

version 9.2.57

Since “Working under Optics”

[v.9.2.33](#) (12/10/2010)

- | | | |
|---|----------------------------------|--------------------------|
| ❖ Stripper Lifetime utility | <u>v. 9.2.38</u> | <i>IV Expert meeting</i> |
| ❖ New options for Target & Stripper | v. 9.2.43 | <i>MP</i> |
| ❖ Range of Momentum distribution for the Convolution model has been increased | v. 9.2.47 | <i>GANIL</i> |
| ❖ Nucleus identification in 2d-plot | v. 9.2.52 | |
| ❖ Customizable Chart of the Nuclides | v.9.2.56 | <i>MT, ZC</i> |
| ❖ MC rays generator: new option "Range" | v. 9.2.57 | <i>MP</i> |

- ❖ Target initial temperature
- ❖ Modification for “stationary beam” models in the case of pulsing beams
- ❖ Rotation target: modifications for a reduced beam pulse length
- ❖ New flux structure: Pulsing beam & rotating target

Calculation of the lifetimes of thin stripper targets

Set-up
 Beam: 238U Energy = 1000.0 MeV/u
 Intensity = 3.2e+7 pA
 Foil: 12C Thickness = 3 g/cm2

Material properties (circled in red)
 Initial temperature = 293 K
 (emissivity factor) = 0.8
 target's atom displacement energy = 25 eV
 $time = k_1 \cdot K_d^{-5/4} \exp(-k_2/T)$
 k1 = 0.0798 LISE reduced value
 k2 = 870 default 870 (Carbon)
 Use LISE++ k1[Z] function ?
 k10 = 50 default 50
 k11 = -0.07 default -0.07

Sublimation influence ("Pulsing beam" case [1])
 alpha (eq.22 for [1]) = 8.12e+10 g K^(1/2) / sec/cm2 default 8.12e10 (Carbon)
 Mode to plot (dimension):
 F (N = 1e3) S1 (N = 1e5) *
 M (N = 1e4) S2 (N = 1e6) *
 S3 (N = 1e7) *
 * - with compression pay attention for "compression" results in the case of very short pulses. Might be curious.
 Rise Time (dT= +1K) = 4.67e-10 sec [a]
 "Plateau" (dT= -1K) = 6.58e-10 sec [b]
 Fall Time (dT= -1K) = 1.03e+01 sec [c]
 Range to plot = 3.93e+03 sec
 Height & Temperature from Time
 [a] T0 = 293.0K
 [b] T0 = 448.9 K, P>0
 [c] T0 = 448.9 K, P=0

Radiation damages
 Kd (atom displacement rate) = 2.63e-11 1 / cm2
 Target warming up temperature = 448.9 K [c] stationary beam
 Foil lifetime due to radiation damages = 1.93e+11 sec
 5.4e+07 hour
 Lifetime and Temperature from Beam Current

Sublimation influence ("Stationary beam" [2])
 alpha (eq.13 for [2]) = 7.83e+10 cm K^(1/2) / sec default 7.83e10 (C)
 LISEcoef = 1.7 0.1 ... 10 (deflt 1.7)
 "Stationary beam" Foil lifetime due to sublimation = INF sec
 INF hour
 Height (time) & Lifetime (Beam Current)

Flux structure
 Stationary beam
 Pulsing beam
 Stationary beam & rotating target
 Pulsing beam & rotating target (circled in red)

Pulsing beam structure (circled in blue)
 Beam pulse length = 5e-8 sec
 Repetition rate = 1 Hz
 Rotation target options:
 Rotation Frequency = 1 Hz
 Radial position of beam spot = 25 cm
 Final reduced structure:
 Beam pulse length = 5e-8 sec
 Repetition rate = 0.00127 Hz
 Beam on-off time ratio = 6.37e-9 %

Heat Capacity [J / g / K] [3]
 Carbon capacity dependence from T
 manually (constant from T)
 c = 0.502 ? Table

Shape
 2-D Gaussian Radius from Interaction Area
 Uniform: ellipse Reduced beam spot radius(sigma) = 2.45 mm
 Uniform: rectangle Area (68.0%) = 42.71 mm2

Calculated beam characteristics (during the pulse)
 Beam power lost (W/cm2) at the center of target (t=0) = 4.73e+09
 Density of particle flux (at the center):
 2e+10 W / cm2
 8.49e+04 pA / cm2
 5.30e+17 pps / cm2

References
 [1] S.G.Lebedev & A.S.Lebedev, PhysRev ST: A&B 11 (2008) 020401
 [2] B.Gikal et al., Preprint P9-2005-110, JINR, Dubna
 [3] C.Liaw et al., Proceedings of the 1999 PAC, New York, p.3300

File: Stripper foil settings
 ? LISE-doc
 ? Articles
 X Quit
 Open Save
 GSI.foil

Pulsing beam

Flux structure

Stationary beam

Pulsing beam

Stationary beam & rotating target

Pulsing beam & rotating target

Pulse structure

Beam pulse length = 5e-8 sec

Repetition rate = 1 Hz

Rotation target options

Final reduced structure

Beam pulse length = 5e-8 sec

Repetition rate = 1 Hz

Beam on-off time ratio = 5e-6 %

Rotating target

Flux structure

Stationary beam

Pulsing beam

Stationary beam rotating target

Pulsing beam & rotating target

Pulse structure

Rotation target options

Rotation Frequency = 1 Hz

Radial position of beam spot = 25 cm

Final reduced structure

Beam pulse length = 0.00127 sec

Repetition rate = 1 Hz

Beam on-off time ratio = 0.127 %

Pulsing beam + Rotating target

Flux structure

Stationary beam

Pulsing beam

Stationary beam & rotating target

Pulsing beam & rotating target

Pulse structure

Beam pulse length = 5e-8 sec

Repetition rate = 1 Hz

Rotation target options

Rotation Frequency = 1 Hz

Radial position of beam spot = 25 cm

Final reduced structure

Beam pulse length = 5e-8 sec

Repetition rate = 0.00127 Hz

Beam on-off time ratio = 6.37e-9 %

Probability with rotating target is defined as $X\text{-spot size} / \text{Target Length} = 0.127\%$,

where the target length is $2\pi R$,

Therefore distance between reduced "pulses" is 787 seconds, with the pulse length equal to 50 ns

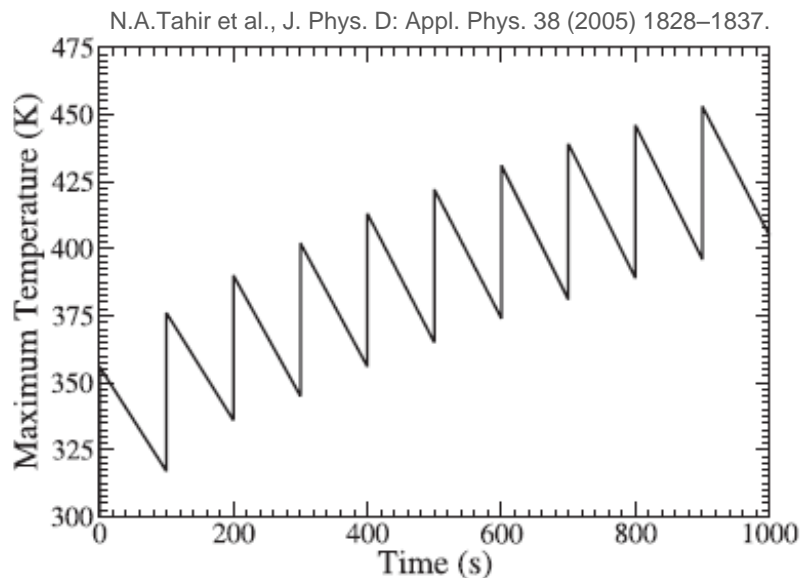
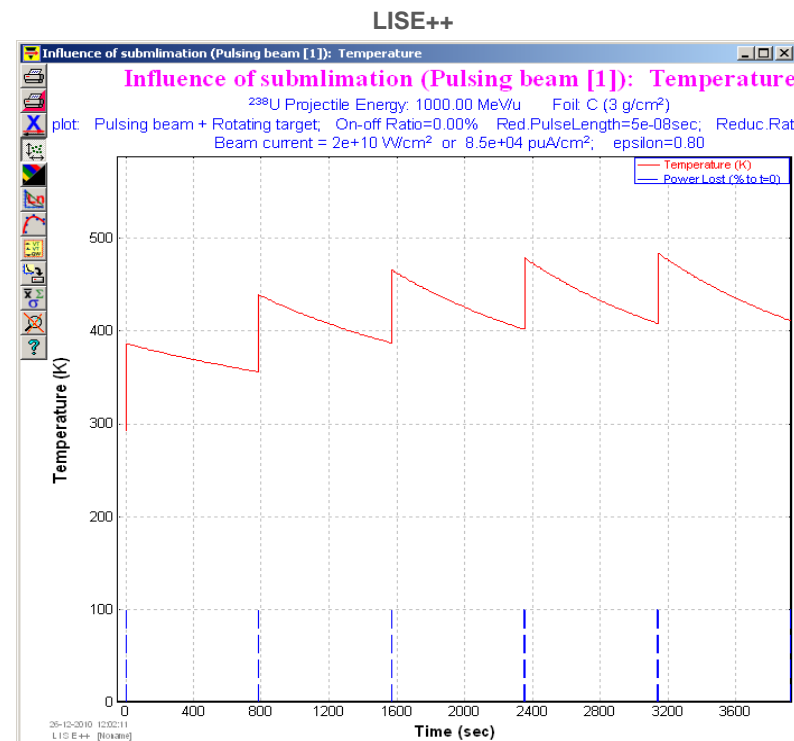


Figure 5. (a) Temperature versus time in the target during 1000 irradiations by a 1 GeV u^{-1} U bunch with $N = 10^{10}$ and $\tau = 50$ ns, $\sigma_x = 1$ mm and $\sigma_y = 6$ mm.



