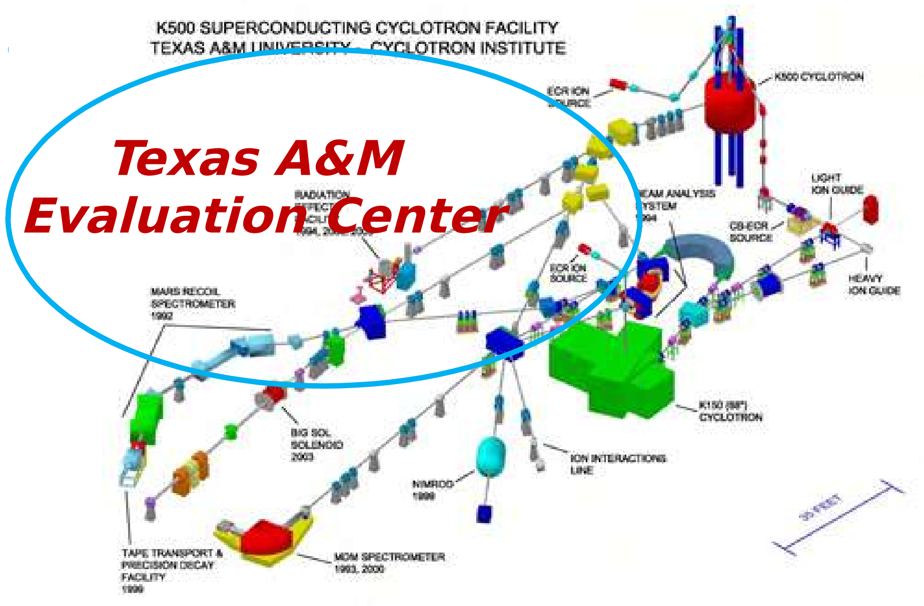
Texas A&M
US Nuclear DATA Program
@HINPw6



Ninel Nica, Evaluator
d Nuclear Structure Data File
Cyclotron Institute
Texas A&M Evaluation Center

Texas A&M
US Nuclear DATA Program

i. ***History:*** ***The need has arisen***
ii. ***US Nuclear Data Program:*** ***… and never left again!***
iii. ***@CI-Texas A&M Evaluation Center:*** ***It's right here***
iv. ***Strategic Priorities, New Initiatives & Directions :*** ***for good***

i. History: *The need has arisen*

Nuclear data evaluation fills a century-long chapter of nuclear science. A search in the *Nuclear Science Reference* (NSR) database maintained at the National Nuclear Data Center (NNDC) (https://www.nndc.bnl.gov/nsr/) on the author "M. Curie" produces a paper titled "*The Radioactive Constants as of 1930*". The introduction to this paper states that

"the need has arisen for the publication of special Tables of the Radioactive Constants"

and continues,

"This responsibility has been assumed by the International Radium Standards Commission chosen in Brussels in 1910 (...)".

Here we have the origin of what today is known as Nuclear Data Evaluation.

JULY, 1931 REVIEWS OF MODERN PHYSICS VOLUME 3

THE RADIOACTIVE CONSTANTS AS OF 1930

REPORT OF THE INTERNATIONAL RADIUM-STANDARDS COMMISSION

BY M. CURIE, A. DEBIERNE, A. S. EVE, H. GEIGER, O. HAHN, S. C. LIND, ST. MEYER, E. RUTHERFORD, AND E. SCHWEIDLER

I. INTRODUCTION

FOLLOWING the reorganization of the International Union of Chemistry and of the International Atomic Weights Commission, the need has arisen for the publication of special Tables of the Radioactive Constants.

This responsibility has been assumed by the International Radium Standards Commission chosen in Brussels in 1910, which has expressed its willingness to cooperate with the International Union.

Recommended value.

The recommended value of Ra/U is:

$Ra/U = 3.4 \cdot 10^{-7}$ $U/Ra = 2.94 \cdot 10^{6}$

Literature.

Literature prior to 1926 in St. Meyer and E. Schweidler, Radioaktivität, 1927, p. 398, pp. 404–406, Lit. Nos. 7, 22, 23.

V. Chlopin and M. A. Paswick, Akad. Leningrad, 1928, (Russian)

In samples from the same location values varying due to chemical changes are found from 2.18 to $4.17 \cdot 10^{-7}$. Compare also Lind and Whittemore, J. Amer. Chem. Soc. **36**, 2066 (1914).

The need has arisen. Here is the US

History by M.J. Martin (Nuclear Data Project ORNL)

- In the US the idea of a publishable evaluation of nuclear data originated with Katharine Way. Kay worked on the Manhattan project in the late 1940’s, first in Chicago and then in Oak Ridge
- In 1948 after a move to Washington, she initiated the Nuclear Data Project at the U.S. National Bureau of Standards, renamed in 1988 as the National Institute of Standards and Technology (NIST). *The first "Nuclear Data" report was published in 1950*.
- In 1953 the Nuclear Data Project moved from NIST to the U.S. National Academy of Sciences - National Research Council.
- The first data sheets were published as AEC reports in the form of loose leaf pages called *Nuclear Data Sheets*.
- In 1964 the Nuclear Data Project moved from its home in Washington D.C. to the Oak Ridge National Laboratory in Oak Ridge Tennessee. Kay felt that the project needed to be situated in an active physics environment.
- Kay negotiated with Academic Press to publish the evaluation work in a journal rather than as loose leaf sheets of data.

Katharine "Kay" Way
(1903-1995)

History - continued

- **February, 1966, saw the first publication of the *Nuclear Data Sheets* published by Academic Press as *Section B* of the journal *Nuclear Data*. *Section A* had begun a year earlier as *Atomic Data Tables*.**
- **In August, 1973, the two journals merged to become Atomic and Nuclear Data Tables with Kay Way as the editor for both.**
- **At this time the evaluation effort was centered at the Nuclear Data Project (NDP) at ORNL.**
- **Initially the data were entered by hand on large squared sheets of paper and the drawings were done by hand. These sheets were then typed and photographed with the drawings turned over to a draftsman to create a publishable product.**
- **The 80-column format for ENSDF was designed in 1977 by Bruce Ewbank and Marcel Schmorak of the NDP staff and published in February 1978 as an ORNL report, 5054/R1. This 80-column form is still in use today with some changes introduced at NNDC.**
- **In this same report are descriptions of the original Logft, Alpha HF, GTOL, HSICC (Hager-Selzer), Medlist, and plot computer programs. These have since been modified at NNDC, with many additional analysis and utility programs added.**
- **The evaluation activity became international with the establishment in 1974 of the Nuclear Structure and Decay Data Network, NSDD, under the auspices of the IAEA, Nuclear Data Section.**

History - continued

- **NNDC at BNL coordinated the national effort (USNDP) and the international (NSDD) effort for the US/DOE, but the lead role in editing and processing of the evaluation effort continued at Oak Ridge.**
- **In 1981, the NNDC took over production of Nuclear Data Sheets, and completely computerized the entire operation.**
- **NDP and NNDC jointly edited the journal, with Murray Martin as Editor-in-Chief and Jag Tuli as Editor. In June 1988, when Martin retired, the editing responsibility shifted to the NNDC with Tuli taking over as sole editor.**
- **The present editor is E. A. (Libby) McCutchan who took over upon Tuli's retirement in April, 2016.**

… and never has left!

ii. US Nuclear Data Program

USNDP

USNDP Mission Statement:

- To provide current, accurate, authoritative DATA
- For workers in pure and applied areas of nuclear science and engineering
- This is accomplished primarily through the compilation, evaluation, dissemination, and archiving of extensive nuclear datasets.
- USNDP also addresses gaps in the data, through targeted experimental studies and the use of theoretical models.

USNDP Coordinating Committee

A. Sonzogni, BNL, chair
D. Brown, BNL
J. Chen, MSU
L. Bernstein, LBNL **S. Basunia**
H. Lee, LANL, *Chair - Reactions*
J. Kelley, TUNL, *Chair - Structure*
F. Kondev, ANL
E.A. McCutchan, BNL
N. Nica, TAMU
M. Smith, ORNL **C.D. Nesaraja**
I. Thompson, LLNL

USNDP

Compilation, Evaluation, Dissemination, Archival

DATA – paradigm of the future

Applications:

