Records H /1/ Hist
        - Records C /1/ GComm nRecords=8
        - Records CE /1/ GComm
        - Records CG /1/ GComm nRecords=4
        - Records CL /1/ GComm nRecords=3
        - Records P /2/ Parent
        - Records N /2/ Norm
        - Records PN /2/ PNorm
        - Records G /3/ UnplacedRadiation-G nRecords=12
        - Records L /4/ Level nRecords=20
          - Level #1/20 "0.0" Lines:2 Comments:1
          - Level #2/20 "68.46" Lines:2 Comments:1 Radiations:1
            - Data Lines:1

```
184AU  L 68.46      4  2+              47.6 S    14                            M
```

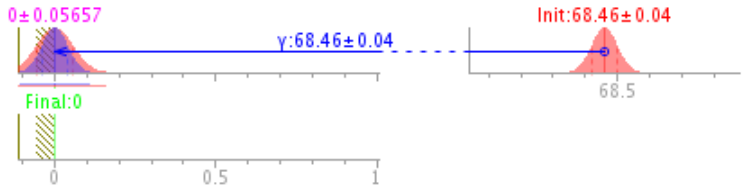
Energy=68.46(±.04)keV Spin and parity:Jπ=2+ $T_{½}$=47.6(±1.4)sec Meta:MS=M

            - Comments:1
            - Radiations:1
              - Gamma #1/1 "68.46" Lines:10 Comments:4
                - Data Lines:3

```
184AU  G 68.46      4  0.90     7M3                      3.19E3    2.87E+3    23
184AUS G LC=2.29E3 4$MC=694 10$NC+=208 3
184AUS G NC=178 3$OC=29.4 5$PC=0.774 11
```

Energy=68.46(±.04)keV

init.Level:L_1:Energy=68.46(±.04)keV Jπ=2+ final.Level:L_0:Energy=0.0keV Jπ=5+ [E_1-E_0=68.46; E_1-E_0-Eγ=0<1% of L1 (0.685keV)]



Relative photon intensity:RI=0.90(7)

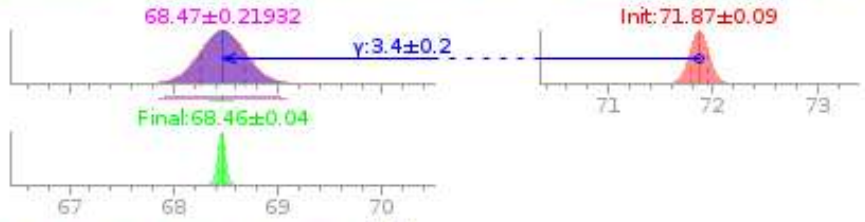
Multipolarity of transaction:M=M3

Total conversion coeff:CC=3.19E3

ENSDF web-editor (ensdf++)

File Edit View History Tools Help About // 184Au.ens

- 184Au.ens
  - MASS 184
    - Nuclide 184AU
      - Dataset /DECAY/ 184AU [184HG EC DECAY] #Lines:359 Records:54
        - Record Ident
        - Records H /1/ Hist
        - Records C /1/ GComm nRecords=8
        - Records CL /1/ GComm nRecords=3
        - Records P /2/ Parent
        - Records N /2/ Norm
        - Records PN /2/ PNorm
        - Records G /3/ UnplacedRadiation-G nRecords=12
        - Records L /4/ Level nRecords=20
          - Level #1/20 "0.0 *5+* T½=20.6 s" Lines:2 Comments:1
          - Level #2/20 "68.46 (4) *2+* T½=47.6 s" Lines:2 Comments:1 EC & radiations:1
          - Level #3/20 "71.87 (9) *2+,3+*" EC & radiations:1
            - Data Lines:1
              - Energy=71.87(±.09)keV Spin and parity:Jπ=2+,3+
            - Comments:0
            - EC and radiations:1
              - Edit record | Edit data | Remove record | Edt | EdtCards
                - Gamma #1/1 "3.4 (2) *(M1)*" Lines:4 Comments:2
                  - Data Lines:1
                    - Energy=3.4(±.2)keV
                      init.Level:L_2:Energy=71.87(±.09)keV Jπ=2+,3+ final.Level:L_1:Energy=68.46(±.04)keV Jπ=2+ [E_2-E_1=3.41;