Target

Be Density 1.85 g/cm³

Use in Q-state calculations

Z	Element	Mass
<input checked="" type="checkbox"/>	4 Be PT 9.012	
<input type="checkbox"/>	14	
<input type="checkbox"/>	14	
<input type="checkbox"/>	14	
<input type="checkbox"/>	14	

Compound dictionary

State: Solid Gas

Dimension: mg/cm² & micron g/cm² & mm

Angle: Calculate 0 degrees

Thickness at 0 degrees: 500 micron 92.5 mg/cm²

Effective Thickness: 500 micron 92.5 mg/cm²

Thickness defect

Cut (Slits)

OK Cancel

d / Range (beam) 0.043

Energy Loss in the target box [KW] 0.000141

Atoms / cm² 6.18e+21

for Distribution and MC modes

Stripper

C Density 2.26 g/cm³

Use in Q-state calculations

Z	Element	Mass
<input checked="" type="checkbox"/>	6 C PT 12.011	
<input type="checkbox"/>	14	
<input type="checkbox"/>	14	
<input type="checkbox"/>	14	
<input type="checkbox"/>	14	

Compound dictionary

State: Solid Gas

Dimension: mg/cm² & micron g/cm² & mm

Angle: Calculate 0 degrees

Thickness at 0 degrees: 26 micron 5.876 mg/cm²

Effective Thickness: 26 micron 5.876 mg/cm²

Atoms quantity / cm² 2.95e+20

Thickness defect

OK Cancel

Rays generator

Setting Fragment: 32S16+..16+ Projectile Fragmentation

Gate: no gate

Fields to Plot: X-axis: X [mm], Y-axis: dP/P [%]

after BLOCK: FP_PIN (for Range and Energy Loss "INTO" this Block)

Output Ray file: MC_LISE.ray

File Format: Number of fields = 10, Header (settings, field names) checked, Field separator: tab

Field	Parameter
1	Range (mm)
2	Radial [cm]
3	Angle [mrad]
4	Y[Phi] [mrad]
5	dP/P [%]
6	Momentum [GeV/c]
7	Length from Target [m]
8	Time from Target [ns]
9	Q (ion charge)
10	Mass (amu)

Number of Rays = 100, Make Default unchecked

Run, Quit

Monte Carlo calculation of fragment transmission

What isotope transmission to calculate? One fragment of interest. Chose manually here

Chose fragment of interest: A=32, Element=S, Z=16

Charge states: 16+, D1

Reaction mechanism: Projectile Fragmentation

MC transmission options, MC calculation to file, Monte Carlo calculation 2D-plot

X-coordinate After BLOCK: FP_PIN

- X [mm]
- X' (T) [mrad]
- Y [mm]
- Y' (P) [mrad]
- dP/P [%]
- Radial [f(X',Y)] [mm]
- Angle [f(X',Y)] [mrad]

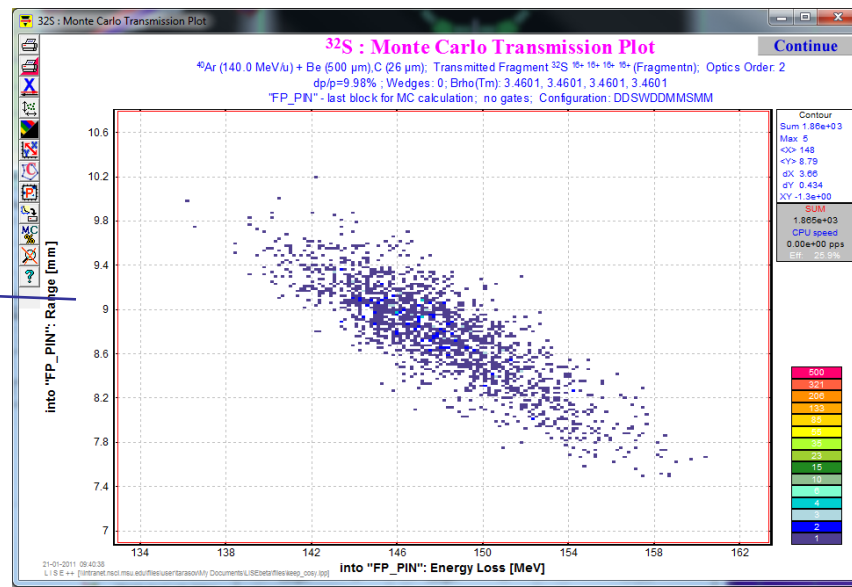
Y-coordinate After BLOCK: FP_PIN

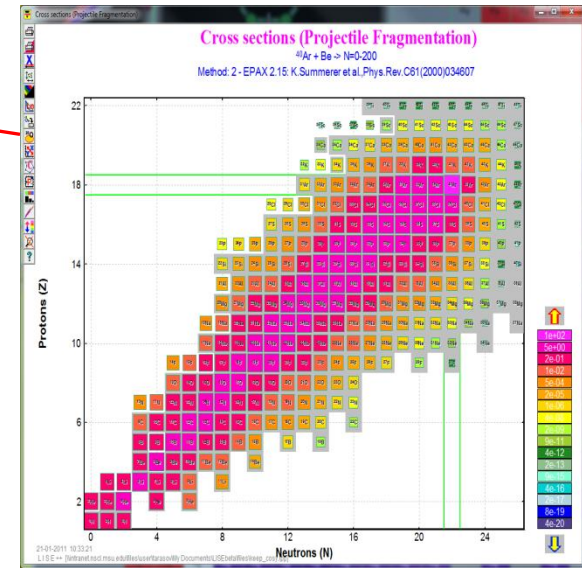
- X [mm]
- X' (T) [mrad]
- Y [mm]
- Y' (P) [mrad]
- dP/P [%]
- Radial [f(X,Y)] [mm]
- Angle [f(X',Y)] [mrad]

Gate 1-4: no gate

1 ! after block "FP_PIN", setting fragment: 32S16+..16+ (Projectile Fragmentation); N_fields=10; N

	Radial [cm]	Angle [mrad]	Energy Loss [MeV]	Range (mm)	TKE [MeV]	Energy [MeV]
2	-0.25369	12.782	151	8.6977	4092.4	121.5
3	0.21045	-20.866	149.39	8.5034	4041.5	126.0
4	-0.24698	25.099	149.83	8.6106	4074.2	127.0
5	0.13704	-12.096	151.6	8.3224	3990.7	124.0
6	0.2919	-38.156	148.21	9.066	4208.2	131.0
7	-0.48393	18.256	143.91	9.4614	4316.3	131.0
8	0.27305	-11.93	149.43	8.7154	4099.7	128.0
9	-0.33784	15.972	156.32	7.6081	3772.7	111.0
10	-0.32898	29.754	152.25	8.4022	4011.5	125.0
11	-0.0627	-25.006	143.89	9.275	4269.3	133.0
12	0.11389	-15.64	145.62	9.1745	4237.1	132.0
13	-0.17274	-10.084	146.18	9.0563	4203.4	131.0
14	0.10091	12.201	146.45	9.045	4142.7	130.0





2D-plot: Identification, values

Identification labels (A,Z)

settings

Height : +2
 Width : +1
 Italic : no
 Bold : Yes
 ULine : no
 Show : If good seen
 Color : Black+Shading

Values (CS,T_1/2 and so on)

Show Dimension text

settings

Height : -2
 Width : -3
 Italic : Yes
 Bold : no
 ULine : no
 Show : If good seen
 Color : Black Color

for T1/2 plots SHOW

all in seconds
 ms.sec.day.year..

Options

Draw grids

Draw vertical and horizontal green lines to underline the projectile

Draw cell borders

change

Make it default

OK Cancel

Option: Identification

Show mode

Show Always
 Show if good seen
 Do not show

Font Colors

Black Color
 Black Color + White Shading
 White Color + Black Shading
 Palette

Font Options

Italic
 Bold
 Underline

+2 Height
 +0 Width

OK Cancel

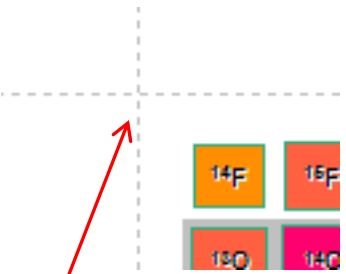
Color

Basic colors:

Custom colors:

Define Custom Colors >>

OK Cancel

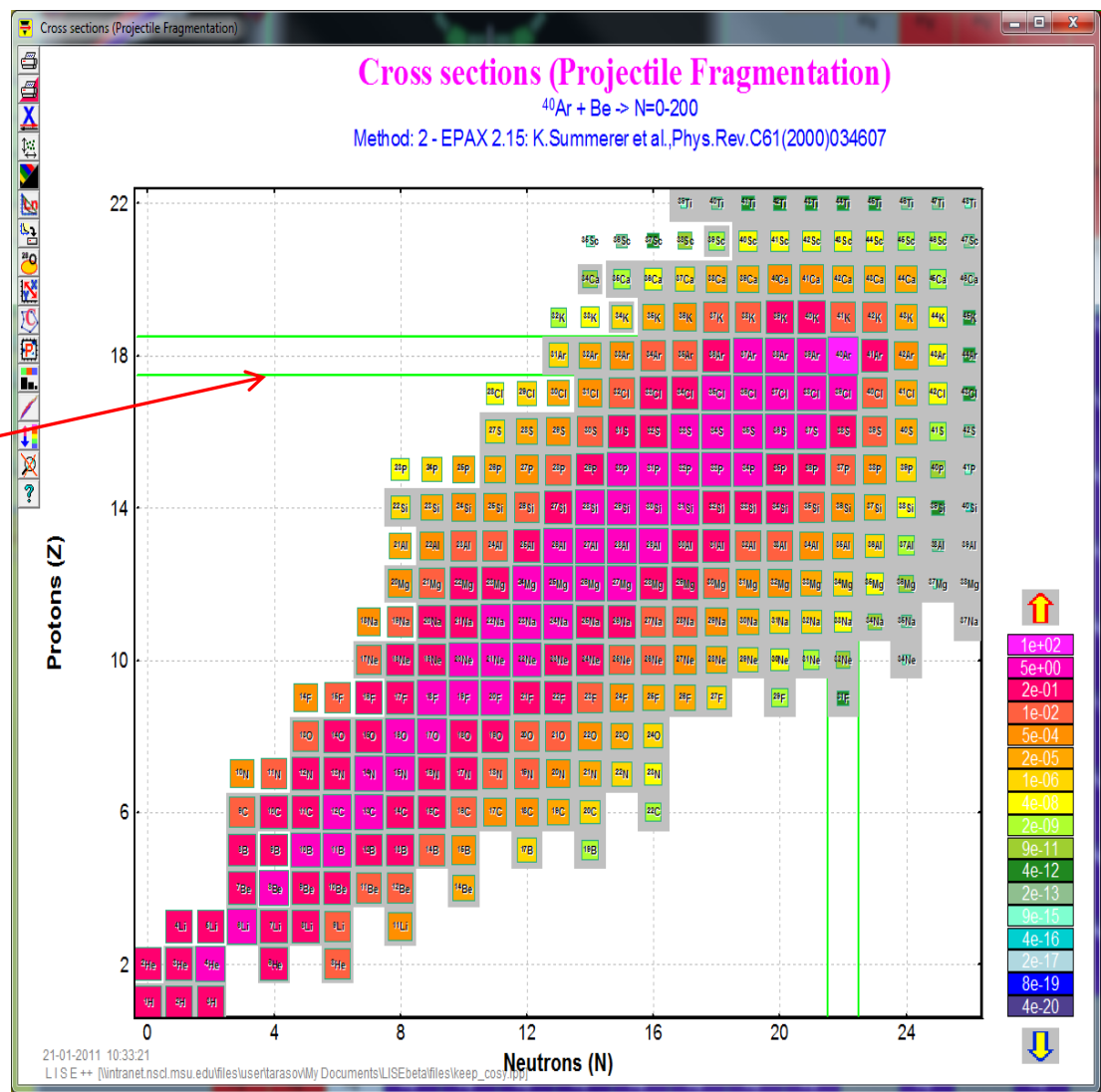


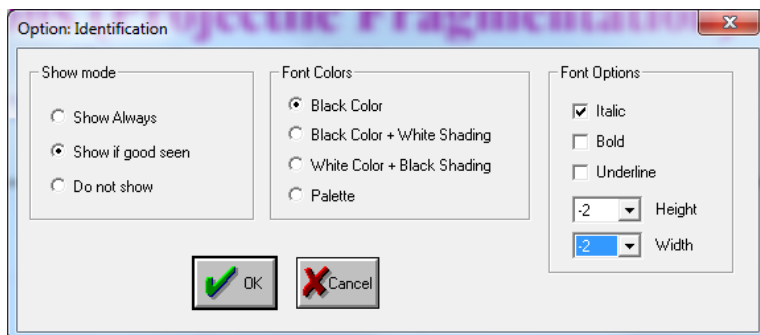
Options

- Draw grids
- Draw vertical and horizontal green lines to underline the projectile
- Draw cell borders