Needs DATA

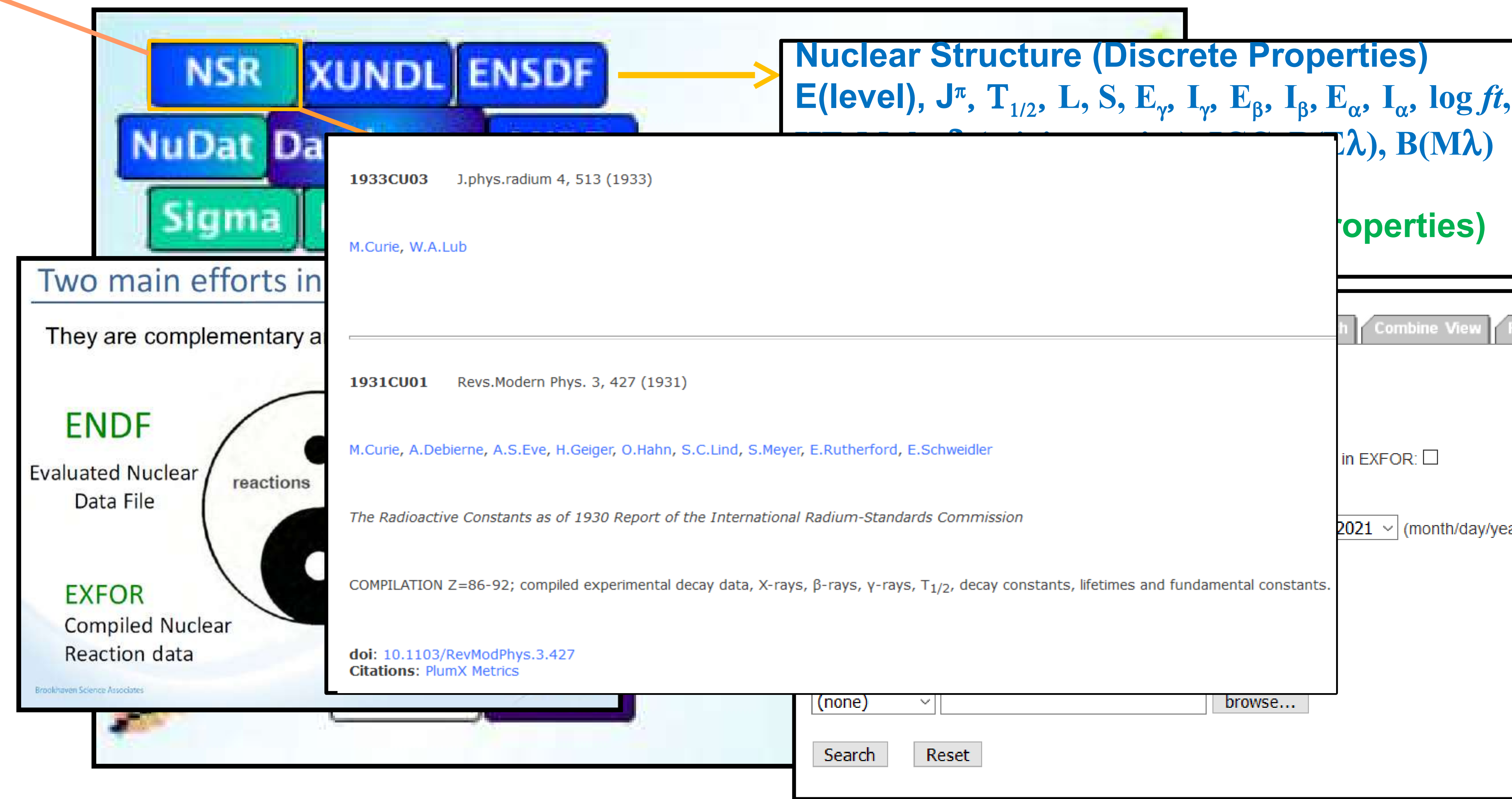
Complete, Organized, Traceable Readable

Nuclear Science:

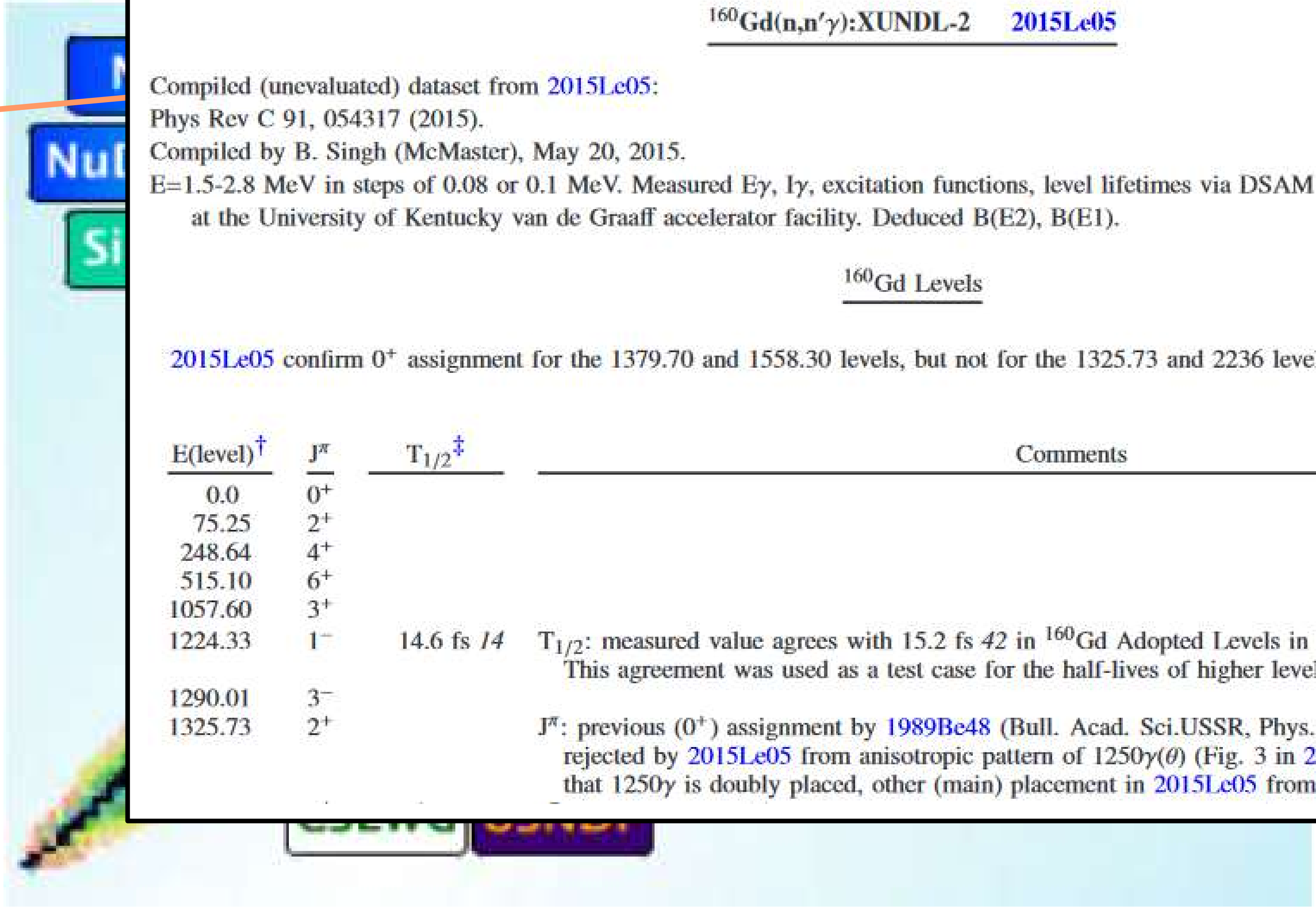
Experiment, Theory

National Nuclear Data Center

Evaluation Pipeline PROGRESSION



National Nuclear Data Center



Matching datasets in XUNDL

$^{160}_{64}Gd_{96}$-1 From XUNDL - May 2015 $^{160}_{64}Gd_{96}$-1

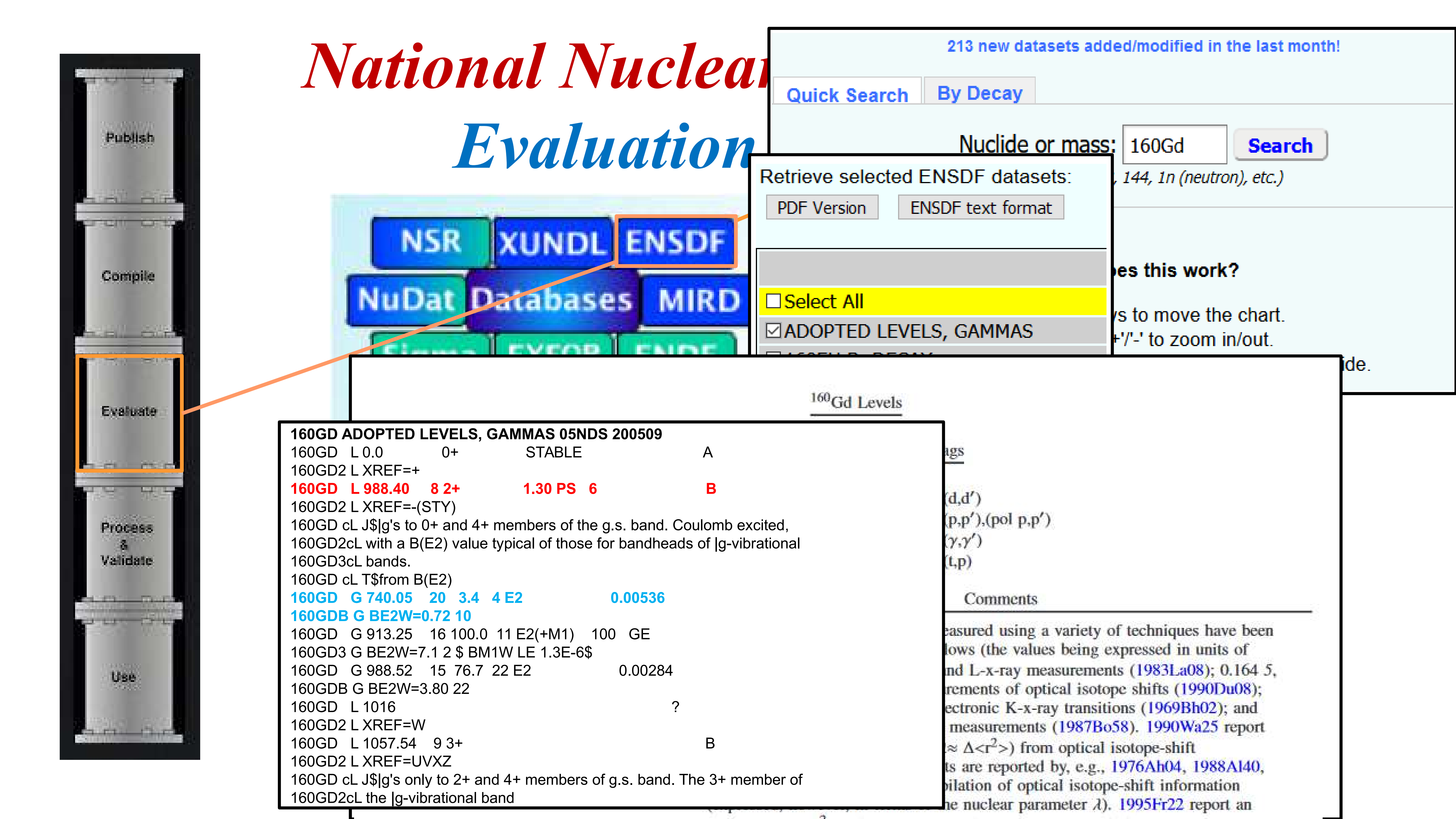
^{160}Gd(n,n′γ):XUNDL-2 2015Le05

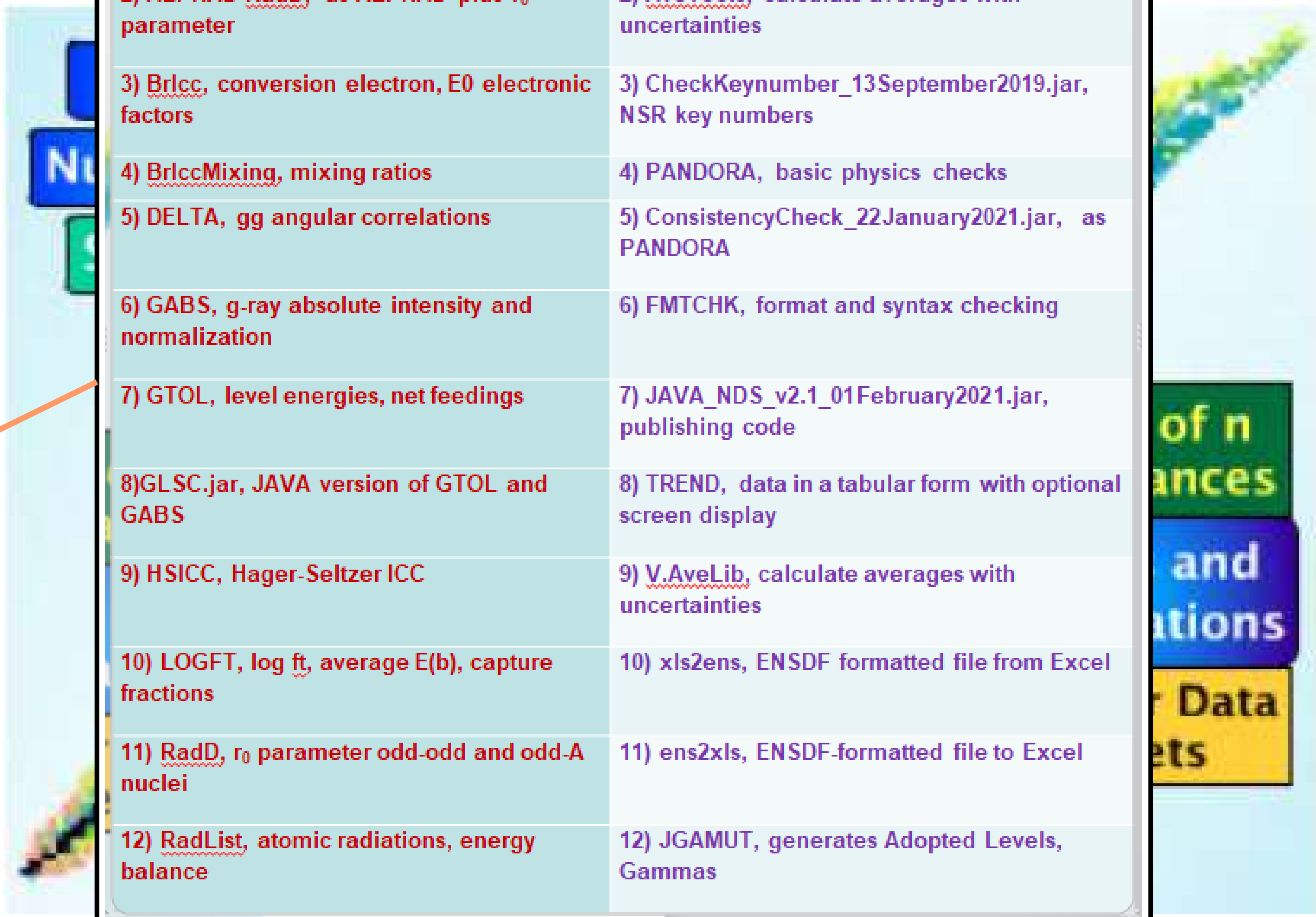
Compiled (unevaluated) dataset from 2015Le05:
Phys Rev C 91, 054317 (2015).
Compiled by B. Singh (McMaster), May 20, 2015.
E=1.5-2.8 MeV in steps of 0.08 or 0.1 MeV. Measured Eγ, Iγ, excitation functions, level lifetimes via DSAM and γ(θ) technique at the University of Kentucky van de Graaff accelerator facility. Deduced B(E2), B(E1).

^{160}Gd Levels

2015Le05 confirm 0^+ assignment for the 1379.70 and 1558.30 levels, but not for the 1325.73 and 2236 levels.

E(level)†	J^π	$T_{1/2}$‡	Comments
0.0	0^+		
75.25	2^+		
248.64	4^+		
515.10	6^+		
1057.60	3^+		
1224.33	1^-	14.6 fs *14*	$T_{1/2}$: measured value agrees with 15.2 fs *42* in ^{160}Gd Adopted Levels in ENSDF database. This agreement was used as a test case for the half-lives of higher levels.
1290.01	3^-		
1325.73	2^+		J^π: previous (0^+) assignment by 1989Be48 (Bull. Acad. Sci.USSR, Phys.Ser. 53, No.5, 76) rejected by 2015Le05 from anisotropic pattern of 1250γ(θ) (Fig. 3 in 2015Le05); but note that 1250γ is doubly placed, other (main) placement in 2015Le05 from 1498 level.


National Nuclear
Evaluation
Publish
Compile
Evaluate
Process & Validate
Use
NSR
XUNDL
ENSDF
NuDat
Databases
MIRD
213 new datasets added/modified in the last month!
Quick Search
By Decay
Nuclide or mass:
160Gd
Search
, 144, 1n (neutron), etc.)
es this work?
s to move the chart.
+'/'-' to zoom in/out.
ide.
Retrieve selected ENSDF datasets:
PDF Version
ENSDF text format
Select All
ADOPTED LEVELS, GAMMAS
^{160}Gd Levels
ags
(d,d′)
(p,p′),(pol p,p′)
(γ,γ′)
(t,p)
Comments
easured using a variety of techniques have been
lows (the values being expressed in units of
nd L-x-ray measurements (1983La08); 0.164 5,
rements of optical isotope shifts (1990Du08);
ectronic K-x-ray transitions (1969Bh02); and
measurements (1987Bo58). 1990Wa25 report
≈ Δ<r²>) from optical isotope-shift
ts are reported by, e.g., 1976Ah04, 1988Al40,
pilation of optical isotope-shift information
he nuclear parameter λ). 1995Fr22 report an
160GD ADOPTED LEVELS, GAMMAS 05NDS 200509
160GD L 0.0 0+ STABLE A
160GD2 L XREF=+
160GD L 988.40 8 2+ 1.30 PS 6 B
160GD2 L XREF=-(STY)
160GD cL J$|g's to 0+ and 4+ members of the g.s. band. Coulomb excited,
160GD2cL with a B(E2) value typical of those for bandheads of |g-vibrational
160GD3cL bands.
160GD cL T$from B(E2)
160GD G 740.05 20 3.4 4 E2 0.00536
160GDB G BE2W=0.72 10
160GD G 913.25 16 100.0 11 E2(+M1) 100 GE
160GD3 G BE2W=7.1 2 $ BM1W LE 1.3E-6$
160GD G 988.52 15 76.7 22 E2 0.00284
160GDB G BE2W=3.80 22
160GD L 1016 ?
160GD2 L XREF=W
160GD L 1057.54 9 3+ B
160GD2 L XREF=UVXZ
160GD cL J$|g's only to 2+ and 4+ members of g.s. band. The 3+ member of
160GD2cL the |g-vibrational band



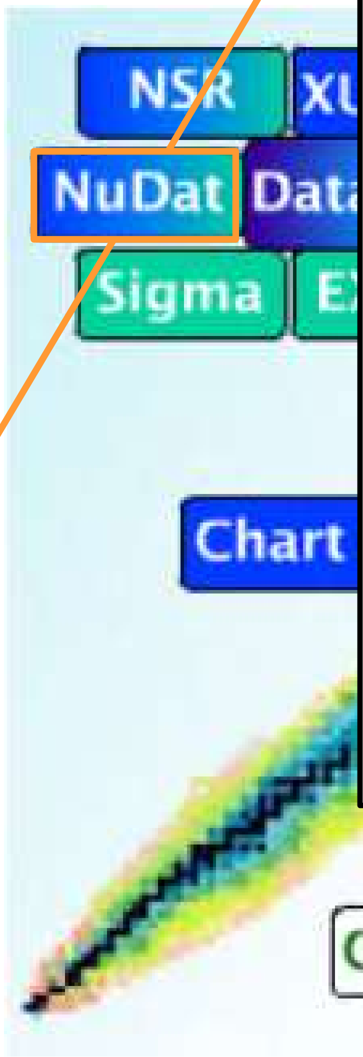
IAEA Vienna Nuclear Data Services, https://www-nds.iaea.org/public/ensdf_pgm/

