

//-----

// 14.7.31 07/03/20
 // d_LastZ_sr dialog : DONE!

// d_CN2 dialog has been remade to heritage two classes:
 // d_CN0_base_Dlg and d_CN2_base_Dlg : DONE!
 // it helps to create(optimize) another d_CN2_*** dialogs as
 // d_CN2_gasPressure, d_CN2_optimumTarget, d_CN2_scanningBrho.
 // This new approach of multiple heritage will be used for 14 different d_Plot dialogs

// d_Fragmentation_convolutionPlot dlg : redesign 50%, connection 10%
 // d_Fusion_plotCS dlg : redesign 50%, connection 10%

```
// 14.7.32 07/04/20
// Implementation of o_Catcher.*, o_Catcher_MC.*, o_MC_trans_base.*, d_MC_outside_file.*
// d_Isol_catcherPlot.*, w_Graph_CS.cpp from Borland to Qt
// Substituion of o_MC_trans.* from LISE Qt(Borland v.10) by Borland v.13
```

```
// o_MC_trans_base.* : completed 100%
// o_MC_trans.*      : completed 20%
// o_Catcher_MC.*    : completed 100%
```

```
// d_Fragmentation_convolutionPlot dlg : redesign 70%, connection 30%
// d_Isol_catcher dlg                   : redesign 80%, connection 20%
```

Fragment momentum distribution: <Convolution> method

Dimension of the plot: ONE-dimensional (selected) | TWO-dimensional | NZ chart

cross-section calculation method to draw a plot: [dropdown]

Plot type:

- Isotopes, Z=const
- Isobars, A=const
- Isotones, N=const
- Isospin, N-Z=const
- Isospin, N-2Z=const
- <N>/Z
- sum(CS); Z=const
- sum(CS); A=const
- sum(CS); N=const

Zmin = 16 | Zmax = 16

Function of:

- Z (protons)
- A (nucleons)
- N (neutrons)
- N-Z (isospin)
- N-2Z

All | Odd | Even

Buttons: Ok, Quit

CATCHER utility

Diagram: Beam → Drift Length #1 → Target (Material #1-3, Radius, Thickness, Material A,Z) → Drift Length #2 → Catcher (Radius 1, Radius 2, Length, Material A,Z)

Materials #1-3: target #1, target #2, target #3

Configuration Files: current file, catcher_origin, Save file as, Load file

Target: Be (2 mm), Radius = 20 mm

Materials #4-6: target #4, target #5, target #6

Calculations: Mode (Reaction place, Fragment stopping place, Projectile stopping place), Options (Z & X, Z & R(X,Y) selected, Z & Y, Z & R(X,Y,Z), X & Y), Minimum detector size to plot (mm) = 1, Calculate

Set-up: Projectile: 7Li (35.00 MeV/u; 1pA), Reaction Product: 6He, #1 Distance from the source to the target block = 20 mm, #2 Distance from the target block to the catcher = 30 mm