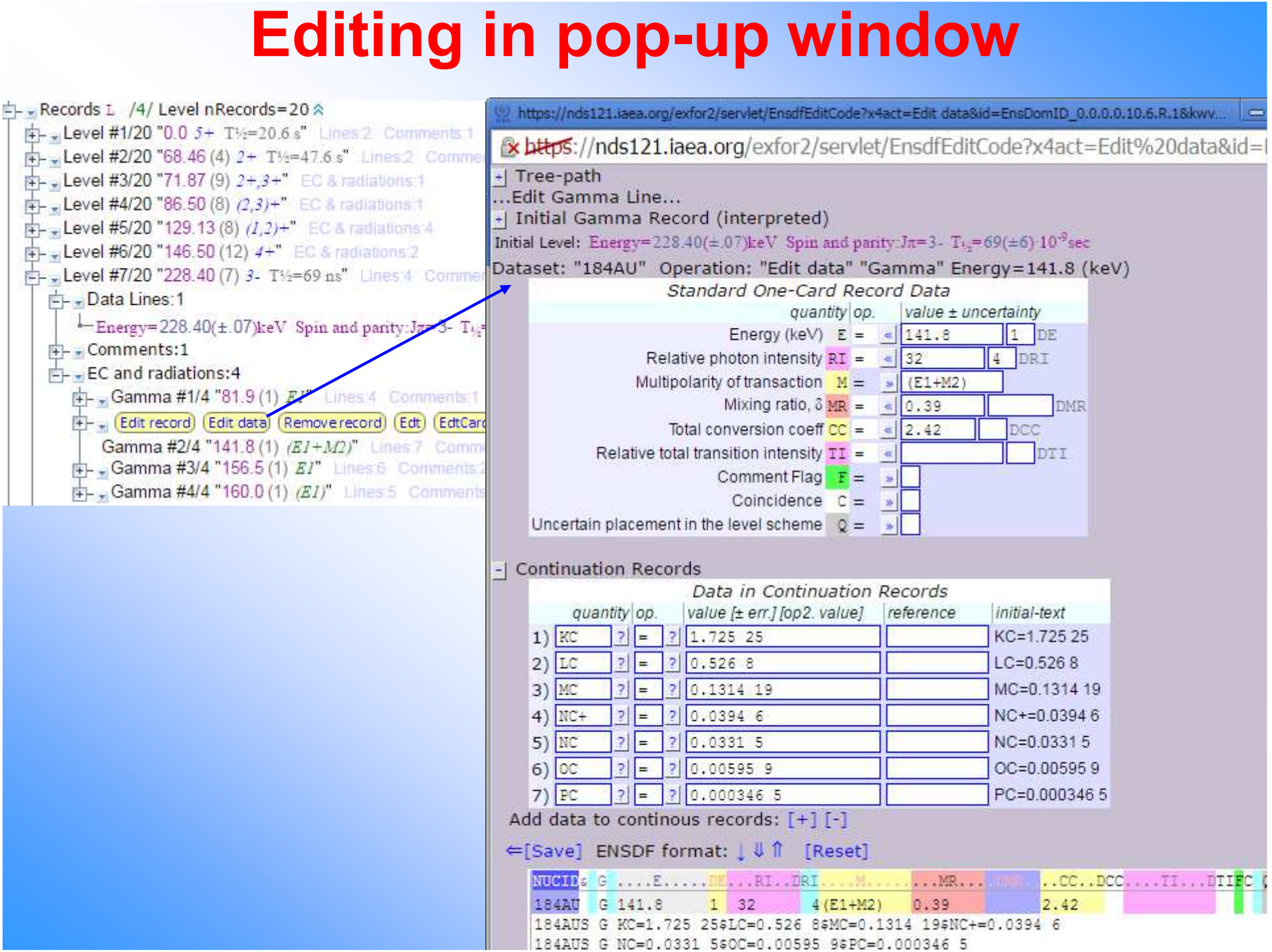
Multipolarity of transaction:M=(M1)
Relative total transition intensity:TI=1.55E3(16)
- Comments:2