Analysis Codes	Utility Codes
1) ALPHAD, alpha HF's, theoretical half-lives.	1) ADDGAM, add gammas to adopted level dataset
2) ALPHAD-RadD, as ALPHAD plus r_0 parameter	2) AveTools, calculate averages with uncertainties
3) BrIcc, conversion electron, E0 electronic factors	3) CheckKeynumber_13September2019.jar, NSR key numbers
4) BrIccMixing, mixing ratios	4) PANDORA, basic physics checks
5) DELTA, gg angular correlations	5) ConsistencyCheck_22January2021.jar, as PANDORA
6) GABS, g-ray absolute intensity and normalization	6) FMTCHK, format and syntax checking
7) GTOL, level energies, net feedings	7) JAVA_NDS_v2.1_01February2021.jar, publishing code
8)GLSC.jar, JAVA version of GTOL and GABS	8) TREND, data in a tabular form with optional screen display
9) HSICC, Hager-Seltzer ICC	9) V.AveLib, calculate averages with uncertainties
10) LOGFT, log ft, average E(b), capture fractions	10) xls2ens, ENSDF formatted file from Excel
11) RadD, r_0 parameter odd-odd and odd-A nuclei	11) ens2xls, ENSDF-formatted file to Excel
12) RadList, atomic radiations, energy balance	12) JGAMUT, generates Adopted Levels, Gammas