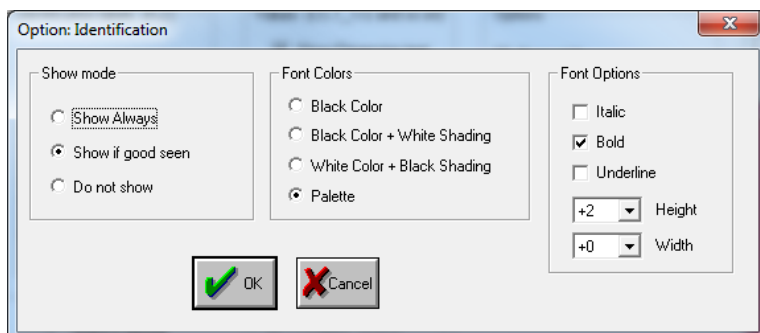
change

²³P 1.1e-07 mb	²⁴P 1.6e-06 m
²²Si 2.5e-06 mb	²³S 3.8e-05 m

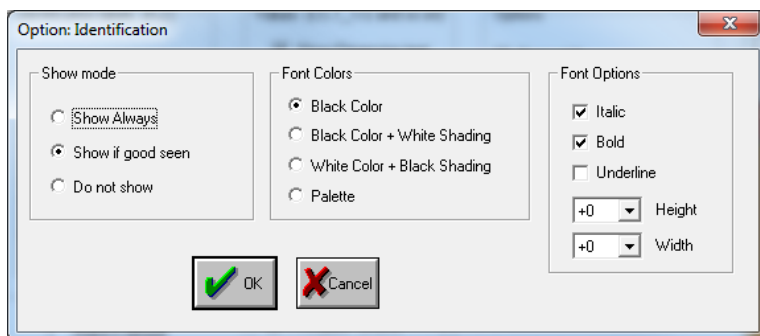




<i>23P</i> 1.1e-07 mb	<i>24P</i> 1.6e-06 mb
<i>22Si</i> 2.5e-06 mb	<i>23Si</i> 3.8e-05 mb



20F 5.2e+00 mb	21F 1.5e+00 mb	22F 3.1e-01 mb
19O 1.0e+00 mb	20O 1.9e-01 mb	21O 2.4e-02 mb
18N 1.1e-01 mb	19N 1.3e-02 mb	20N 1.1e-03 mb



29Na 2.6e-03 mb	30Na 2.3e-04 mb
28Ne 8.5e-05 mb	29Ne 5.7e-06 mb

Values (CS,T_1/2 and so on)

Show Dimension text

settings

Height : +1
Width : +2
Italic : Yes
Bold : no
ULine : no
Show : If good seen
Color : Palette

for T1/2 plots SHOW

all in seconds
 ms,sec,day,year..

¹⁸⁰Hf <i>stable</i>	¹⁸¹Hf <i>42.39 d</i>	¹⁸²Hf <i>9 My</i>
¹⁷⁹Lu <i>4.59 h</i>	¹⁸⁰Lu <i>5.7 m</i>	¹⁸¹Lu <i>3.5 m</i>
¹⁷⁸Yb <i>1.23 h</i>	¹⁷⁹Yb <i>8 m</i>	¹⁸⁰Yb <i>2.4 m</i>

Values (CS,T_1/2 and so on)

Show Dimension text

settings

Height : +0
Width : -1
Italic : no
Bold : no
ULine : no
Show : If good seen
Color : Black Color

for T1/2 plots SHOW

all in seconds
 ms,sec,day,year..

1.0e+20	3.7e+06	2.8e+14
1.7e+04	3.4e+02	2.1e+02
4.4e+03	4.8e+02	1.4e+02

Values (CS,T_1/2 and so on)

Show Dimension text

settings

Height : +0
Width : -1
Italic : no
Bold : no
ULine : no
Show : If good seen
Color : Black Color

for T1/2 plots SHOW

all in seconds
 ms,sec,day,year..

¹⁸⁰Hf 1.0e+20 sec	¹⁸¹Hf 3.7e+06 sec	¹⁸²Hf 2.8e+14 sec
¹⁷⁹Lu 1.7e+04 sec	¹⁸⁰Lu 3.4e+02 sec	¹⁸¹Lu 2.1e+02 sec
¹⁷⁸Yb 4.4e+03 sec	¹⁷⁹Yb 4.8e+02 sec	¹⁸⁰Yb 1.4e+02 sec

Identification labels (A,Z)

settings

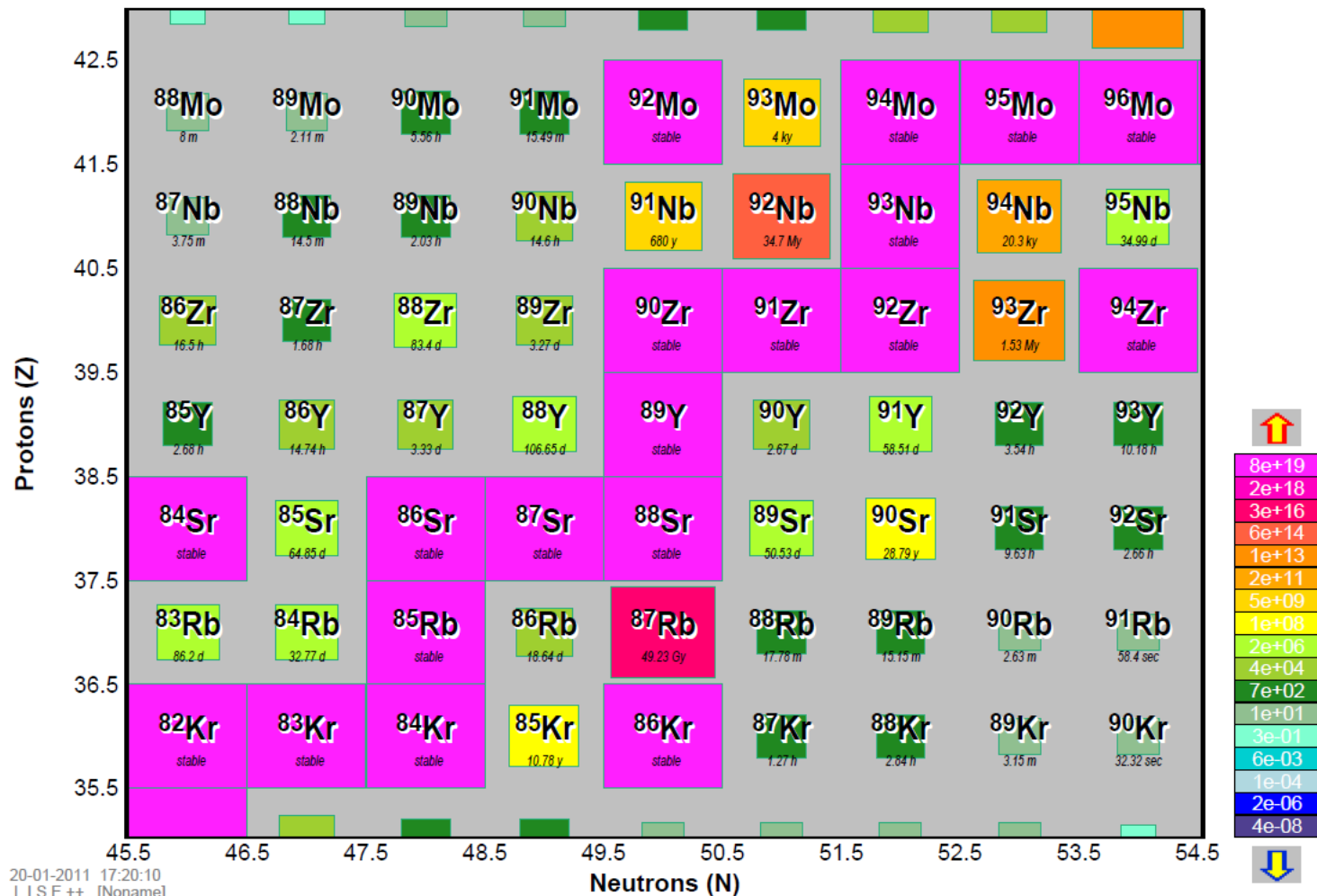
Height : +2
Width : +2
Italic : no
Bold : Yes
ULine : no
Show : Always
Color : White+Shading

¹⁸⁰Hf	¹⁸¹Hf	¹⁸²Hf
¹⁷⁹Lu	¹⁸⁰Lu	¹⁸¹Lu
¹⁷⁸Yb	¹⁷⁹Yb	¹⁸⁰Yb

Color scale board based on the internal database or calculations



$T_{1/2}$ (sec)
<Experiment>
N=0-200



20-01-2011 17:20:10
LISE++ [Noname]