Light ENSDF Editor
V.Zerkin, IAEA-NDS, 2015-2016, ver-2016-03-15
ENSDF file is presented as an interactive tree
with possibility to hide/show/edit information

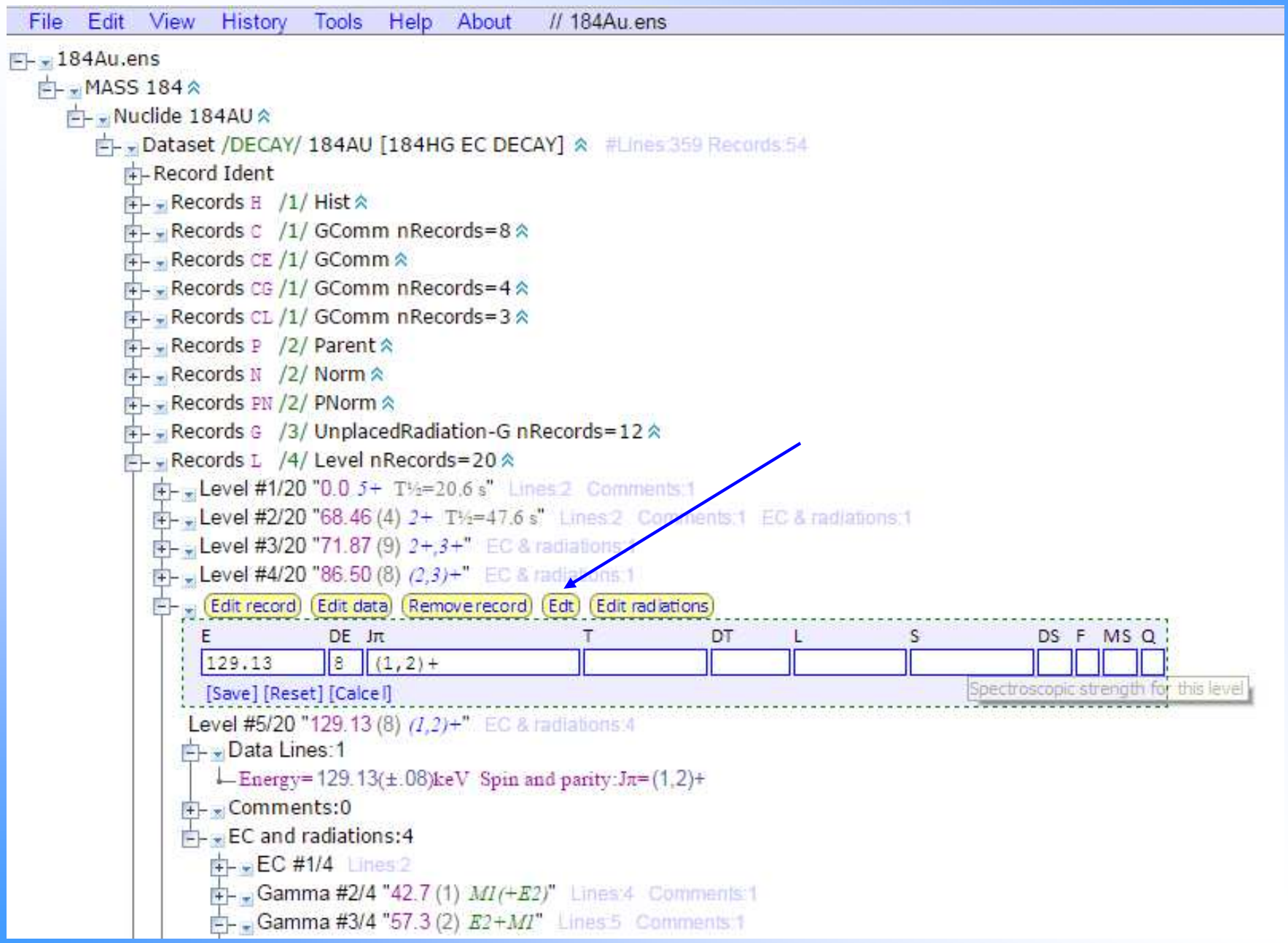
Implementation of editing

1. Editing in popup window
2. Editing on the main window (build-in frame)
3. Editing original ENSDF and interpreted information
4. Integrated editing (e.g. parallel datasets, all levels)