Reaction: Projectile Fragmentation, Fusion -> Residual

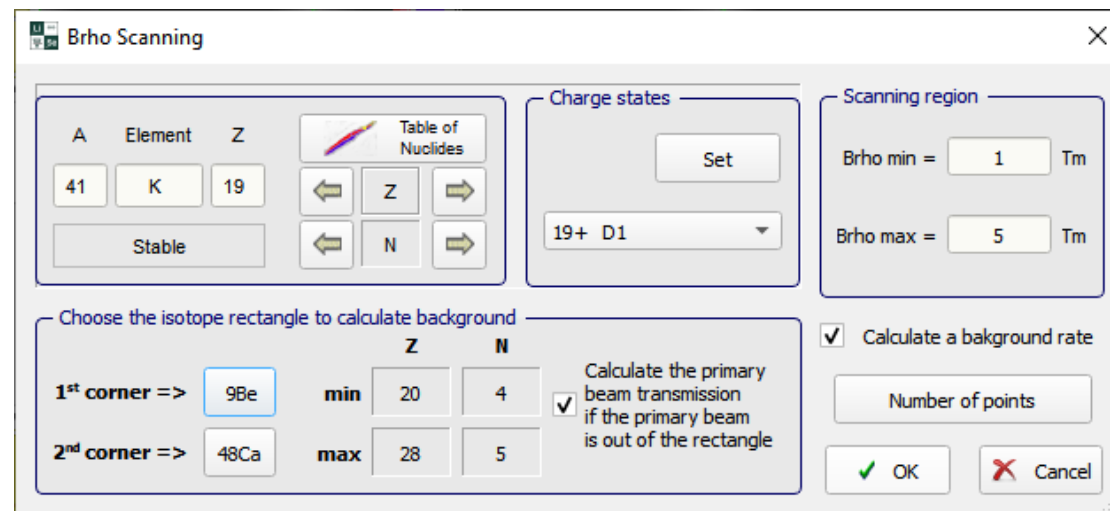
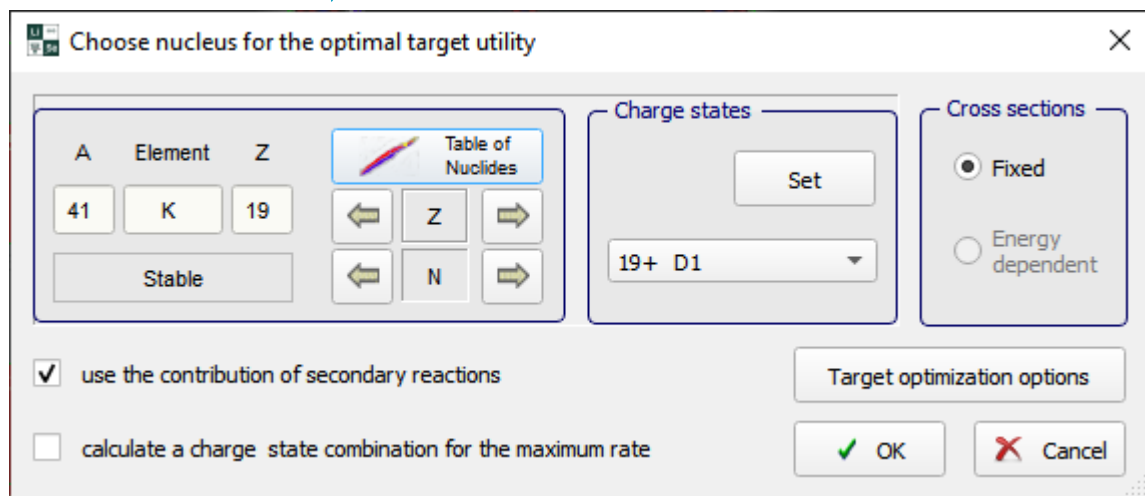
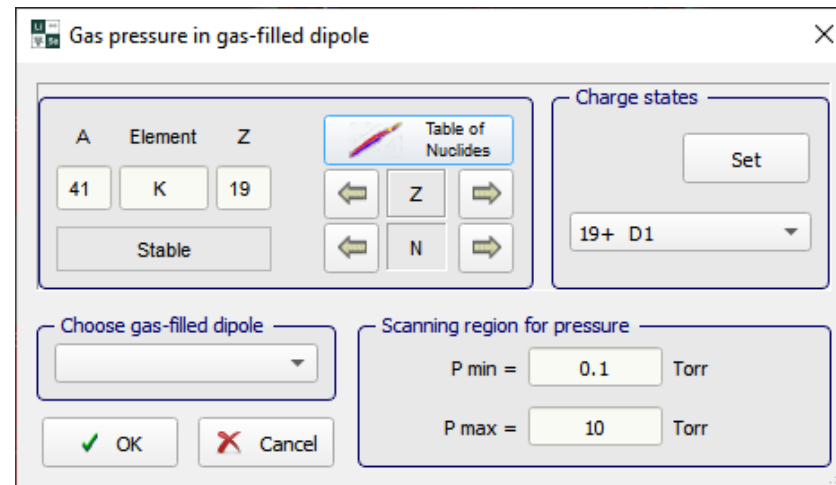
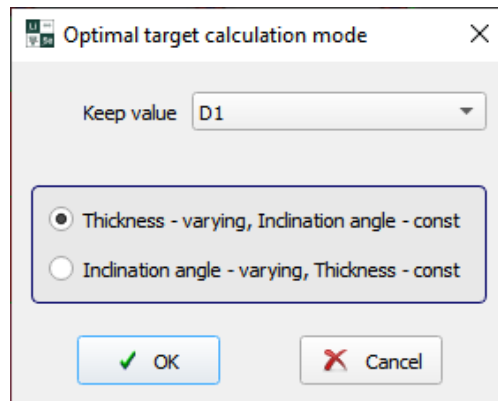
Cross sections: LISE++ built-in for selected reaction, FILE: Excitation function (see Help), Save file as