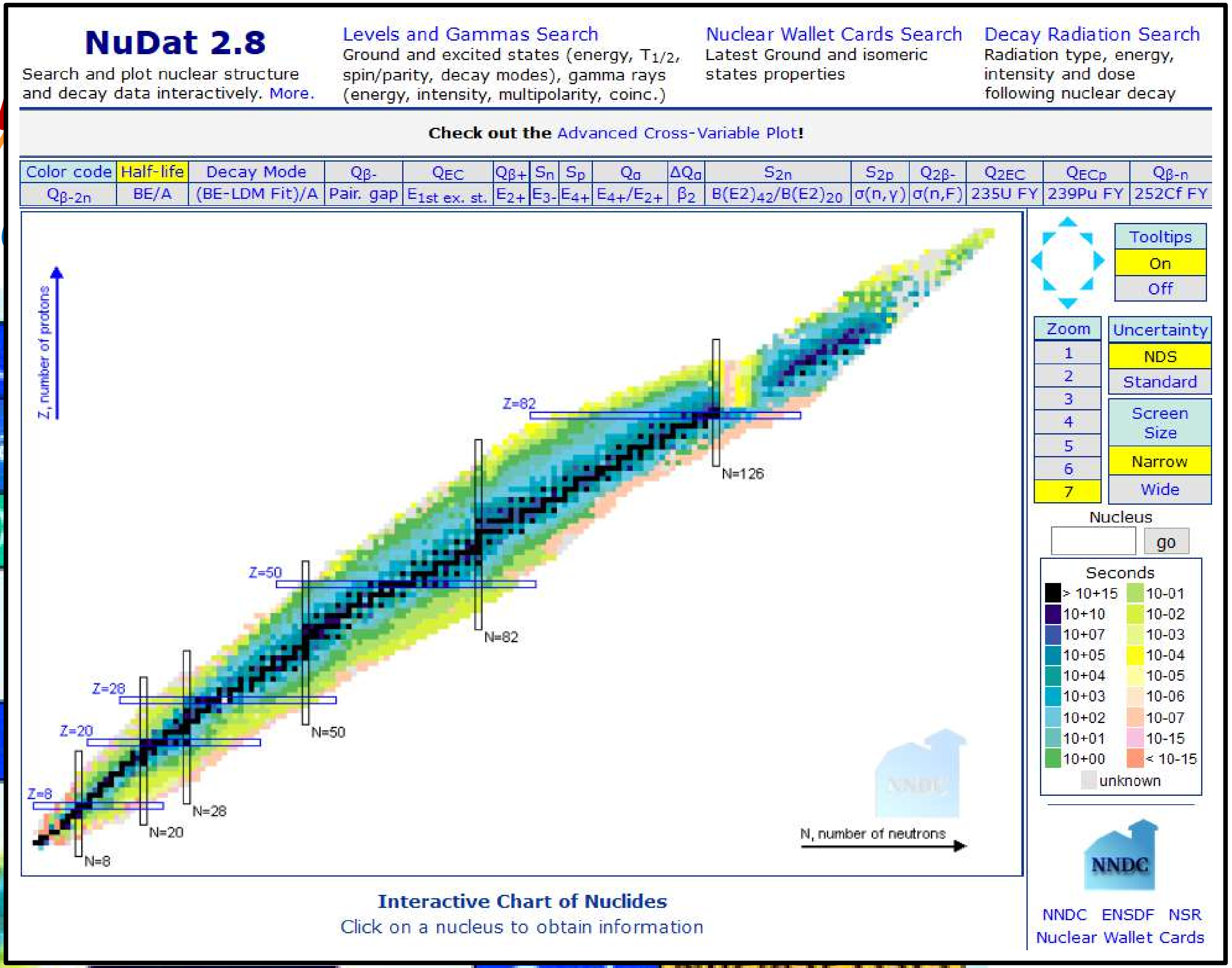
Nationa

Ev

Publish
Compile
Evaluate
Process & Validate
Use

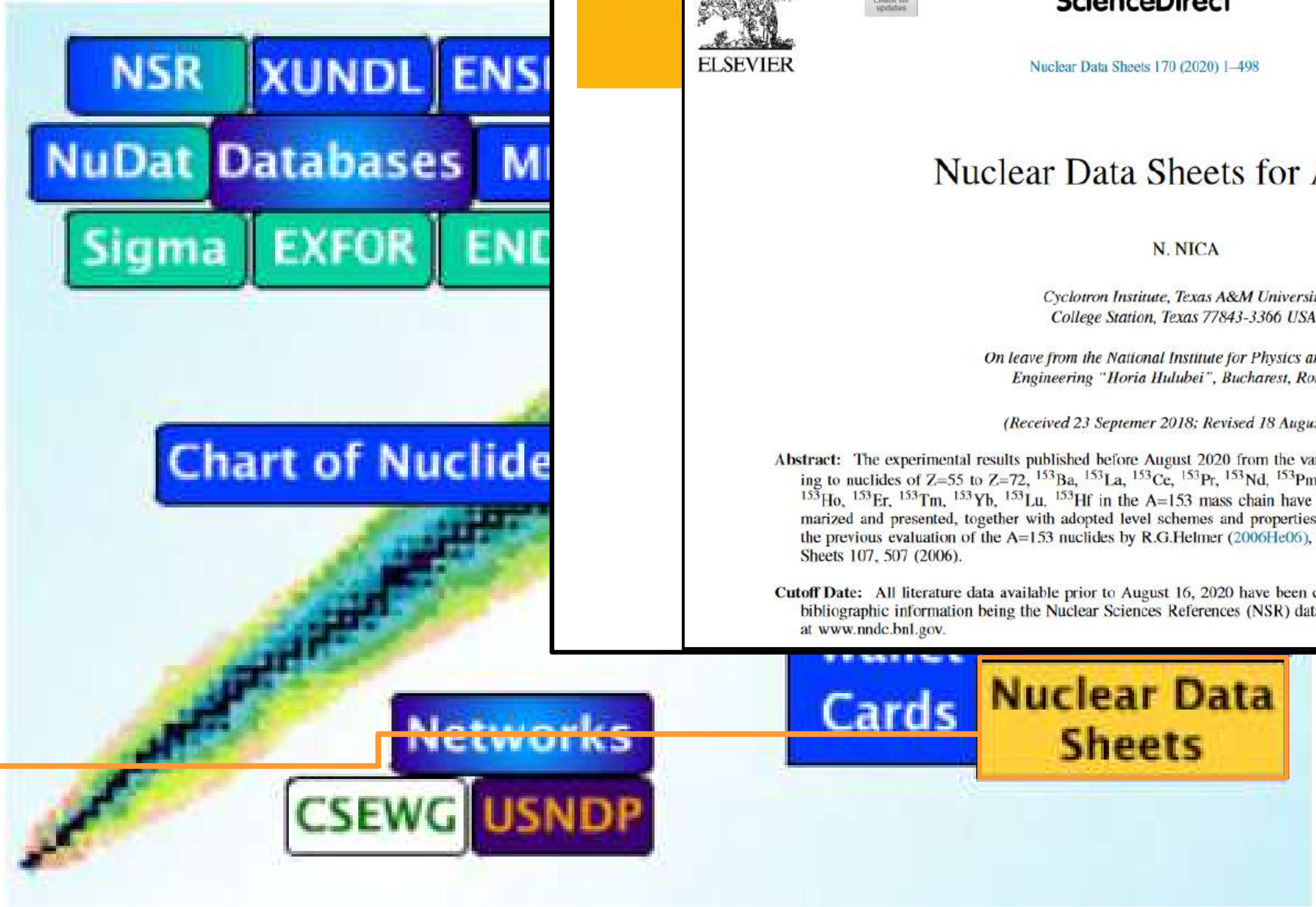


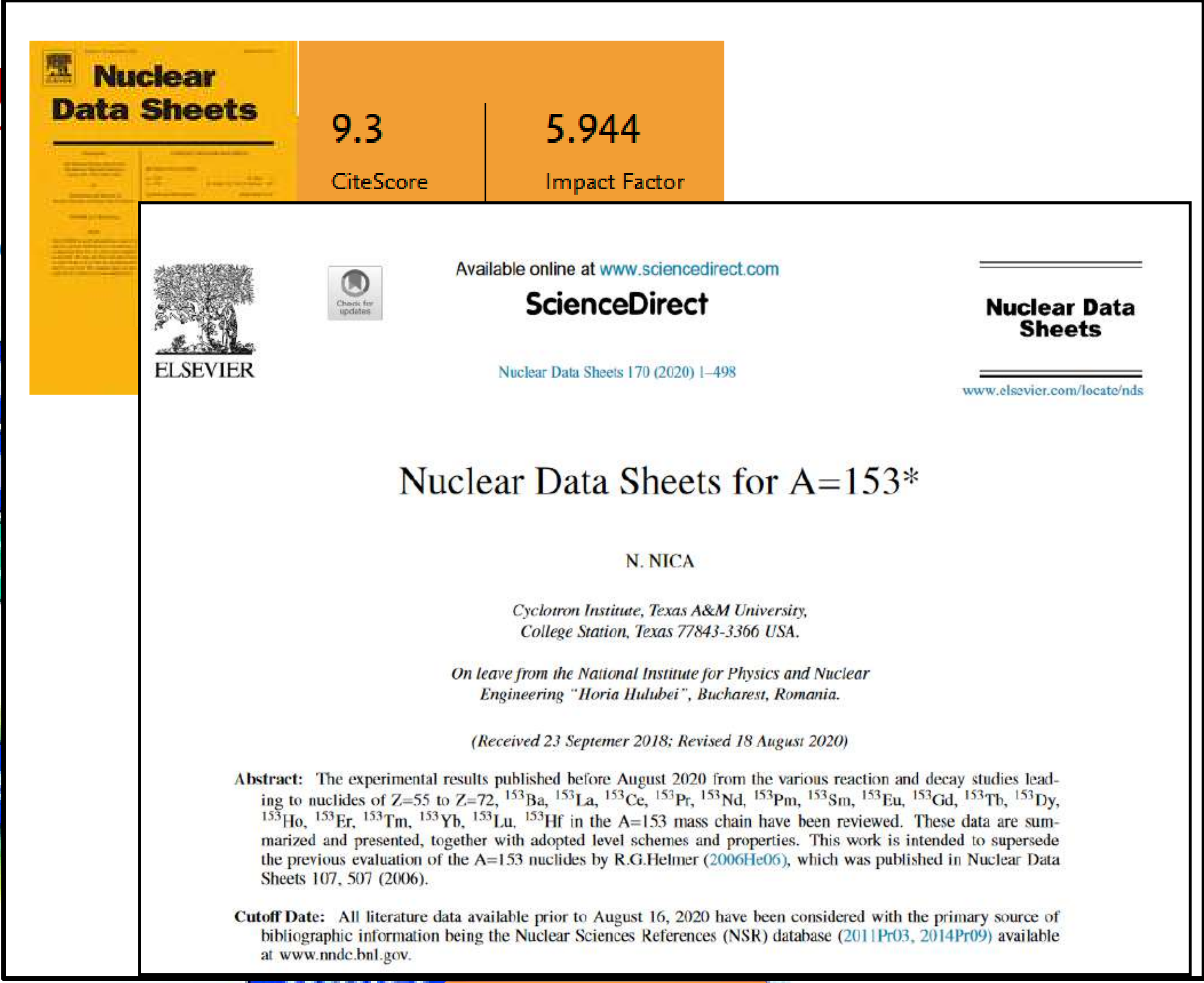
NSR
XU
NuDat
Data
Sigma
EX
Chart
Networks
CSEWG
USNDP
Cards
Nuclear Data Sheets



NuDat 2.8
Search and plot nuclear structure and decay data interactively. More.
Levels and Gammas Search
Ground and excited states (energy, T1/2, spin/parity, decay modes), gamma rays (energy, intensity, multipolarity, coinc.)
Nuclear Wallet Cards Search
Latest Ground and isomeric states properties
Decay Radiation Search
Radiation type, energy, intensity and dose following nuclear decay
Check out the Advanced Cross-Variable Plot!
Color code
Half-life
Decay Mode
Qβ-
QEC
Qβ+
Sn
Sp
Qα
ΔQα
S2n
S2p
Q2β-
Q2EC
QECp
Qβ-n
Qβ-2n
BE/A
(BE-LDM Fit)/A
Pair. gap
E1st ex. st.
E2+
E3-
E4+
E4+/E2+
β2
B(E2)42/B(E2)20
σ(n,γ)
σ(n,F)
235U FY
239Pu FY
252Cf FY
Z, number of protons
N, number of neutrons
Z=8
Z=20
Z=28
Z=50
Z=82
N=8
N=20
N=28
N=50
N=82
N=126
Tooltips
On
Off
Zoom
1
2
3
4
5
6
7
Uncertainty
NDS
Standard
Screen Size
Narrow
Wide
Nucleus
go
Seconds
> 10+15
10+10
10+07
10+05
10+04
10+03
10+02
10+01
10+00
10-01
10-02
10-03
10-04
10-05
10-06
10-07
10-15
< 10-15
unknown
NNDC
Interactive Chart of Nuclides
Click on a nucleus to obtain information
NNDC
ENSDF
NSR
Nuclear Wallet Cards

National Nucl
Evaluati





ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

Nuclear Data Sheets 170 (2020) 1–498

Nuclear Data Sheets

www.elsevier.com/locate/nds

Nuclear Data Sheets for A=153*

N. NICA

Cyclotron Institute, Texas A&M University,
College Station, Texas 77843-3366 USA.

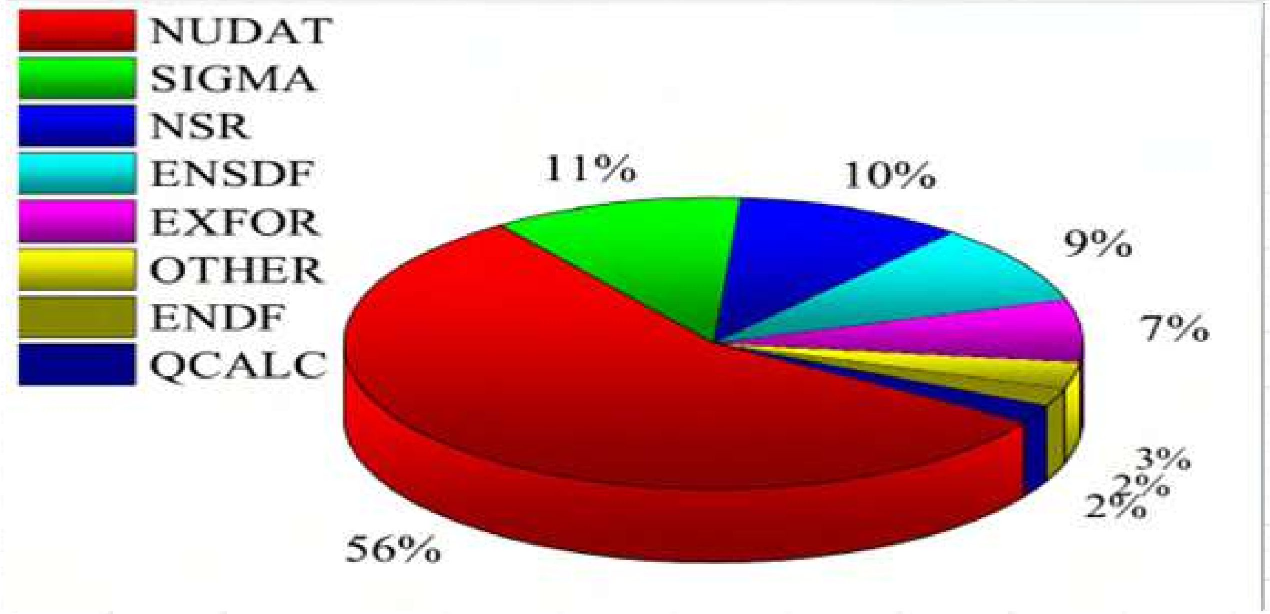
On leave from the National Institute for Physics and Nuclear
Engineering "Horia Hulubei", Bucharest, Romania.

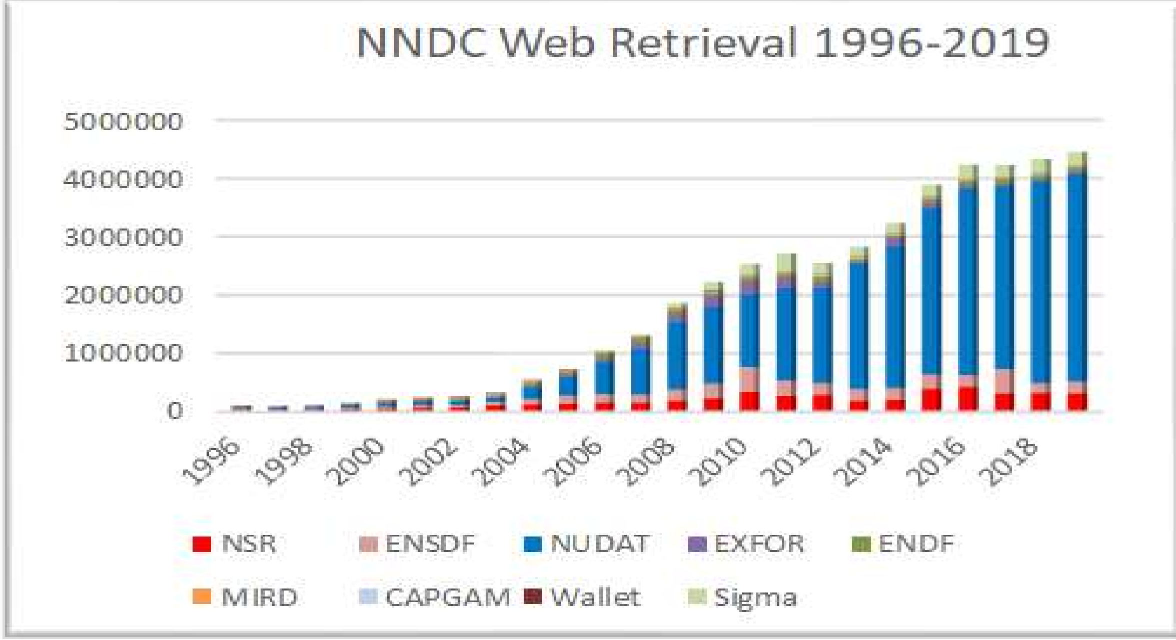
(Received 23 Septemer 2018; Revised 18 August 2020)