Editing in pop-up window

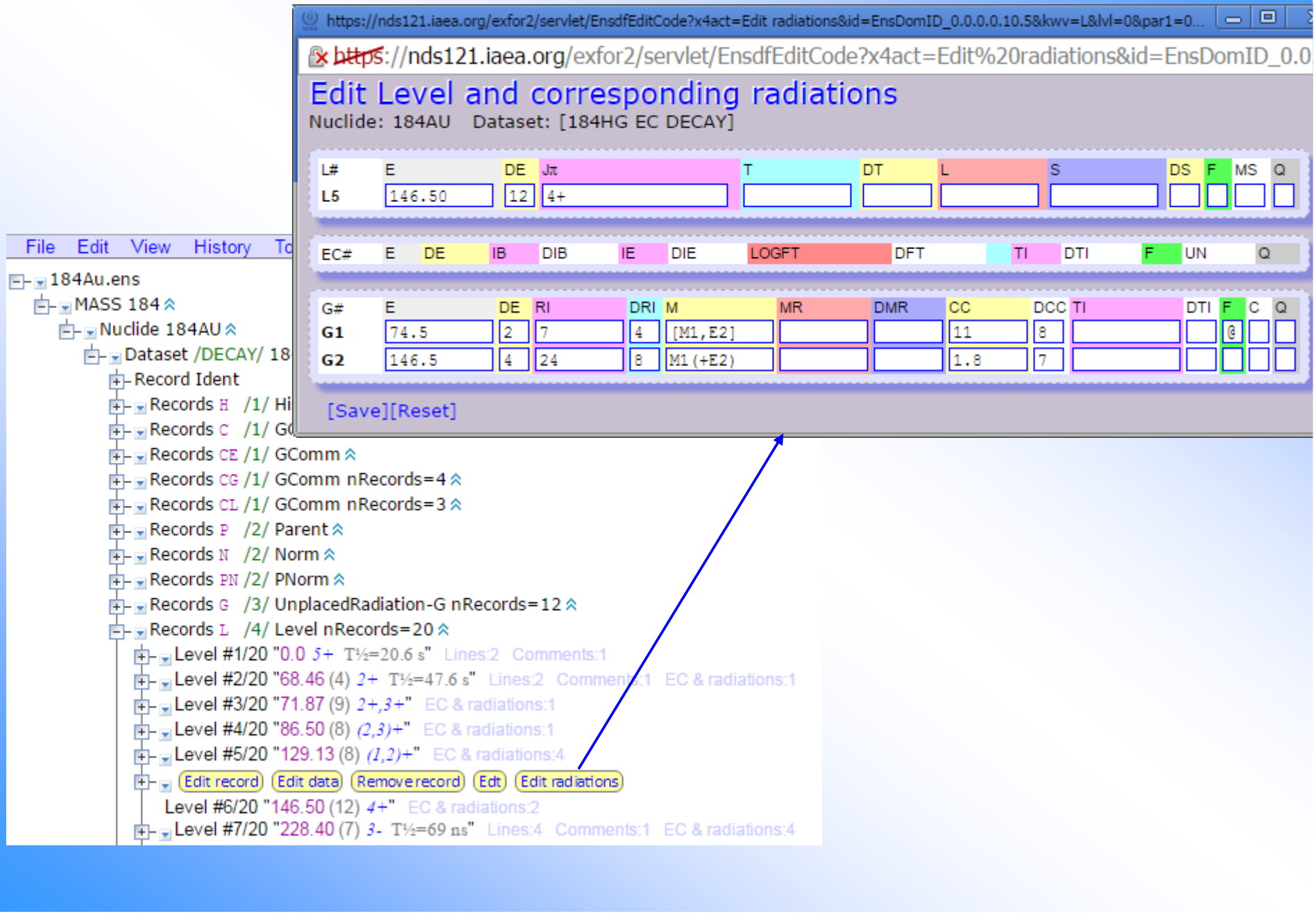


Editing on the main window

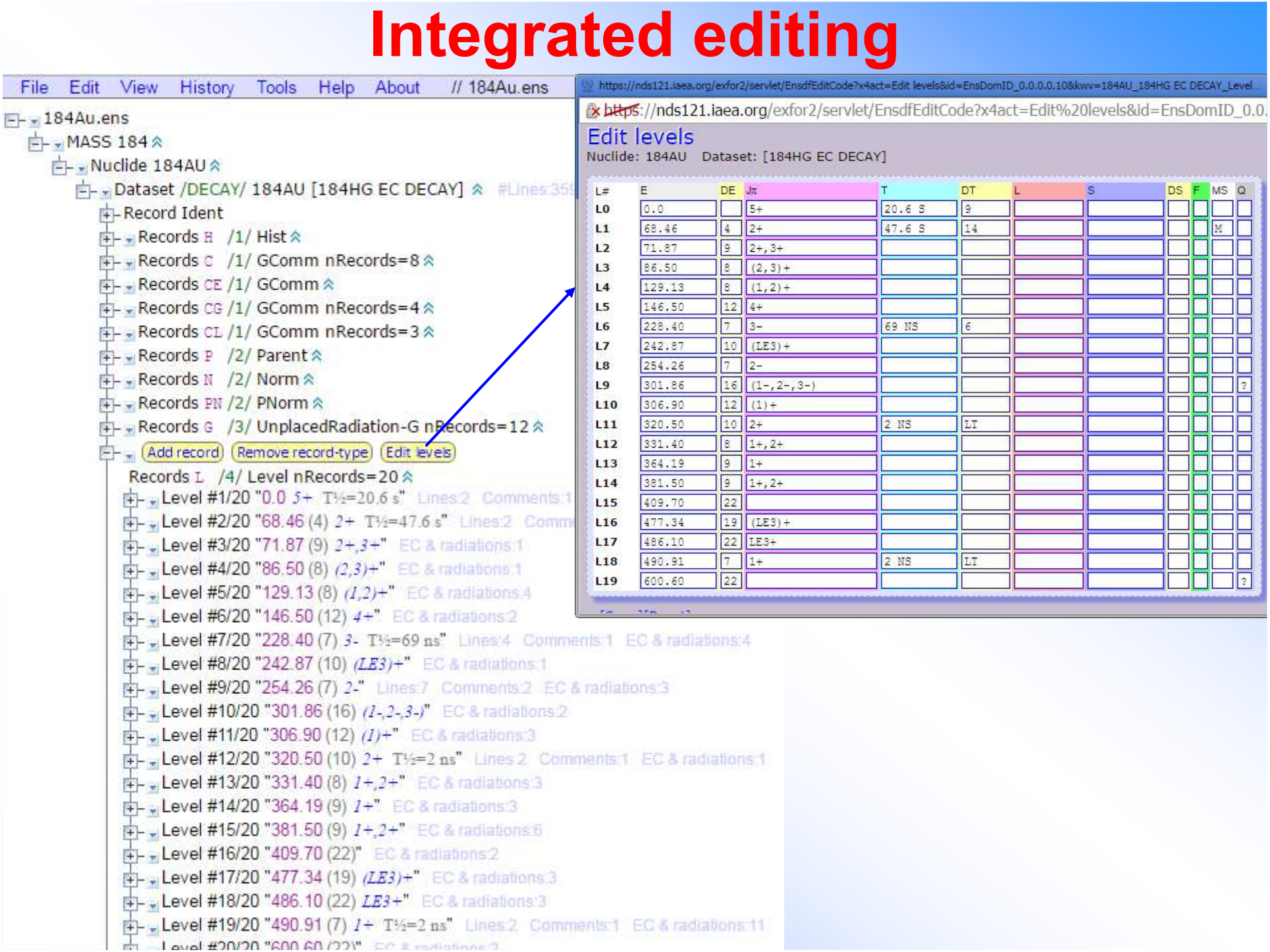


