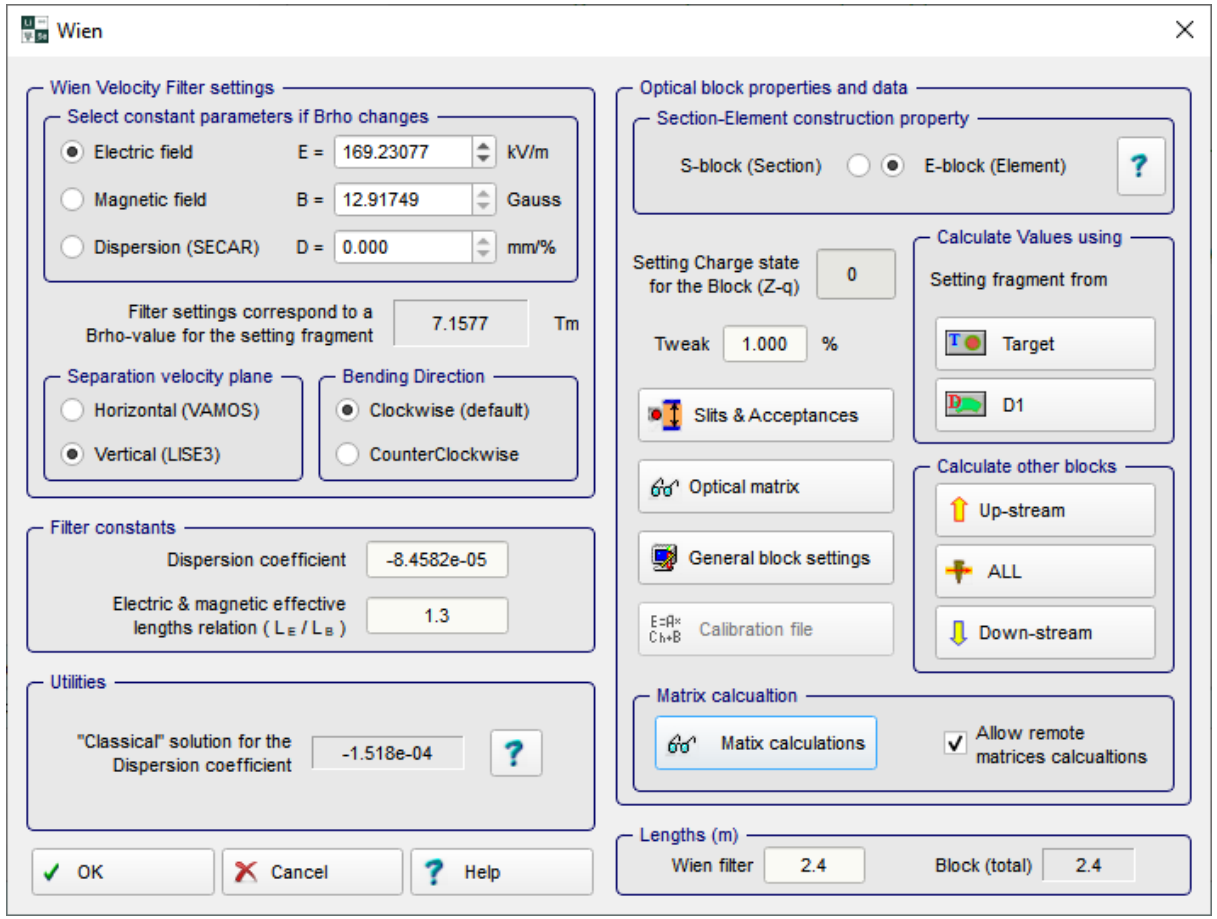
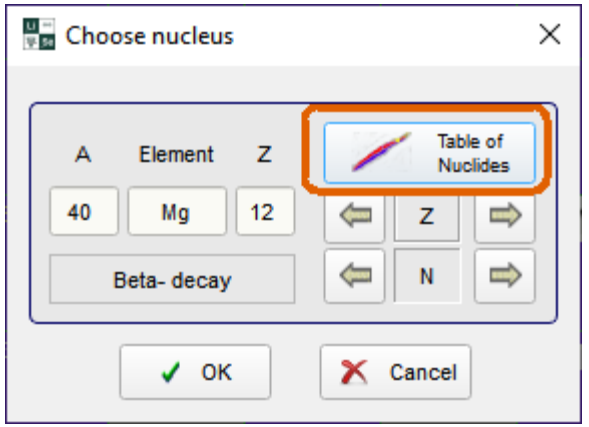
LISE cute status 08/29 - 09/04

```
//-------------------------------------------------------------------------
// 14.12.8   29/08/20
// moving all d_CN*_base dialogs to directory d_CN/d_CN_base/
// revision of all Choose Nucleus (CN) dialogs regarding to TableNuclides button mode : 10%

// d_Wien dialog   : redesign  100%, connection 80%
```