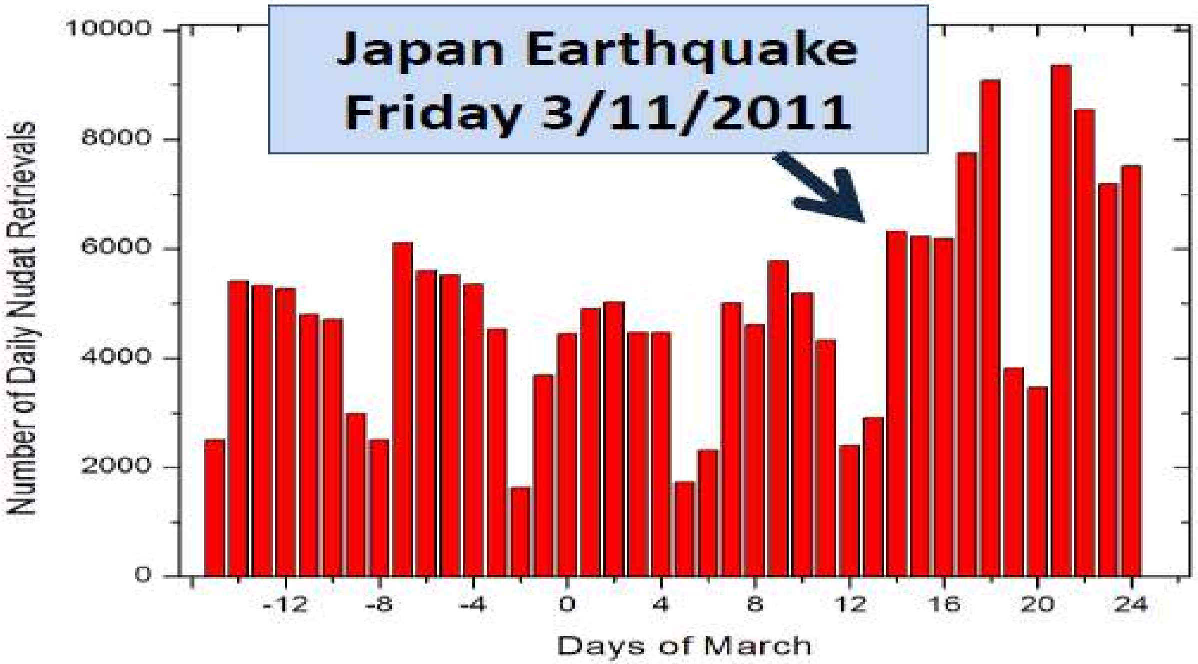
Abstract: The experimental results published before August 2020 from the various reaction and decay studies leading to nuclides of Z=55 to Z=72, ^{153}Ba, ^{153}La, ^{153}Ce, ^{153}Pr, ^{153}Nd, ^{153}Pm, ^{153}Sm, ^{153}Eu, ^{153}Gd, ^{153}Tb, ^{153}Dy, ^{153}Ho, ^{153}Er, ^{153}Tm, ^{153}Yb, ^{153}Lu, ^{153}Hf in the A=153 mass chain have been reviewed. These data are summarized and presented, together with adopted level schemes and properties. This work is intended to supersede the previous evaluation of the A=153 nuclides by R.G.Helmer (2006He06), which was published in Nuclear Data Sheets 107, 507 (2006).

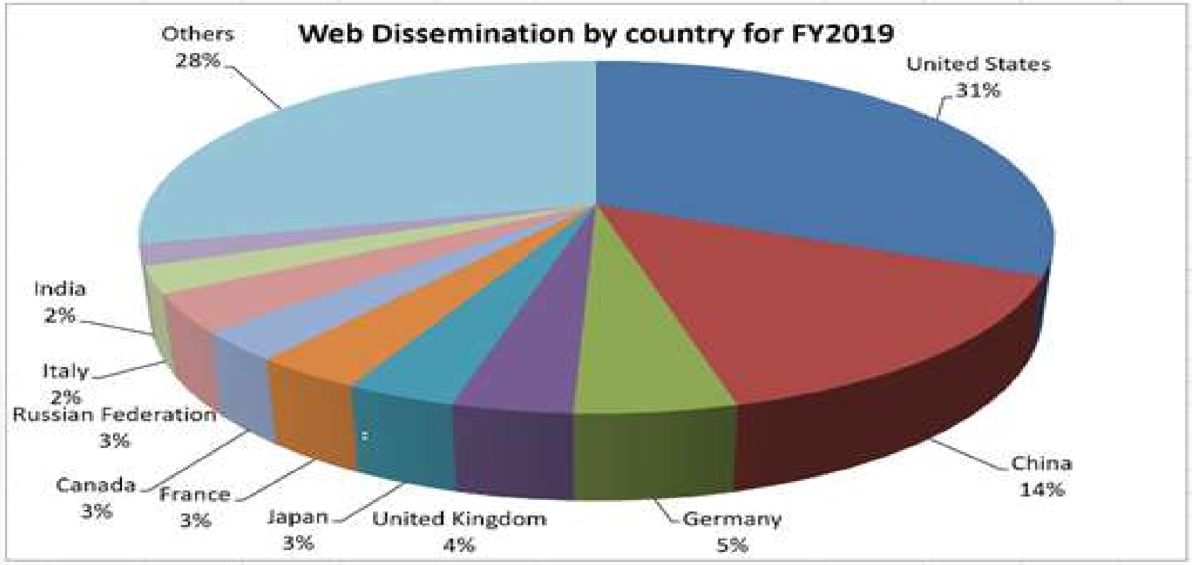
Cutoff Date: All literature data available prior to August 16, 2020 have been considered with the primary source of bibliographic information being the Nuclear Sciences References (NSR) database (2011Pr03, 2014Pr09) available at www.nndc.bnl.gov.