Editing ENSDF cards on the main window

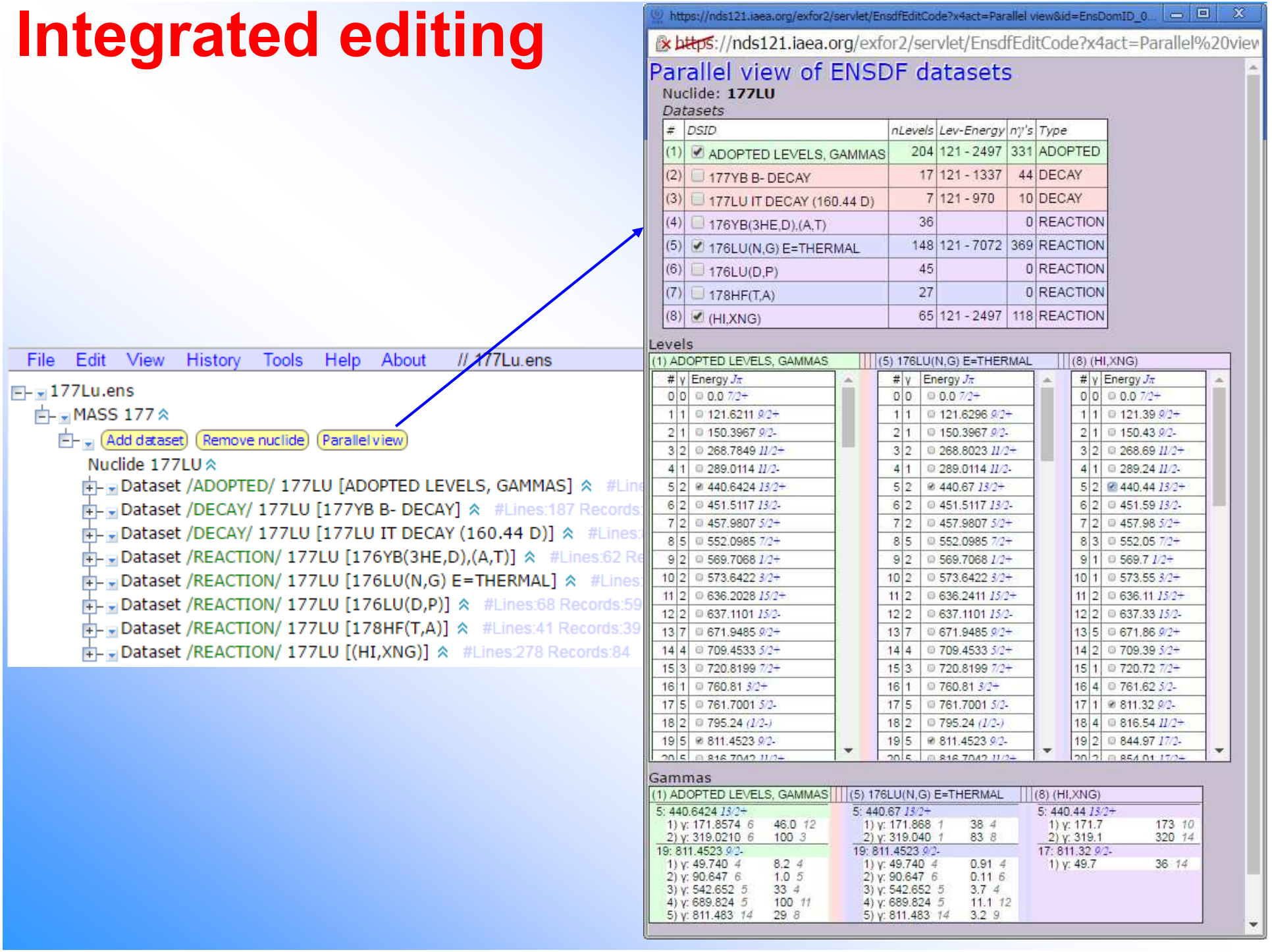
Integrated editing



Integrated editing



Integrated editing



Concluding remarks

1. Light Web editors are still “experimental projects”
2. There are still “technological questions”
3. Clear outline of the tasks (and users) is needed

Thank you.