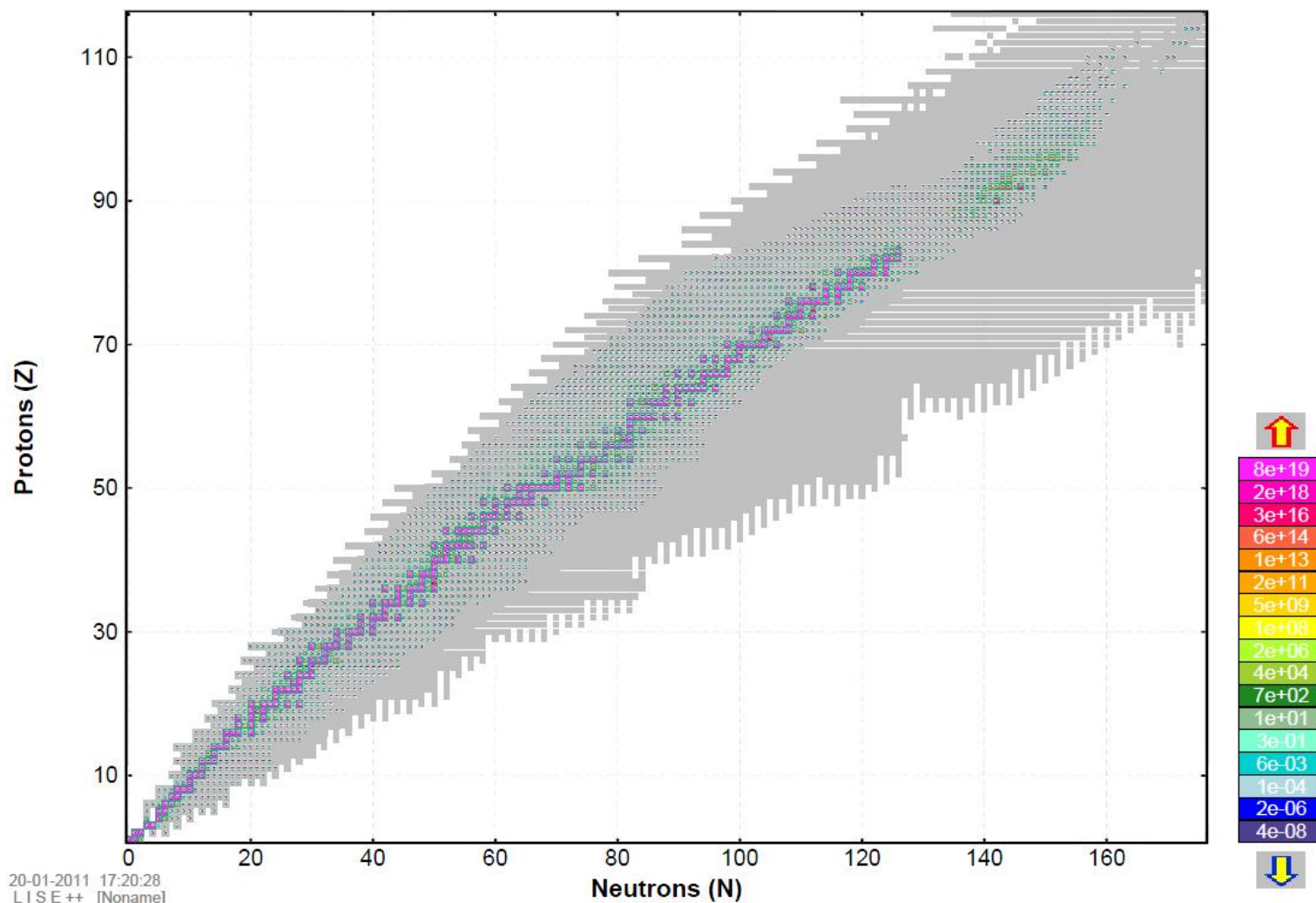
Color scale board based on the internal database or calculations



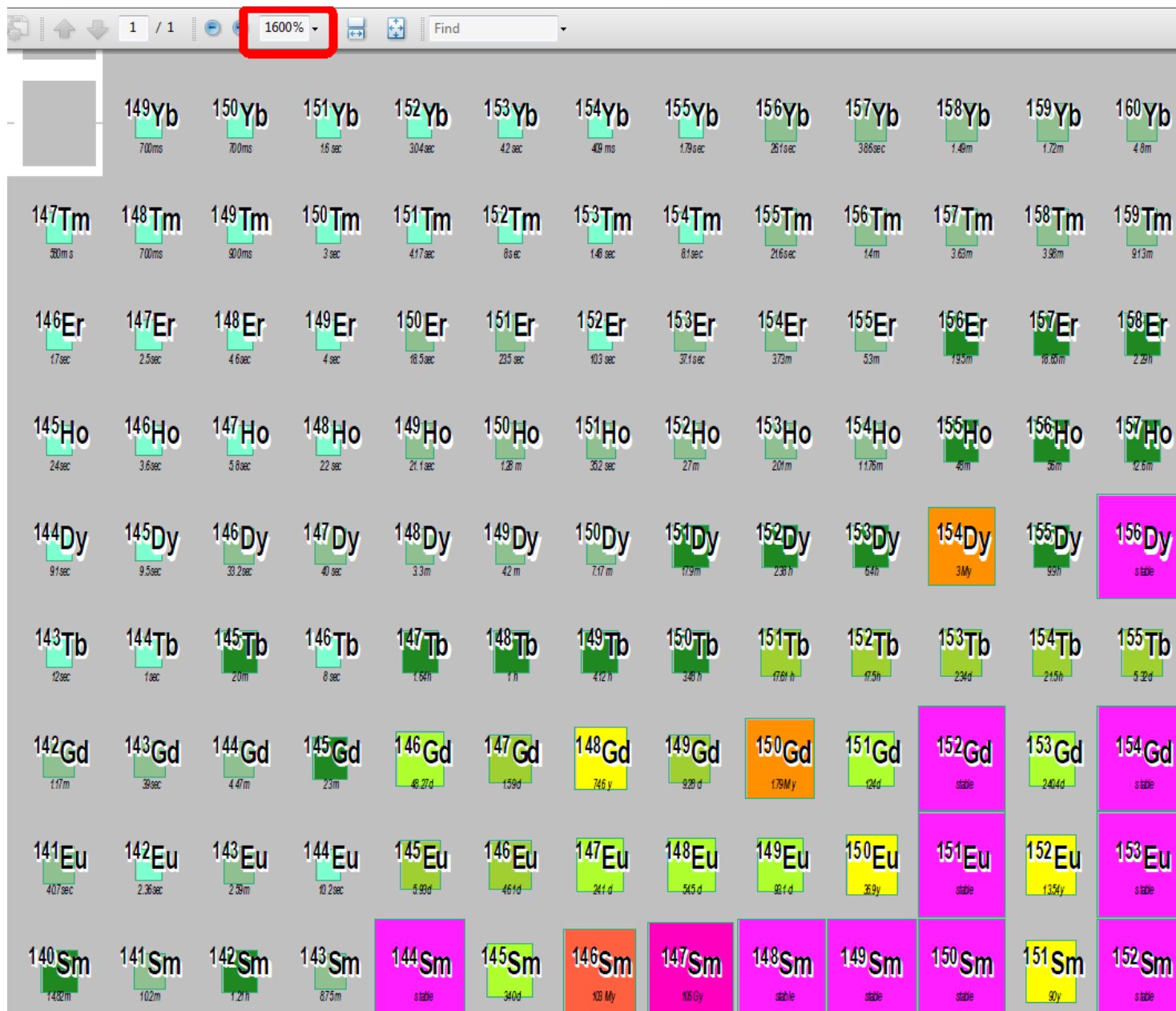
$T_{1/2}$ (sec)

<Experiment>

N=0-200



20-01-2011 17:20:28
LISE++ [None]

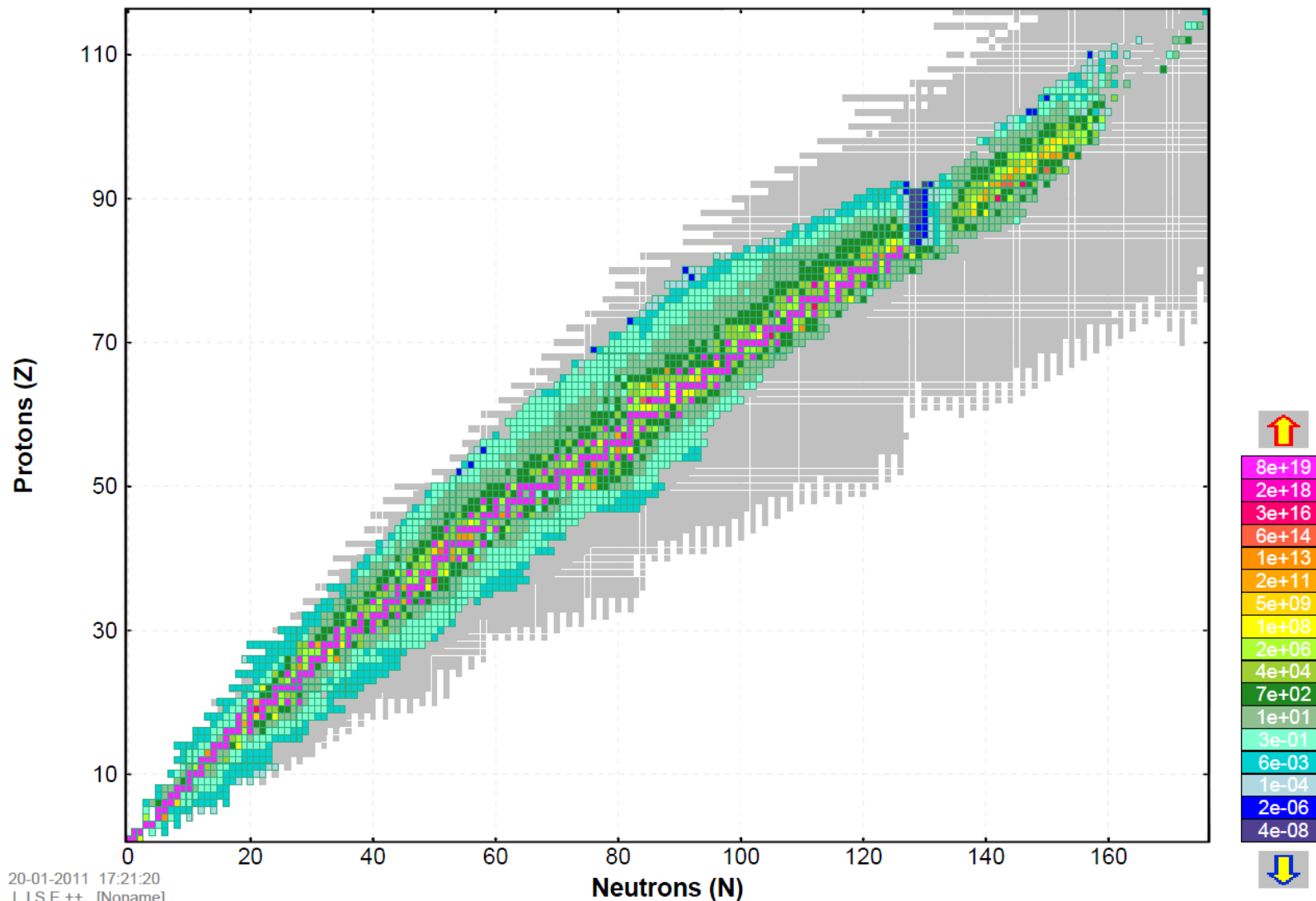


Color scale board based on the internal database or calculations

$T_{1/2}$ (sec)