Catcher: --- absent ---, Radius 1 = 25 mm, Radius 2 = 30 mm

Buttons: Help, Quit, Save & Exit

```
//-----
// 14.7.33 07/06/20
// d_CN/d_CN2_gasPressure dialog : DONE! (based on new parent class : d_CN2_base_Dlg)
// d_CN/d_CN2_scanningBrho dialog : DONE! (based on new parent class : d_CN2_base_Dlg)
// d_CN/d_CN2_optimumTarget dialog : DONE! (based on new parent class : d_CN2_base_Dlg)
```

```
// CalculateBeamFragmentation() : completed!
// CmCallSecondaryCalculations() : completed!
```



- //-----
- // 14.7.34 07/07/20
- // d_Utility/d_Isol_catcher dialog : DONE!
- // d_Utility/d_Isol_catcherExEnergy dialog : redesign 100%, connection 20%
- // d_Utility/d_Twinsol dialog : DONE!

CATCHER utility

Diagram: Shows a beam passing through materials 1-3, a target, materials 4-6, and a catcher. Labels include: Beam, Drift Length #1, Target, Fragment A,Z, Catcher, Radius 1, Radius 2, Length Material (A,Z).

Materials #1-3: #1: Ti (0.5 mg/cm2) [checked], #2: Al (52.1 micron) [checked], #3: []

Materials #4-6: #4: Fe (12 micron) [checked], #5: [], #6: []

Target: Be (2 mm), Radius = 20 mm

Catcher: C (10 mm), Radius 1 = 12.5 mm, Radius 2 = 19.4 mm

Set-up: Projectile: ^{11}Li (50.00 MeV/u; 1pA), Reaction Product: ^4He

Reaction: Projectile Fragmentation [selected], Fusion -> Residual []

Cross sections: LISE++ built-in for selected reaction [selected], FILE: Excitation function (see Help) []

Configuration Files: current file: july07, Save file as, Load file

Calculations: Mode: Fragment stopping place [selected], Options: Z & R(X,Y) [selected], Minimum detector size to plot (mm): 1, Calculate, Help, Quit, Save & Exit

TwinSol

Twinsol settings: Use the second solenoid [checked], Twinsol operation mode: Antiparallel [], Parallel [selected], Use the defocusing solenoid [checked], Use the absorber [checked], Use the "soft-edge" corrections for solenoid matrix calculations [checked], Twinsol optical matrix, Twinsol scheme

1-st solenoid block: 1-st solenoid block settings, Optical matrix for setting fragment, Block Length = 0.594 m, B = 2 T

Absorber: Absorber settings, Si (1 mg/cm2), Distance from target to absorber = 0.594 m, Change state after absorber (Z-Q) = 0

defocusing solenoid: Settings, Optical Matrix, Length = 0.594 m, B = 2 T

2-nd solenoid block: 2-nd solenoid block settings, Optical matrix for setting fragment, Block Length = 0.594 m, B = 2 T

Files: current file, att4, Save file as, Load file

Utility: Function of: 01. beam sigma: X, from: 1-st solenoid: B_field Max, at: 0 m, 1-st solenoid: x0, Calculate

Initial Beam: Projectile, Beam emittance, Initial ray values table:

	Beam emittance	Initial ray values	
1. X	1.23	5	mm
2. T	20	-5	mrاد
3. Y	1	20	mm
4. F	20	25	mrاد
1&3. R	1.59	7.07	mm
2&4. A	28.28	32.02	mrاد