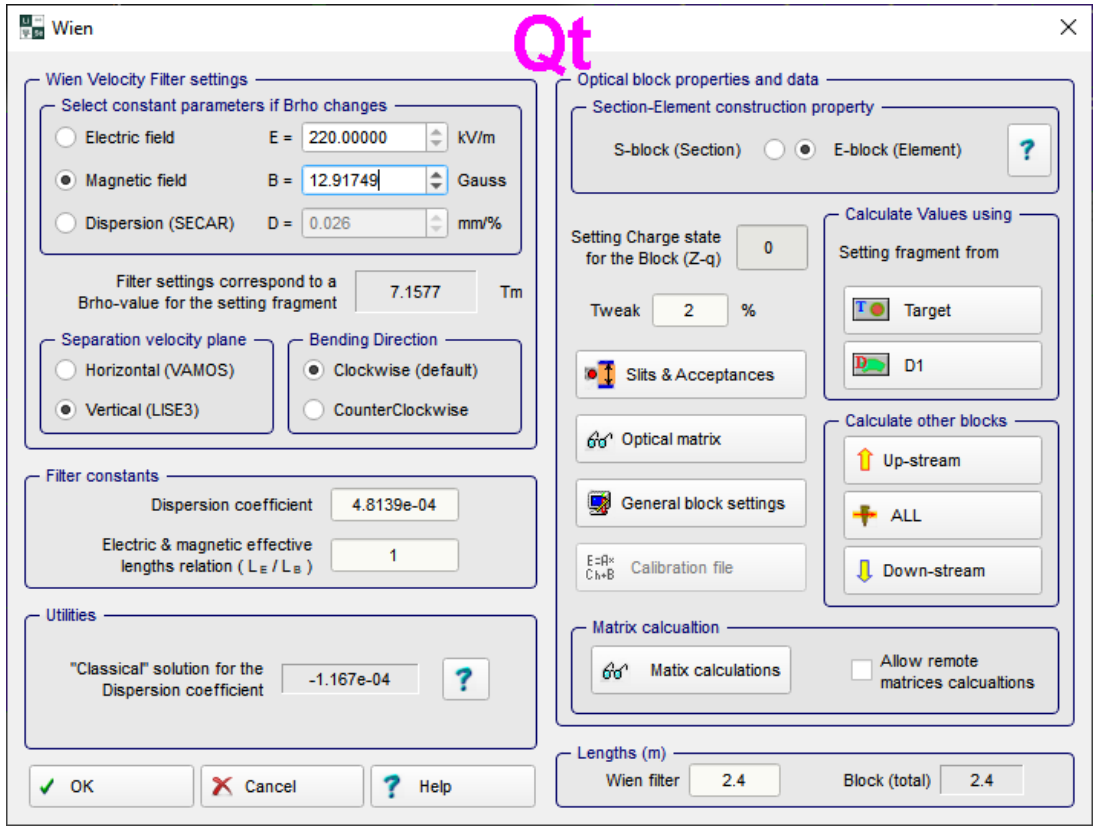


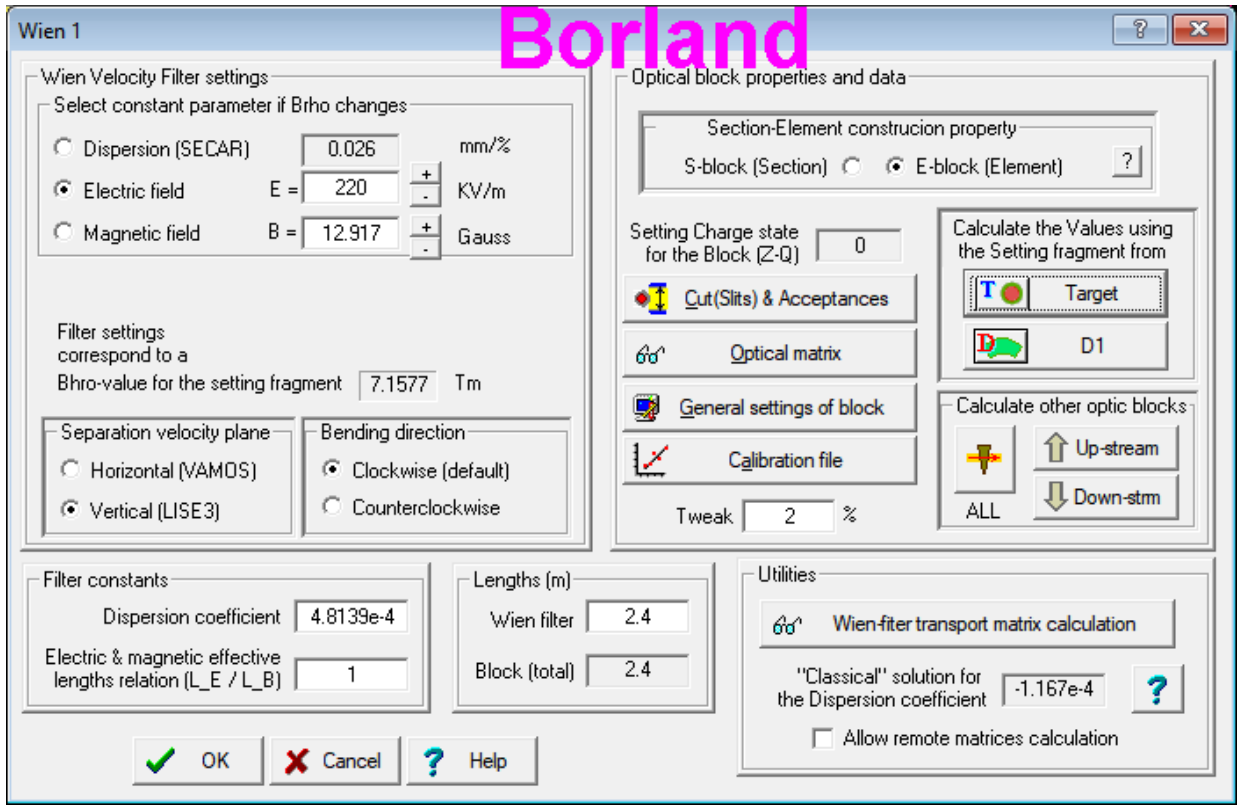
//--

// 14.12.9 30/08/20

// revision of all Choose Nuclues (CN) dialogs regarding to TableNuclides button mode : 30%

// d_Wien dialog : DONE!