<Experiment>

N=0-200



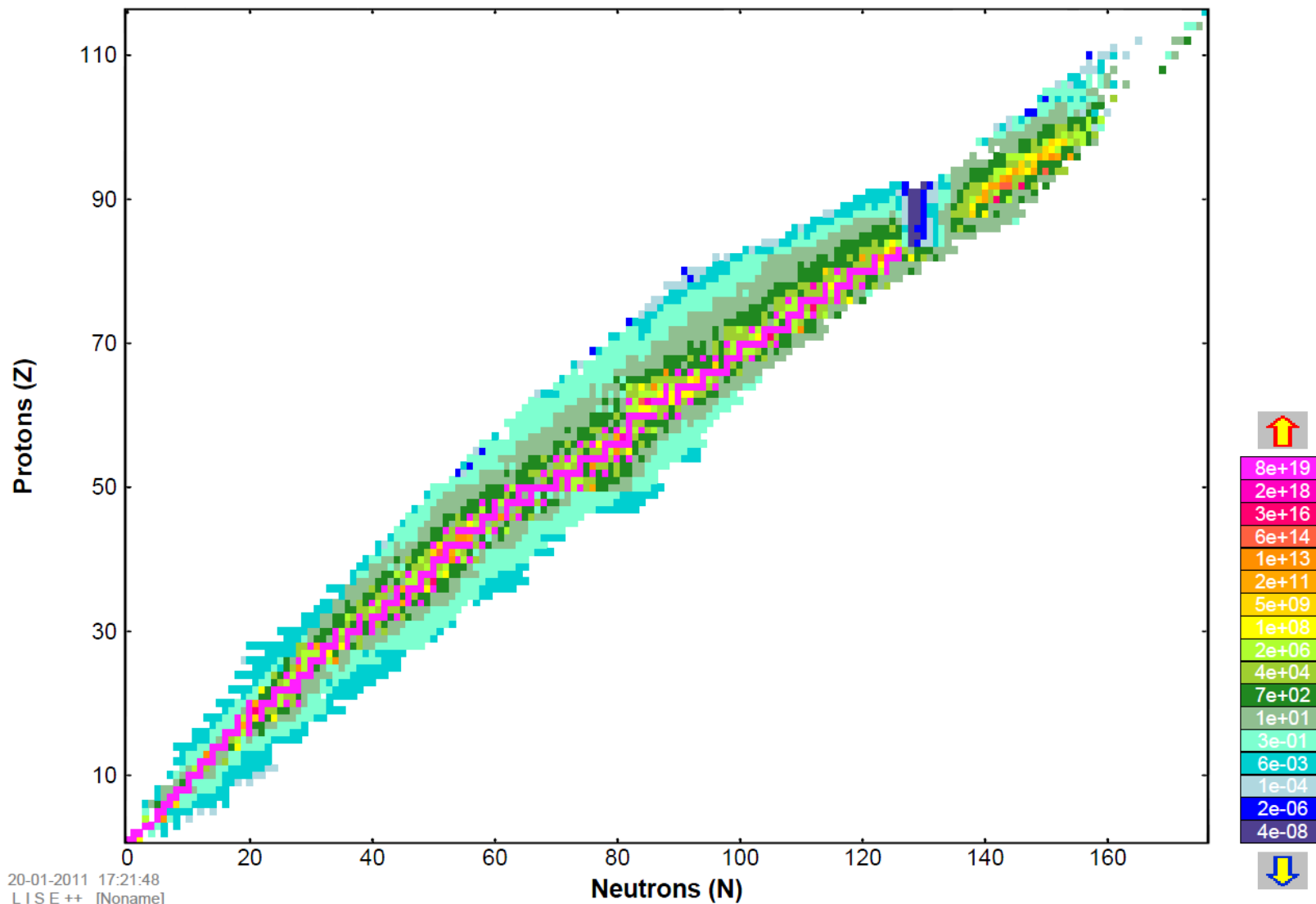
20-01-2011 17:21:20
L I S E ++ [Noname]

Color scale board based on the internal database or calculations

$T_{1/2}$ (sec)

<Experiment>

N=0-200



20-01-2011 17:21:48
L I S E ++ [No name]

Databases

- AME & properties: View, Edit
- AME & properties: Plots
- Isomer database: View, Edit
- User database: Edit
- User database: Plots

- S 1n
- S 2n
- S 1p
- S 2p
- Q alpha
- Beta- decay
- Beta+ decay
- T 1/2
- Mass Excess
- Binding energy
- Binding energy per A

for any plot

Choose a Plot Type

Select a data set to plot

- Exper,Beta,Alpha,Proton
- compilation set: min(Beta,Alpha,Proton)

Include "unbound" isotopes

2 - Compilation of Experiment & Min (Beta,Alpha,Proton)

Dimension of the plot

- ONE-dimensional
- TWD-dimensional

Plot type

- Isotopes, Z=const
- Isobars, A=const
- Isotones, N=const
- Isospin, N-Z =const
- Isospin, N-ZZ=const

function of

- Z (protons)
- A (nucleons)
- N (neutrons)
- N-Z (isospin)
- N-ZZ

Nmin = 0
Nmax = 200

2D: Color scale board based on

- Internal database values or calculations
- External source (iso & isolist files)

ISO file (external database): table

ISOLIST file (description of database): decay_mode

Decay mode filter: All modes

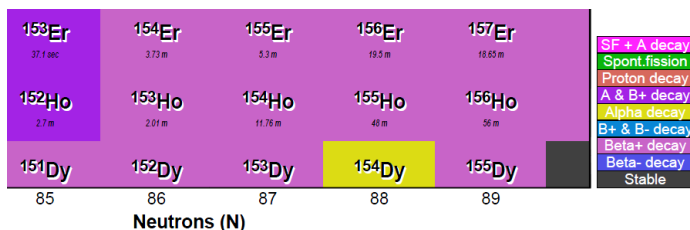
All
 Odd
 Even

OK Cancel

NZ chart

Why in database plots?

LISE++ Database (based on AME2003) values or calculations could be joined with the user color board



Default location of ISO and ISOLIST files is the "My Documents\LISE\bin" directory

ASCII file

LISE++ reads first two columns

1st column is name (should be in quotation marks)
2nd column is color (decimal base)

```

\bin\decay_mode.isolist
File
"Stable"      4210752
"Beta- decay" 15224912
"Beta+ decay" 13133000
"B+ & B- decay" 13993481
"Alpha decay" 1367260
"A & B+ decay" 15016867
"Proton decay" 6121687
"Spont.fission" 767243
"SF + A decay" 16720639
  
```

```

\bin\discovery_lab.isolist
File
"MSU"        2523917
"GANIL"      11804186
"RIKEN"      11470694
"Dubna"      598489
"Argonne"    12871363
"Cern"       10593035
"Oak Ridge"  2007034
"Berkeley"   3666870
"other"      6579300
  
```

```

welcome.isolist
File
"2011"      2523917
"++"        481967
"LISE"      11470694
"to"        598489
"welcome"   11804186
  
```

SF + A decay
Spont.fission
Proton decay
A & B+ decay
Alpha decay
B+ & B- decay
Beta+ decay
Beta- decay
Stable

other
Berkeley
Oak Ridge
Cern
Argonne
GANIL
Dubna
RIKEN
GSI
MSU

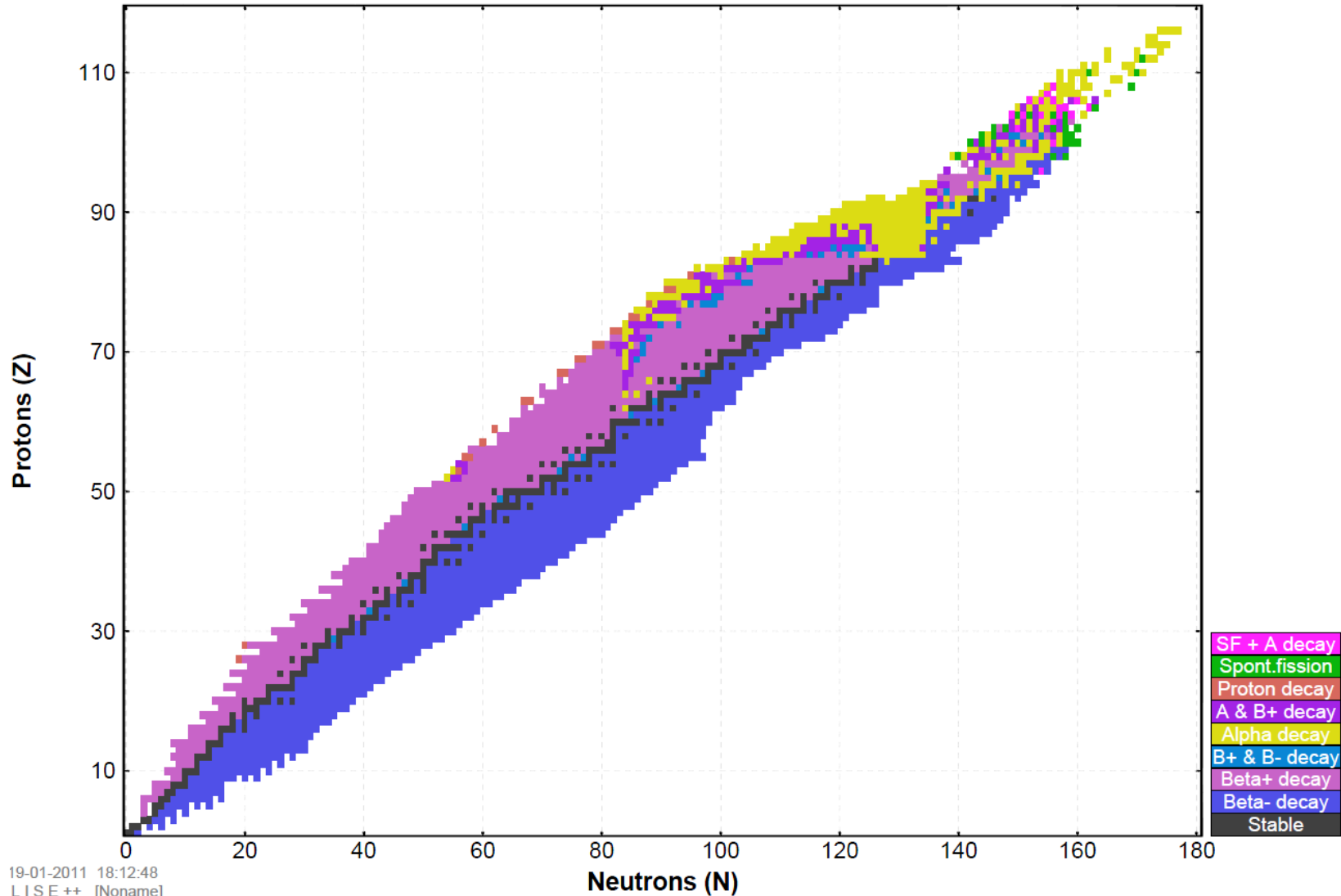
welcome
to
LISE
++
2011

$T_{1/2}$ (sec) (compilation)