^{40}Ar (10.00 MeV/u), P transport: 0.3038 GeV/c

Beam tracking: 1-st solenoid: x0 = 0 m, "Transport" (matrix solution) table:

	Beam sigmas	Ray Values	Ray TRACE
1. X	1.23	5	5.04
2. T	20	20	20.03
3. Y	1	-5	-4.95
4. F	20	25	24.92
1&3. R	1.59	7.07	7.06
2&4. A	28.28	32.02	31.97

Energy (MeV/u) = 10, Energy (MeV/u) = 0.05

Plot options. Show: Transport: Beam Sigmas [], Transport: Ray Values [checked], Ray Trace [checked], Scratch file data [], Selected plot: 1. X

Calculate, Save & Exit, Plot, Quit

```
//-----
// 14.7.35 07/08/20
// d_Utility/d_Isol_catcherExEnergy dialog : DONE!
// d_Utility/d_RadiationLength dialog : DONE!
```

// w_spectrometer_scheme : 75%

// (it has been done by "Borland" way.
 // In future should be redone using
 // Qt QGraphicsItem class for dragging blocks)

C:/LISEcute/_install/CrossSections/287B4.exfunc

```
; LISE++ 48Ca + 242Pu -> 287B4
4.682813 6.82E-16
4.746094 1.92E-12
4.809375 2.93E-10
4.872656 5.37E-09
4.935938 1.86E-08
4.999219 1.24E-08
5.0625 2.32E-09
5.125781 2.05E-10
5.189063 1.99E-11
5.252344 1.93E-12
5.315625 3.31E-13
5.378906 3.24E-14
5.442188 3.89E-15
5.505469 3.94E-16
5.56875 3.94E-17
5.632031 3.43E-18
5.695313 3.70E-19
5.758594 3.14E-20
5.821875 4.71E-21
5.885156 4.91E-22
5.948438 5.41E-23
6.011719 6.63E-24
6.075 8.29E-25
6.138281 1.26E-25
6.201563 1.66E-26
6.264844 2.59E-27
```

Excitation energy file

Open file View file Clear

287B4.exfunc

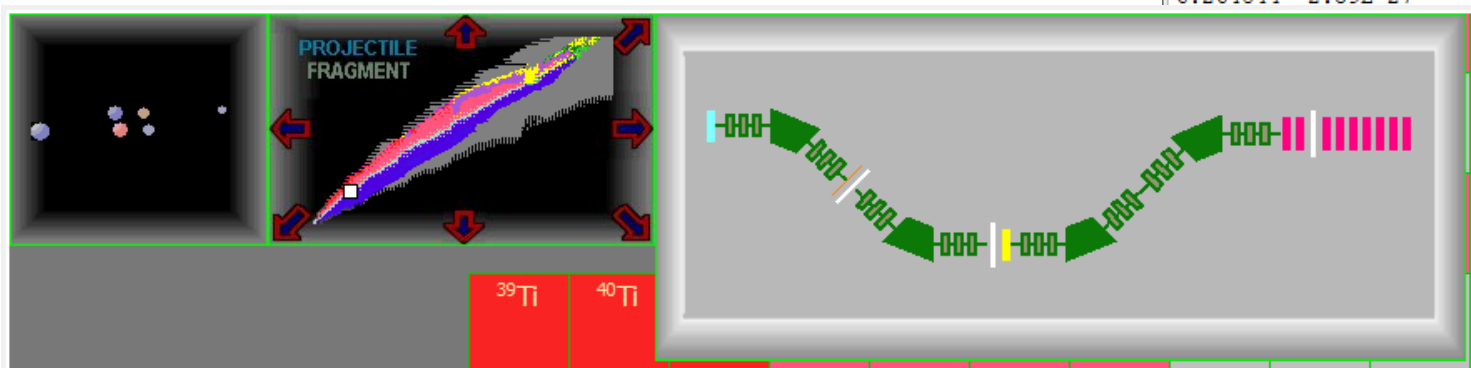
Rows = 32 OK Cancel

Note

The excitation function file is in ASCII format. Comments string begin with "!" or ";"

The Coulombs can be separated by a Space, a Comma or a Tabulation. User can put comments after the data.