Web Dissemination







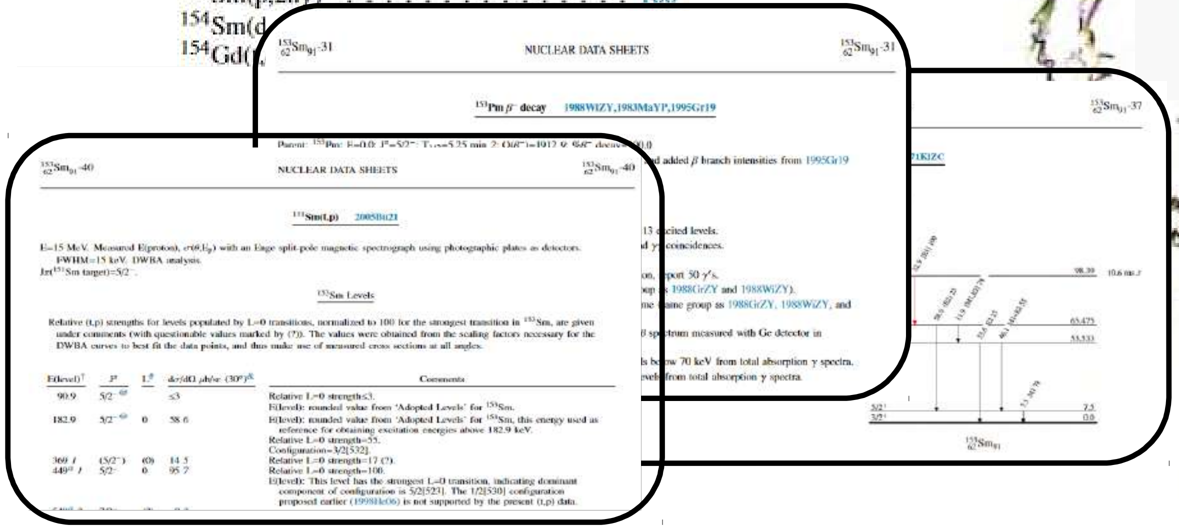


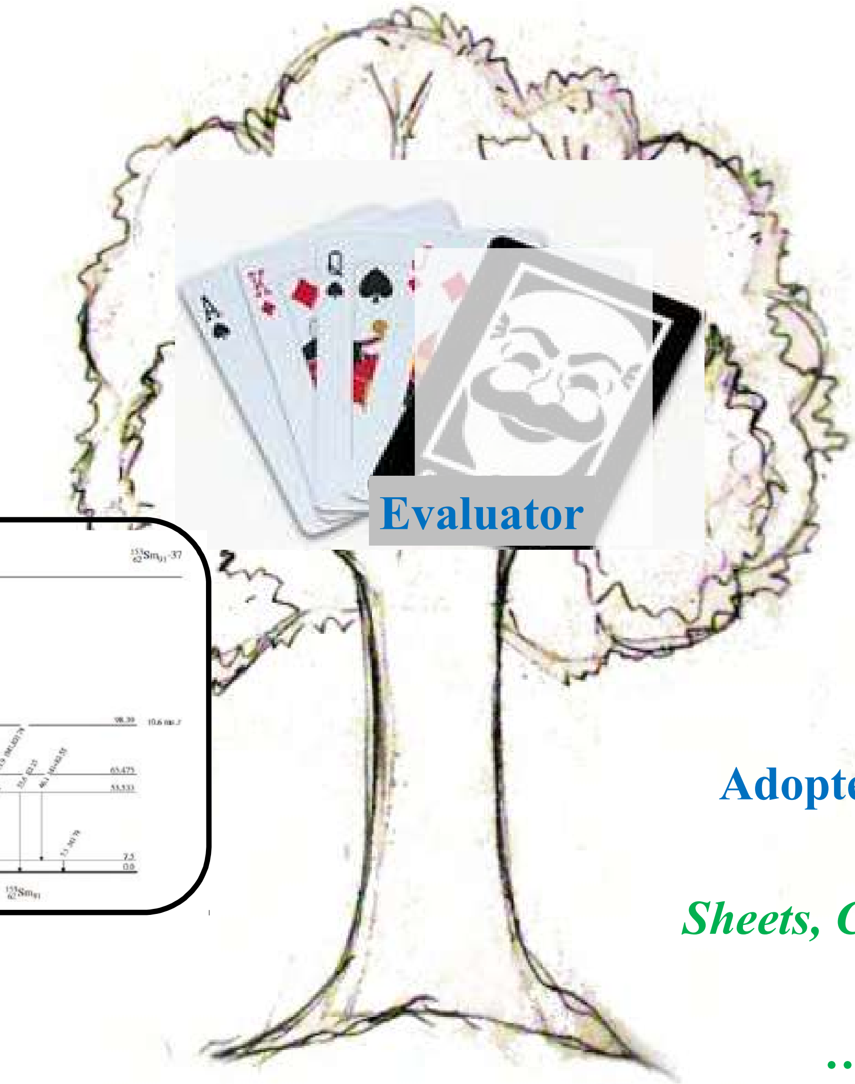
BROOKHAVEN
NATIONAL LABORATORY

A-Chain Evaluation Playing Cards

"Nuclear Data Sheets"

Sheets, Cards, Leaves and Branches…





Nuclear Structure

RESTAURATION

Adopted Levels, Gammas Dataset

no longer just

Sheets, Cards, Leaves and Branches…

but

… THE TREE of DATA

Most extensive peace of Nuclear Reality

"The Tree of Nuclear Knowledge"

Particular Decay or Reaction Datasets, just

It's right here

iii. @CI-Texas A&M Evaluation Center

- ***Scope:***
  - *Promote and accomplish mass-chain nuclear structure data evaluation at Texas A&M University - Cyclotron Institute as regular activity and foresee future developments.*
  - *Address gaps in data through targeted experiments*
- ***2005-2017: under contract with BNL/NNDC***
  - *67% FTE Mass Chain Evaluation*
  - *N. Nica (PI, evaluator), J.C. Hardy (scientific adviser)*
- ***2018-2020: NSDD Data Center***
  - *FY18: 67% FTE Mass Chain Evaluation*
  - *FY19-20: 100% FTE Mass Chain Evaluation*
  - *N. Nica (PI, evaluator), J.C. Hardy (retiree, scientific adviser)*

Texas A&M - Cyclotron Institute Contributions

- *Major Direct Contribution to USNDP/NSDD: Nuclear Data Evaluation*
  - *16 major publications*
- *Important Contribution to USNDP/NSDD: Precision ICC Measurements*
  - *BrIcc adopted the "Frozen Orbitals" calculations*
  - ^{93}*Nb*, ^{103}*Rh*, ^{125}*Te*, ^{127}*Te*, ^{111}*Cd*, ^{119}*Sn*, ^{134}*Cs*, ^{137}*Ba*, ^{191}*Os*, ^{193}*Ir*, ^{197}*Pt*
  - *17 major publications*
- *Texas A&M Contribution to Precision Nuclear Data Production: Precision β-γ Measurements (Standard Model, CKM matrix)*
  - $T_{1/2}$ *, Branching Ratios, Efficiency calibration*
  - *21 major publications*
- *Texas A&M Medical Radioisotopes*
  - ^{67}*Cu*, ^{99}*Mo*
  - *1 major publication*