<Compilation>

N=0-200

The color scale board is based on "table.iso" & "decay_mode.isolist" files

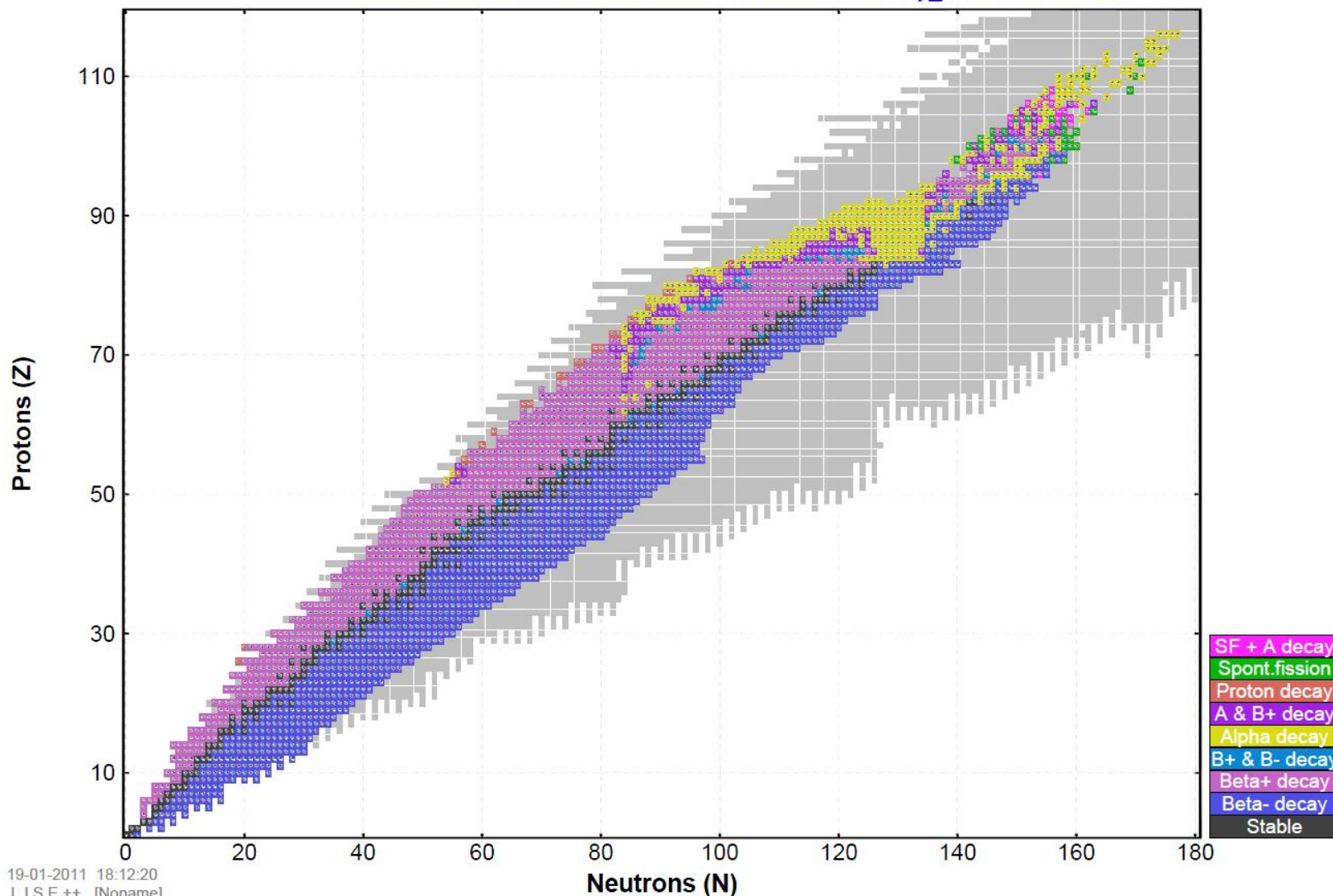


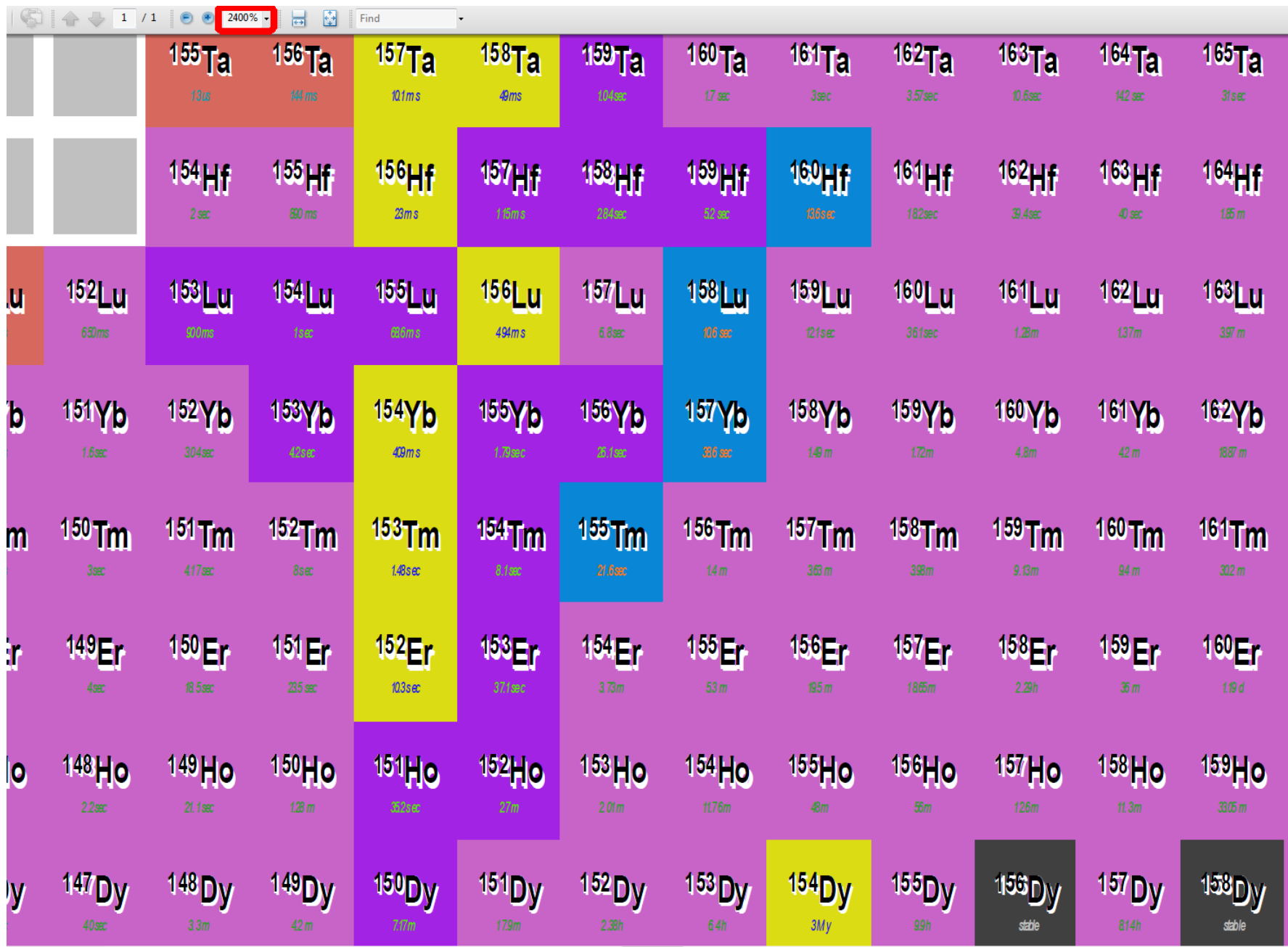
$T_{1/2}$ (sec) (compilation)

<Compilation>

N=0-200

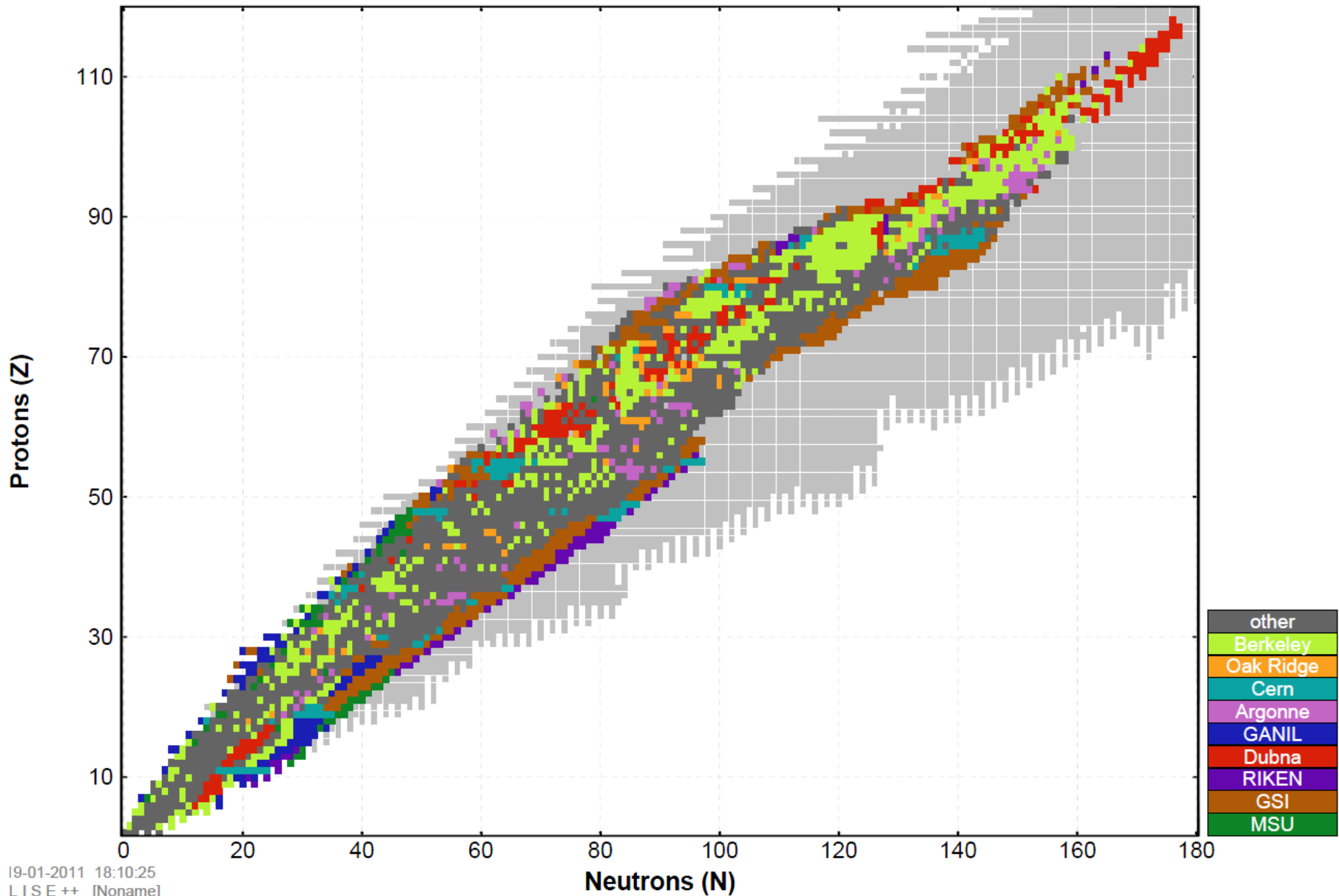
The color scale board is based on "table.iso" & "decay_mode.isolist" files