1st column: (E) Projectile energy in (MeV/u)
 2nd column: (CS) production cross section in [mb]



Radiation length

Material Be

Radiation length (<http://pbg.lbl.gov>)

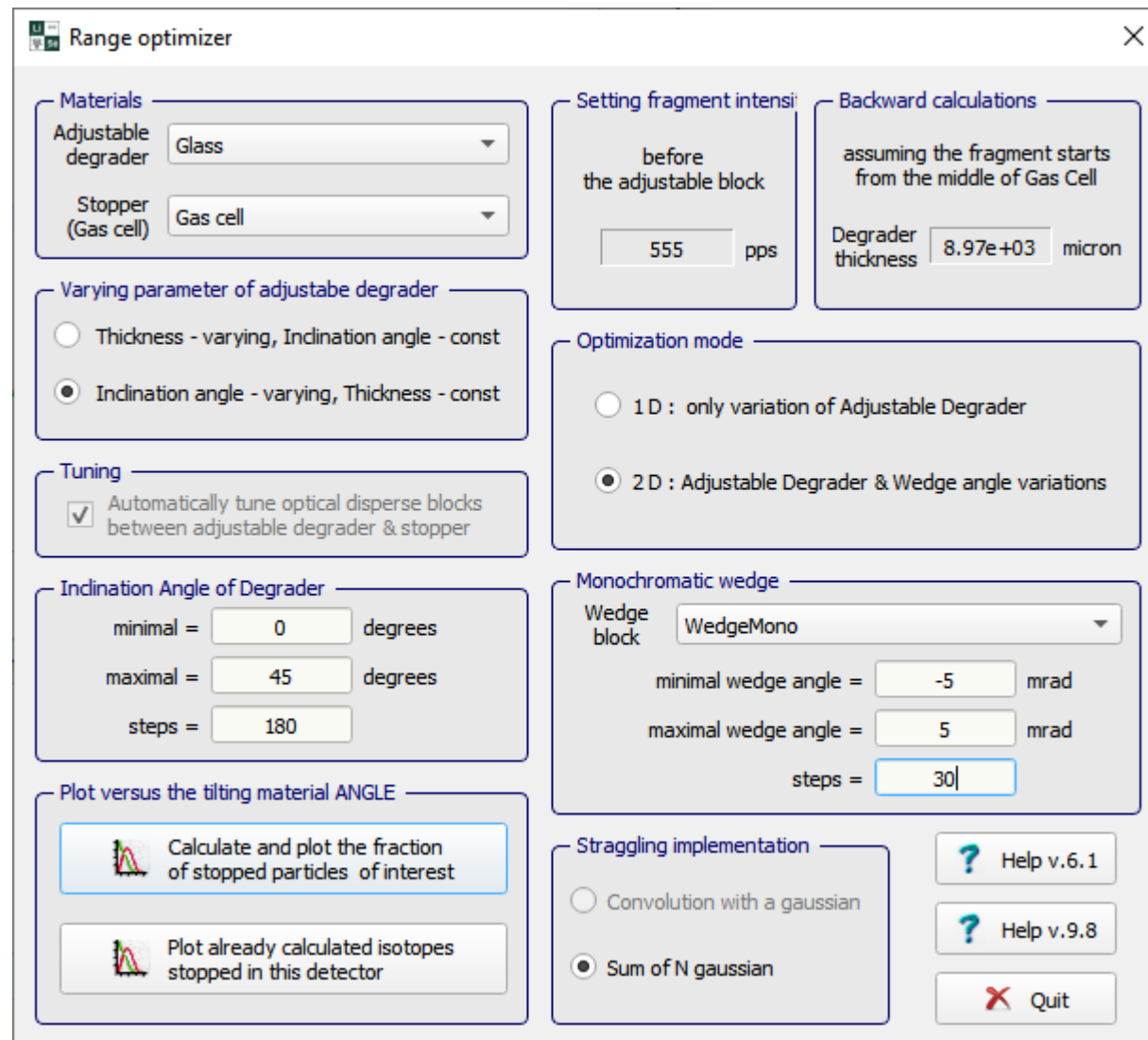
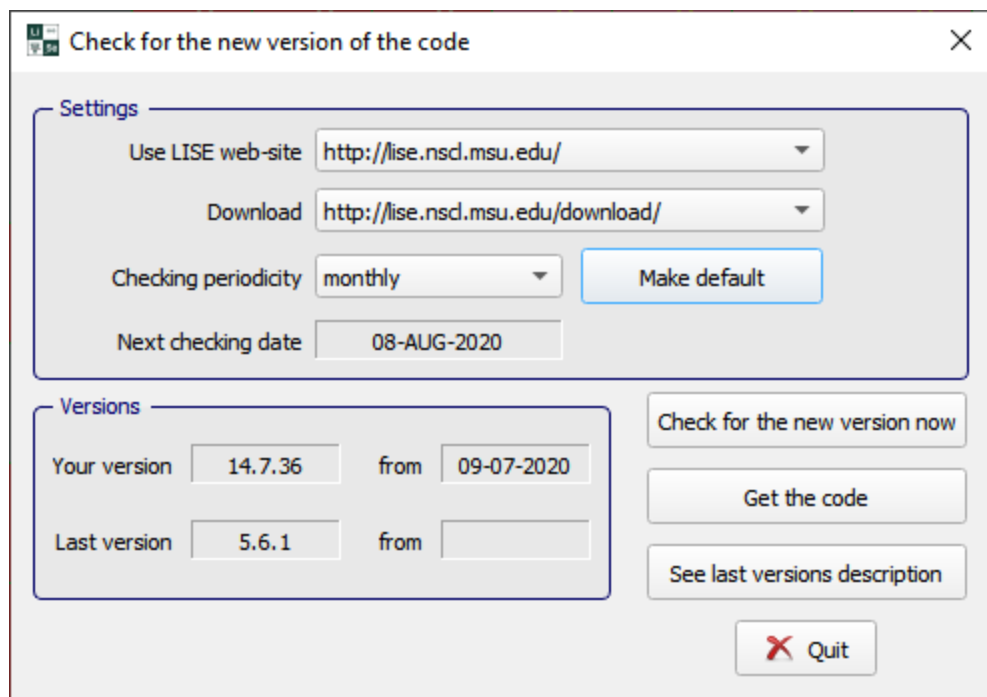
Y.S.Tsai, Rev.Mod.Phys. 46 (1974) 815 65.19 g/cm²