Mass Chain Evaluation: *300 nuclei, 20 A-chains*

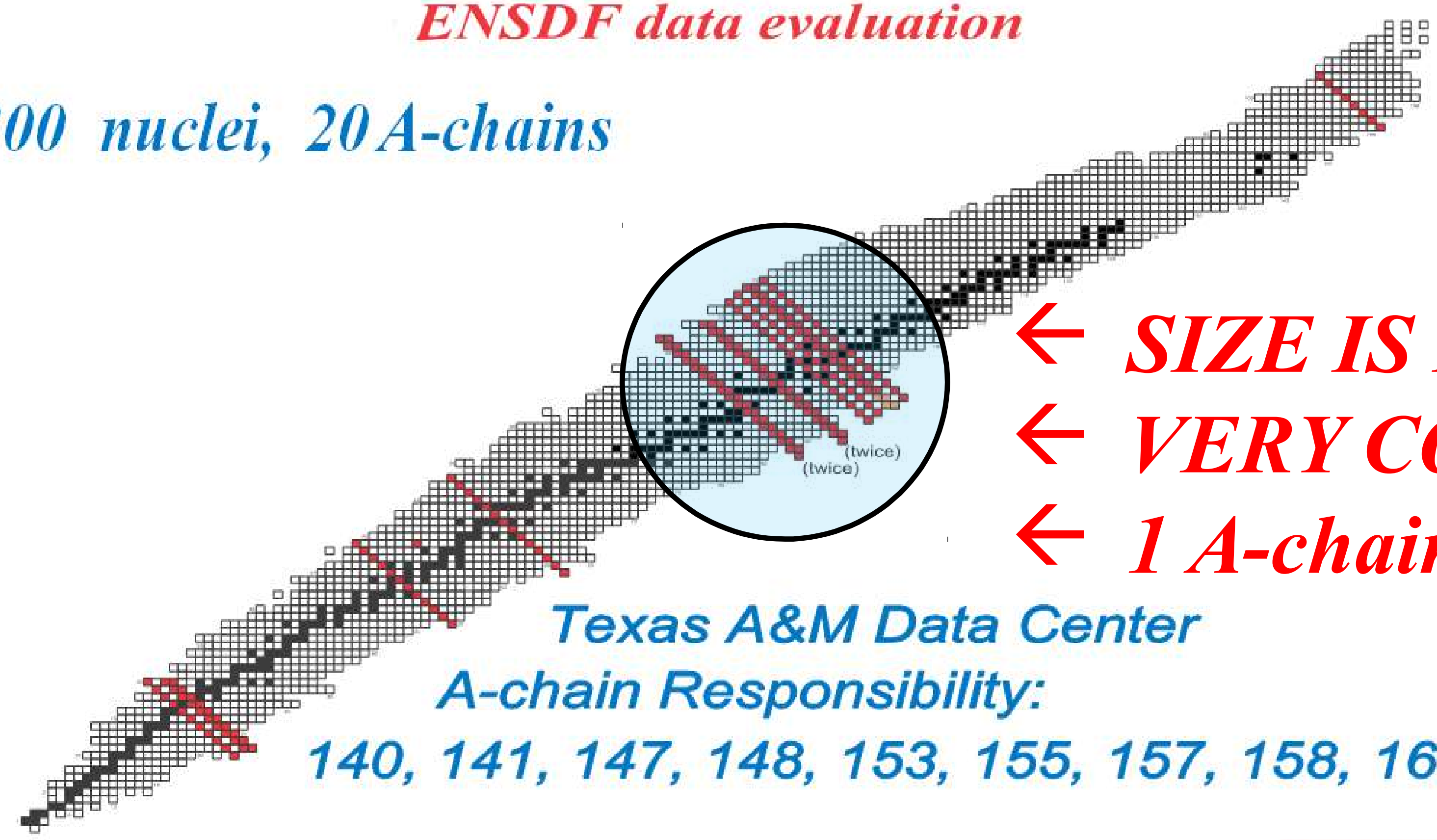
- 1. N.Nica, *Nuclear Data Sheets for A = 252*, Nucl.Data Sheets 106, 813 (2005)
  8 nuclei: ^{252}Cm, ^{252}Bk, ^{252}Cf, ^{252}Es, ^{252}Fm, ^{252}Md, ^{252}No, ^{252}Lr
- 2. N.Nica, *Nuclear Data Sheets for A = 140*, Nucl.Data Sheets 108, 1287 (2007)
  16 nuclei: ^{140}Te, ^{140}I, ^{140}Xe, ^{140}Cs, ^{140}Ba, ^{140}La, ^{140}Ce, ^{140}Pr, ^{140}Nd, ^{140}Pm, ^{140}Sm, ^{140}Eu, ^{140}Gd, ^{140}Tb, ^{140}Dy, ^{140}Ho
- 3. D.Abriola *et al.*, *Nuclear Data Sheets for A = 84*, Nucl.Data Sheets 110, 2815 (2009)
  1 nucleus: ^{84}Y
- 4. N.Nica, *Nuclear Data Sheets for A = 147*, Nucl.Data Sheets 110, 749 (2009)
  16 nuclei: ^{147}Xe, ^{147}Cs, ^{147}Ba, ^{147}La, ^{147}Ce, ^{147}Pr, ^{147}Nd, ^{147}Pm, ^{147}Sm, ^{147}Eu, ^{147}Gd, ^{147}Tb, ^{147}Dy, ^{147}Ho, ^{147}Er, ^{147}Tm
- 5. N.Nica, *Nuclear Data Sheets for A = 97*, Nucl.Data Sheets 111, 525 (2010)
  14 nuclei: ^{97}Br, ^{97}Kr, ^{97}Rb, ^{97}Sr, ^{97}Y, ^{97}Zr, ^{97}Nb, ^{97}Mo, ^{97}Tc, ^{97}Ru, ^{97}Rh, ^{97}Pd, ^{97}Ag, ^{97}Cd
- 6. J.Cameron, J.Chen, B.Singh, N.Nica, *Nuclear Data Sheets for A = 37*, Nucl.Data Sheets 113, 365 (2012)
  10 nuclei: ^{37}Na, ^{37}Mg, ^{37}Al, ^{37}Si, ^{37}P, ^{37}S, ^{37}Cl, ^{37}Ar, ^{37}K, ^{37}Ca
- 7. N.Nica, J.Cameron, B.Singh, *Nuclear Data Sheets for A = 36*, Nucl.Data Sheets 113, 1 (2012)
  10 nuclei: ^{36}Na, ^{36}Mg, ^{36}Al, ^{36}Si, ^{36}P, ^{36}S, ^{36}Cl, ^{36}Ar, ^{36}K, ^{36}Ca
- 8. N.Nica, B.Singh, *Nuclear Data Sheets for A = 34*, Nucl.Data Sheets 113, 1563 (2012)
  11 nuclei: ^{34}Ne, ^{34}Na, ^{34}Mg, ^{34}Al, ^{34}Si, ^{34}P, ^{34}S, ^{34}Cl, ^{34}Ar, ^{34}K, ^{34}Ca
- 9. B.Singh, N.Nica, *Nuclear Data Sheets for A = 77*, Nucl.Data Sheets 113, 1115 (2012)
  12 nuclei: ^{77}Ni, ^{77}Cu, ^{77}Zn, ^{77}Ga, ^{77}Ge, ^{77}As, ^{77}Se, ^{77}Br, ^{77}Kr, ^{77}Rb, ^{77}Sr, ^{77}Y
- 10. N.Nica, *Nuclear Data Sheets for A = 148*, Nucl.Data Sheets 117, 1 (2014)
  16 nuclei: ^{148}Xe, ^{148}Cs, ^{148}Ba, ^{148}La, ^{148}Ce, ^{148}Pr, ^{148}Nd, ^{148}Pm, ^{148}Sm, ^{148}Eu, ^{148}Gd, ^{148}Tb, ^{148}Dy, ^{148}Ho, ^{148}Er, ^{148}Tm
- 11. N.Nica, *Nuclear Data Sheets for A = 141*, Nucl.Data Sheets 122, 1 (2014)
  16 nuclei: ^{141}Te, ^{141}I, ^{141}Xe, ^{141}Cs, ^{141}Ba, ^{141}La, ^{141}Ce, ^{141}Pr, ^{141}Nd, ^{141}Pm, ^{141}Sm, ^{141}Eu, ^{141}Gd, ^{141}Tb, ^{141}Dy, ^{141}Ho
- 12. N.Nica, *Nuclear Data Sheets for A = 157*, Nucl.Data Sheets 132, 1 (2016)
  15 nuclei: ^{157}Nd, ^{157}Pm, ^{157}Sm, ^{157}Eu, ^{157}Gd, ^{157}Tb, ^{157}Dy, ^{157}Ho, ^{157}Er, ^{157}Tm, ^{157}Yb, ^{157}Lu, ^{157}Hf, ^{157}Ta, ^{157}W
- 13. N.Nica, *Nuclear Data Sheets for A = 158*, Nucl.Data Sheets 141, 1 (2017)
  15 nuclei: ^{158}Nd, ^{158}Pm, ^{158}Sm, ^{158}Eu, ^{158}Gd, ^{158}Tb, ^{158}Dy, ^{158}Ho, ^{158}Er, ^{158}Tm, ^{158}Yb, ^{158}Lu, ^{158}Hf, ^{158}Ta, ^{158}W
- 14. N.Nica, *Nuclear Data Sheets for A = 140*, Nucl.Data Sheets – Nucl.Data Sheets 154, 1 (2018)
  17 nuclei: ^{140}Sb, ^{140}Te, ^{140}I, ^{140}Xe, ^{140}Cs, ^{140}Ba, ^{140}La, ^{140}Ce, ^{140}Pr, ^{140}Nd, ^{140}Pm, ^{140}Sm, ^{140}Eu, ^{140}Gd, ^{140}Tb, ^{140}Dy, ^{140}Ho
- 15. N.Nica, A =155, *Nuclear Data Sheets for A = 155, Nucl.Data Sheets* 160, 1 (2019)
  16 nuclei: ^{155}Ce, ^{155}Pr, ^{155}Nd, ^{155}Pm, ^{155}Sm, ^{155}Eu, ^{155}Gd, ^{155}Tb, ^{155}Dy, ^{155}Ho, ^{155}Er, ^{155}Tm, ^{155}Yb, ^{155}Lu, ^{155}Hf, ^{155}Ta
- 16. N.Nica, A =160, *Nuclear Data Sheets for A = 160, Nucl.Data Sheets – in review (with evaluator)*
  17 nuclei: ^{160}Pr, ^{160}Nd, ^{160}Pm, ^{160}Sm, ^{160}Eu, ^{160}Gd, ^{160}Tb, ^{160}Dy, ^{160}Ho, ^{160}Er, ^{160}Tm, ^{160}Yb, ^{160}Lu, ^{160}Hf, ^{160}Ta, ^{160}W, ^{160}Re
- 17. N.Nica, A =153, *Nuclear Data Sheets for A = 153, Nucl.Data Sheets 170, 1 (2020)*
  16 nuclei: ^{153}La, ^{153}Ce, ^{153}Pr, ^{153}Nd, ^{153}Pm, ^{153}Sm, ^{153}Eu, ^{153}Gd, ^{153}Tb, ^{153}Dy, ^{153}Ho, ^{153}Er, ^{153}Tm, ^{153}Yb, ^{153}Lu, ^{153}Hf
- 18. N.Nica, *Nuclear Data Sheets for A = 147 – submitted to NNDC (FY19)*
  16 nuclei: ^{147}Xe, ^{147}Cs, ^{147}Ba, ^{147}La, ^{147}Ce, ^{147}Pr, ^{147}Nd, (*^{147}Pm Balraj Singh*), ^{147}Sm, ^{147}Eu, ^{147}Gd, ^{147}Tb, ^{147}Dy, ^{147}Ho, ^{147}Er, ^{147}Tm
- 19. N.Nica, *Nuclear Data Sheets for A = 141 – submitted to NNDC (FY20)*
  17 nuclei: : ^{141}Sb, ^{141}Te, ^{141}I, ^{141}Xe, ^{141}Cs, ^{141}Ba, ^{141}La, ^{141}Ce, ^{141}Pr, ^{141}Nd, ^{141}Pm, ^{141}Sm, ^{141}Eu, ^{141}Gd, ^{141}Tb, ^{141}Dy, ^{141}Ho

Mass Chain Evaluation: *300 nuclei, 20 A-chains*

- 16. N.Nica, A =160, *Nuclear Data Sheets for A = 160, – in review (with evaluator)*
  17 nuclei: ^{160}Pr, ^{160}Nd, ^{160}Pm, ^{160}Sm, ^{160}Eu, ^{160}Gd, ^{160}Tb, ^{160}Dy, ^{160}Ho, ^{160}Er, ^{160}Tm, ^{160}Yb, ^{160}Lu, ^{160}Hf, ^{160}Ta, ^{160}W, ^{160}Re
- 18. N.Nica, *Nuclear Data Sheets for A = 147 – in review (with evaluator)*
  16 nuclei: ^{147}Xe, ^{147}Cs, ^{147}Ba, ^{147}La, ^{147}Ce, ^{147}Pr, ^{147}Nd, (*^{147}Pm Balraj Singh*), ^{147}Sm, ^{147}Eu, ^{147}Gd, ^{147}Tb, ^{147}Dy, ^{147}Ho, ^{147}Er, ^{147}Tm
- 19. N.Nica, *Nuclear Data Sheets for A = 141 – in review (with evaluator)*
  17 nuclei: ^{141}Sb, ^{141}Te, ^{141}I, ^{141}Xe, ^{141}Cs, ^{141}Ba, ^{141}La, ^{141}Ce, ^{141}Pr, ^{141}Nd, ^{141}Pm, ^{141}Sm, ^{141}Eu, ^{141}Gd, ^{141}Tb, ^{141}Dy, ^{141}Ho
- 20. N.Nica, *Nuclear Data Sheets for A = 162 – in progress (FY21)*
  17 nuclei: ^{162}Nd, ^{162}Pm, ^{162}Sm, ^{162}Eu, ^{162}Gd, ^{162}Tb, ^{162}Dy, ^{162}Ho, ^{162}Er, ^{162}Tm, ^{162}Yb, ^{162}Lu, ^{162}Hf, ^{162}Ta, ^{162}W, ^{162}Re, ^{162}Os,

Our accomplishments
ENSDF data evaluation

300 nuclei, 20 A-chains



← SIZE IS HUGE!
← VERY COMPLX
← 1 A-chain/FY

Texas A&M Data Center
A-chain Responsibility:
140, 141, 147, 148, 153, 155, 157, 158, 160

TEXAS A&M UNIVERSITY

iv. Strategic Priorities, New Initiatives & Directions : for good

1. **Continuing ENSDF Mass Chain Evaluation (1 FTE)**
   First Strategic Priority according to the Mission Statement.
   All other priorities will be strictly subordinated to this purpose
2. **Data Evaluation Station**
   Data support in basic physics research environment, assist experiments and pre-evaluate data
3. **Produce experimental nuclear data to aid data evaluation**
   Precision Internal Conversion Coefficients Measurements at Cyclotron Institute, Texas A&M University to give USDNP the best approach for ENSDF ICC-calculated values (concluding cases pending on conditions)
4. **Experimental studies of Medical Isotopes**
   Invers kinematics methodology, Cyclotron Institute, Texas A&M University
5. **Reevaluation of data procedures for basic science and data evaluation**
   Level scheme re-concept based on Repeatability, a newly revealed experimental data evidence

Nuclear Data:

The need has arisen and never left again!

It's right here for good.

Don't forget …

Future is DATA-centric !