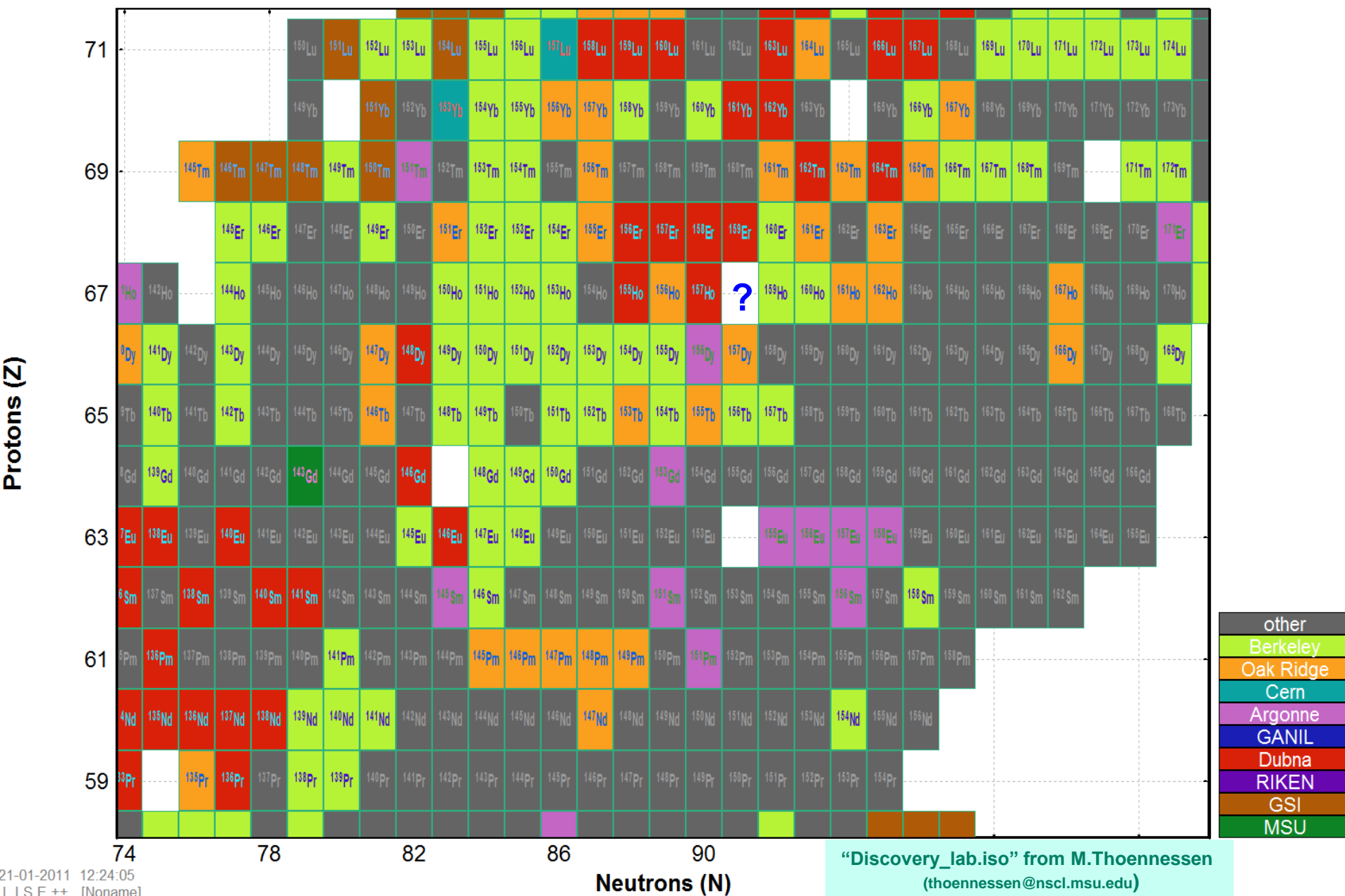


“Discovery_lab.iso” from M.Thoennesen (thoennesen@nscl.msu.edu)

The color scale board is based on "discovery_lab.iso" & "discovery_lab.isolist" files



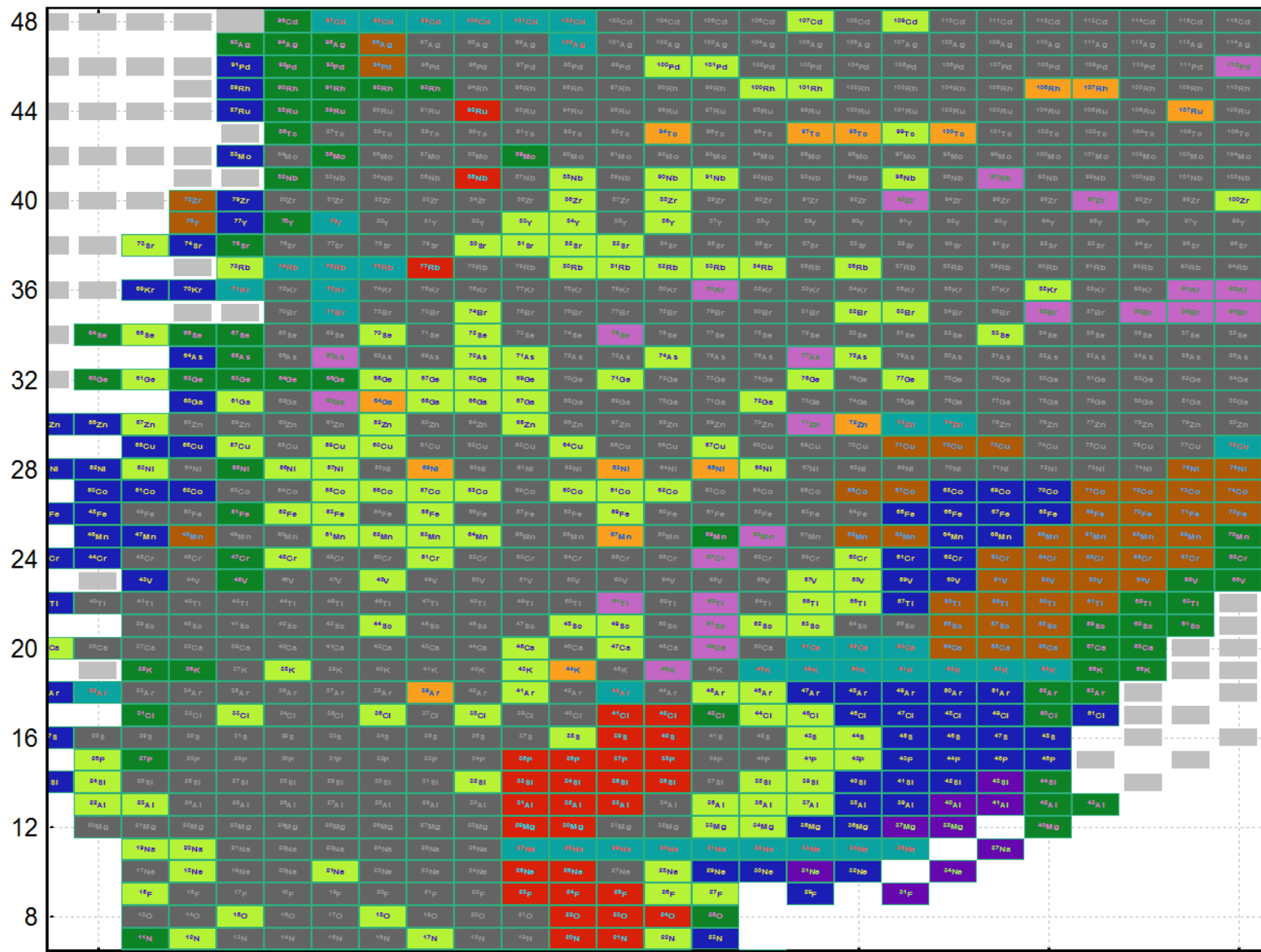
The color scale board is based on "discovery_lab.iso" & "discovery_lab.isolist" files



Printing to Adobe PDF – Example 9: Color scale board based on the “DISCOVERY” files

The color scale board is based on "discovery_lab.iso" & "discovery_lab.isolist" files

Protons (Z)



- other
- Berkeley
- Oak Ridge
- Cem
- Argonne
- GANIL
- Dubna
- RIKEN
- GSI
- MSU