O.I.Dahl, private communication 65 g/cm²

Quit

```
//-----
// 14.7.36 07/09/20
// d_Options/d_NewVersion dialog      : DONE! (no http-link)
// d_Uilities/d_Range_optimizer dialog : DONE!
```

```
// L_Init/L_Date.cpp implemented from Borland : conversion completed 100%
// L_Init/L_Init_options.cpp : completed from 70 -> 80 %
// w_spectrometer_scheme      : 80%
```



07/02

1	Directory	Subdirectory	Dialog	re-Design, %	Link, %	DONE	Plots total	Plots done	Bench-mark	Comments	date	size	size done	
218	w_Stuff		d_Transmission_statistics	100	100	1	0				05/28/20	60991	60991	
219	w_Stuff		d_Value_input	100	100	1					04/15/20	3401	3401	
220	w_Stuff		w_Gauge	100	100	1					03/31/20	5122	5122	
221														
222		total		219	sum	150	68.5%					5.12E+06	3.83E+06	74.6%
223		procent			completely done	123	56.2%							

07/09

1	Directory	Subdirectory	Dialog	re-Design, %	Link, %	DONE	Plots total	Plots done	Bench-mark	Comments	date	size	size done	
219	w_Stuff		d_Transmission_statistics	100	100	1	0				05/28/20	60991	60991	
220	w_Stuff		d_Value_input	100	100	1					04/15/20	3401	3401	
221	w_Stuff		w_Gauge	100	100	1					03/31/20	5122	5122	
222														
223		total		220	sum	158	71.8%					5.14E+06	3.93E+06	76.5%
224		procent			completely done	133	60.5%							