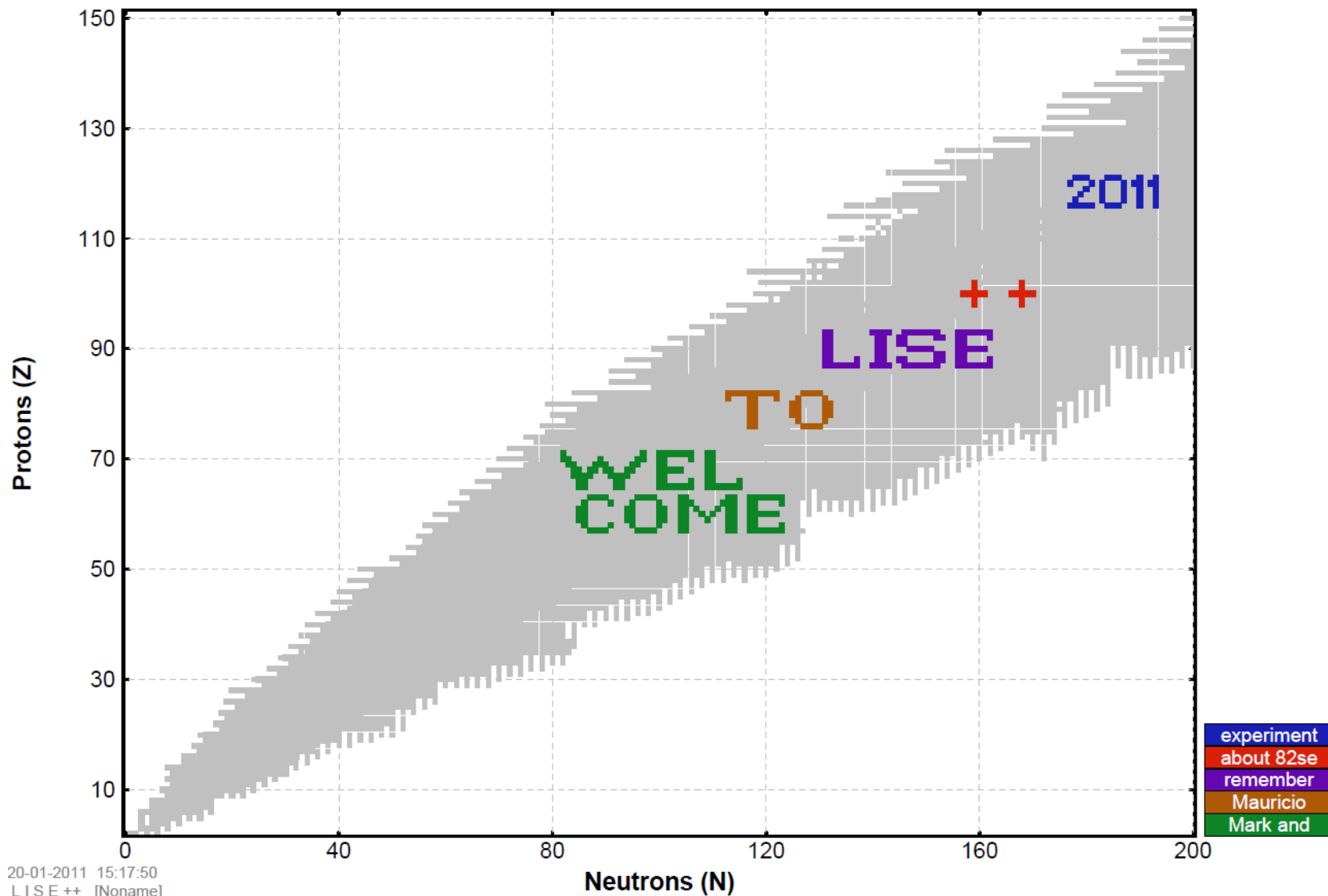
“Discovery_lab.iso” from M.Thoennessen
(thoennessen@nscl.msu.edu)

S_{2p}

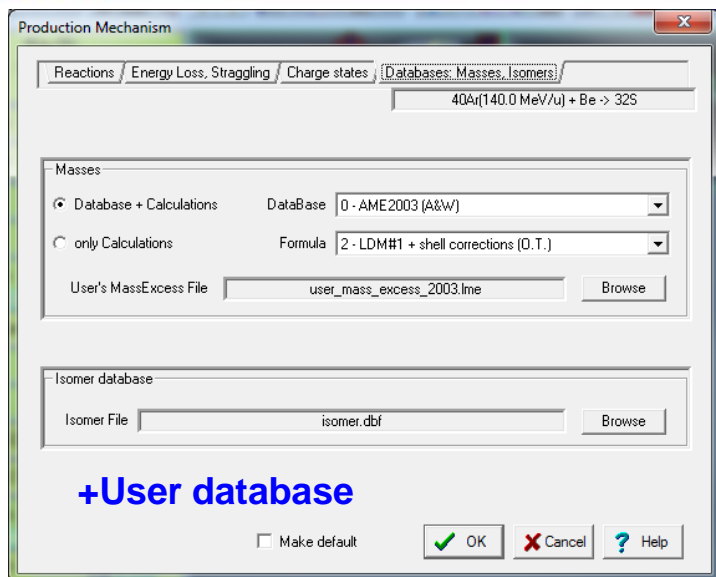
<Database: AME2003 (A&W) + LDM2>

N=0-200

The color scale board is based on "welcome.iso" & "welcome.isolist" files



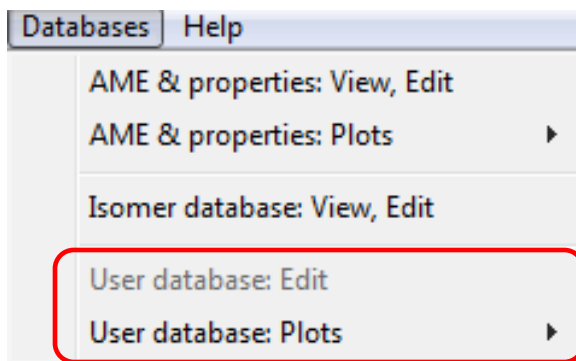
20-01-2011 15:17:50
LISE ++ [None]



Excel file → DBF (dBASE) → LISE++

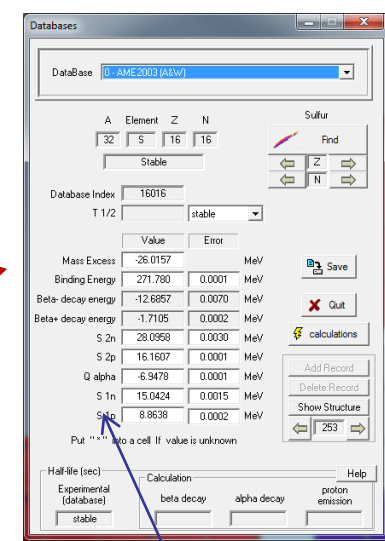
	A	B	C	D	E	F	G	H
1	INDEX	A	EL	Z	MASS_EXCES	BINDING_EN	BETA-DEC/ S(2N)	
2	1000	1	H	1	7.2890	0.000	* * *	
3	1001	2	H	1	13.1357	2.225	* * *	
4	1002	3	H	1	14.9498	8.482	0.0186	8.4818
5	1003	4	H	1	25.9000	5.600	23.4800	3.3768
6	1004	5	H	1	32.8900	6.680	21.5100	-1.8000
7	1005	6	H	1	41.8600	5.760	24.2700	0.1804
8	1006	7	H	1	49.1400	6.580	23.0300	-0.1000
9	2001	3	He	2	14.9312	7.718	* * *	
10	2002	4	He	2	2.4249	28.296	* * *	

For the user database just we needs INDEX, other columns are user information.
Restriction : < 15 fields



dynamical menus should be

- S 1n
- S 2n
- S 1p
- S 2p
- Q alpha
- Beta- decay
- Beta+ decay
- T 1/2
- Mass Excess
- Binding energy
- Binding energy per A



User database fields

Outlooks

Subject	priority	new	order	time
LongTerm				
>>> Custom shape degrader optimization in MC mode for high order optics	high priority		1	< 2 weeks
>>> Input angles in wedge in MC mode	high priority	X	1a	< 1 week
>>> PACE4 generator of one event (creation dll-library)	high priority		4	< 1 week
>>> PACE4 in MC LISE++ (using PAVE4 dll-library)	high priority		5	< 1 week
>>> ETACHA implementation	high priority			1.5 months
>>> ADA (Abrasion-Dissipation-Ablation) model creation	medium			2 months
>>> Evaporation cascade: create Monte Carlo version	medium			1 month
>>> Abrasion-Fission: create Monte Carlo version	medium	X		2 weeks
>>> Implementation of Intranuclear cascade (INC) model in LISE++ Windows	medium			3 months
>>> Ray tracing in LISE++	medium			1 year
>>> Minimization in LISE++ (which can be used for MC, TRANSPORT, Ray tracing cases)	medium			2 months
>>> Write full LISE++ documentation	medium			1-2 months
>>> The "MOTER" code development	low			1 year
>>> Energy loss in PACE4 (low priority)	low			< 1 week
>>> Three-body kinematics relativistic calculator	low			1 month
>>> Water wedge procedure (wedge with one moving plane and filled by liquid)	low			< 2 weeks
ShortTerm				
Develop a subroutine to calculate a reduced dispersion for large values of dP/P	high priority		2	< 3 days
PACE4 : request from TRIUMF	high priority		3	< 2 days
Cross section for stripper	medium			< 2 days
High order : write documentation and put source for COSY files	medium			done?
User database: import, edit, plot	medium	X		< 5 days
Discovery of isotopes : utilities, database, plots (see row above)	medium			< 5 days
Wedge (including curved profile wedge) inclination	medium			< 4 days
Create possibility to Insert a material before the target	medium			< 2 days
Brho method to measure T1/2 (MC: possibility of decay in flight)	low			< 5 days
Dispersion method for secondary target: check DJM case	low			< 2 days
Fission without angular acceptances: low transmission for analytical solution	low			< 3 days
High order optics calculation: improvement, adaptation GICOSY format	low			< 3 days
MOCADI <-> LISE++ converter	low			< 4 days
Transport <-> LISE++ converter	low			< 1 day
m-rad dimensions for LISE++ optics	low			< 2 days
Problem with Projectile Fragmentation in the Catcher utility	low			< 1 day
Simulation reactions in Si-telescope in MC mode	low			< 4 days
DONE				
Linked COSY matrices reload in LISE++ by user demand in the LISE code	high priority		done	
Recalculate optical matrices of quadrupoles according to Brho by pressing one button	high priority		done	
increasing number block limit up to 200 (was 100)	high priority		done	
quadrupoles: option matrix or field calculations	high priority		done	
second order matrix for dipole and entrance and exit face of dipoles	high priority		done	
ideal magnet solution (tabulation) : first and second order	high priority		done	
Stripper foil half-life : initial temperature	medium		12/23/2010	1 day
Stripper foil half-life : pulsing beam & rotating target together	medium		12/23/2010	2 days
Target and stripper thickness defects	medium		1/7/2011	2 days
Range option in MC rays generator	high priority		1/21/2011	1 day
Customizable chart of Nuclides	high priority		1/20/2011	5 days

Tasks	time	dates
LISE++ : Custom shape degrader Vs. MC, high orders	< 2 weeks	to 3 February
Input angles in wedge in MC mode	< 1 week	to 10 February
FRIB yields	< 7 days	to 17 February
#9016 experiment preparation		15 February - 31 March
#9016 experiment performance		1 April - 10 April
#9016 experiment analysis		11 April - 29 April , June-July
PACE4 dll	< 1 week	
PACE4 in LISE++ MC	< 1 week	
dp/p subroutine	< 3 days	
Triumf requests	< 2 days	
S3 in LISE++	< 1 week	