LISE cute status 08/31

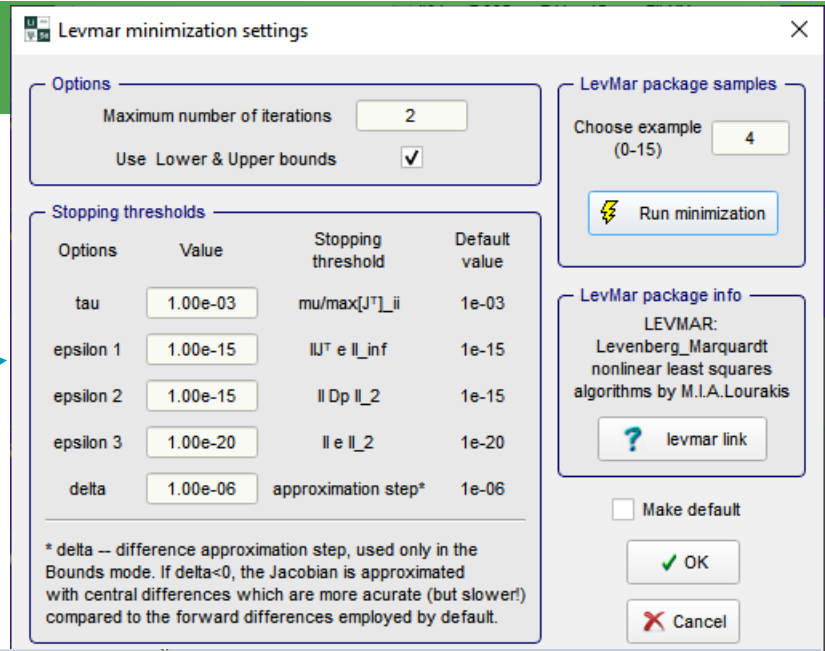
//--

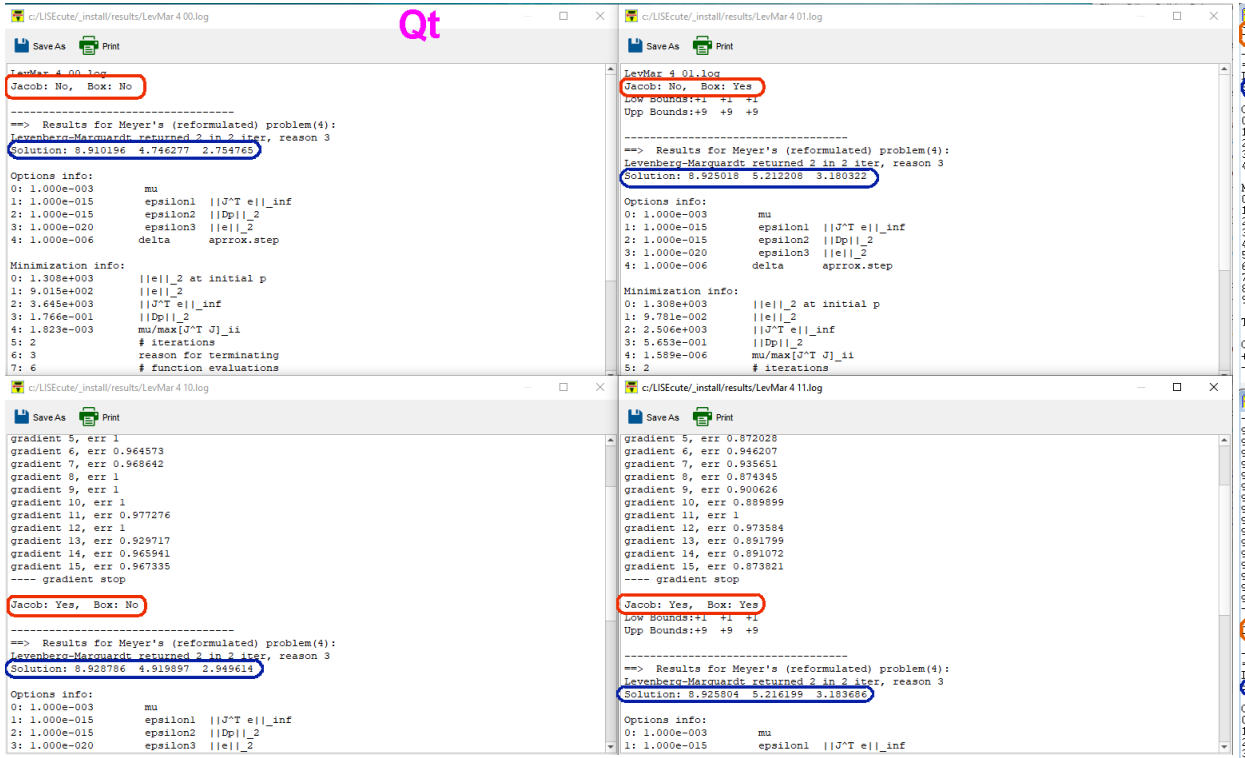
// 14.12.10 31/08/20

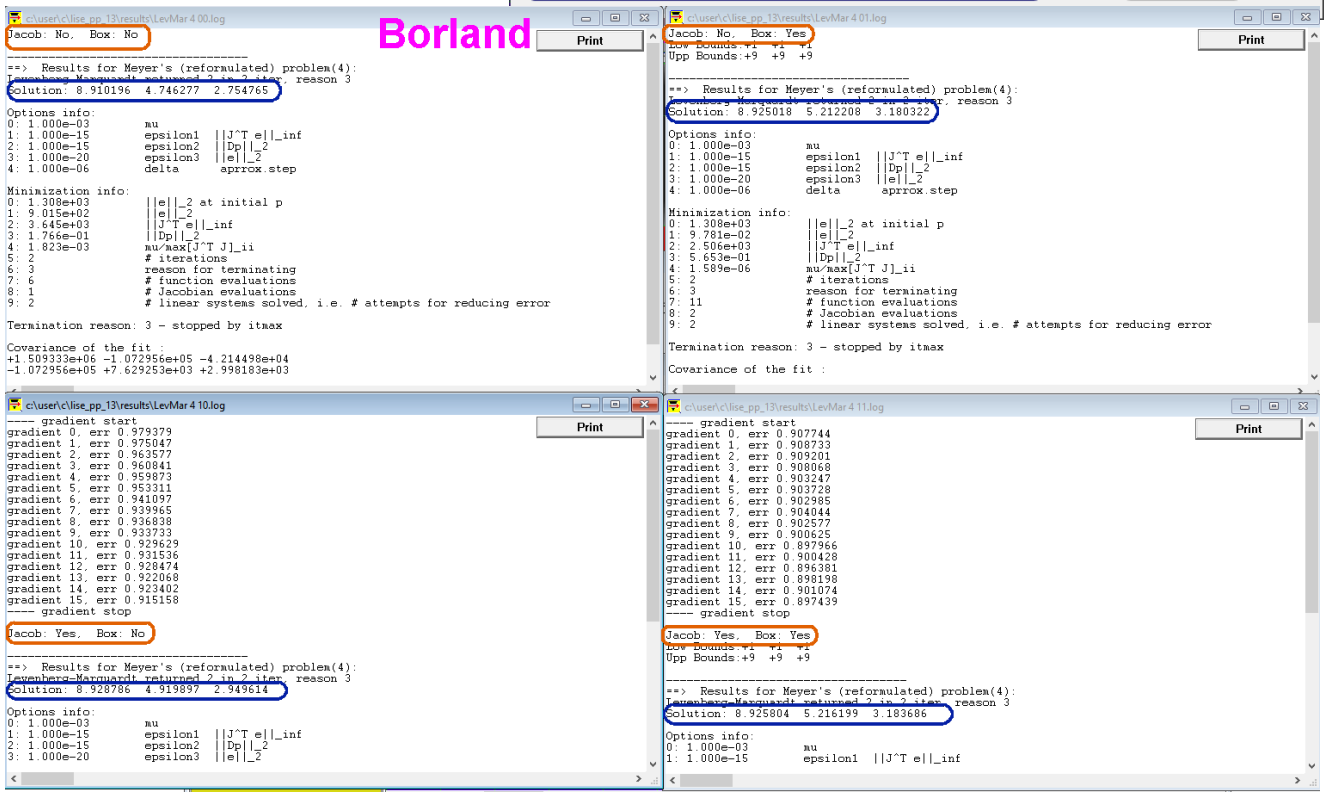
// revision of all Choose Nuclues (CN) dialogs regarding to TableNuclides button mode : 35%

// Borland Levmar package finally has been implemented in LISEcute : 100%

// d_Optics_fitSet dialog : DONE!

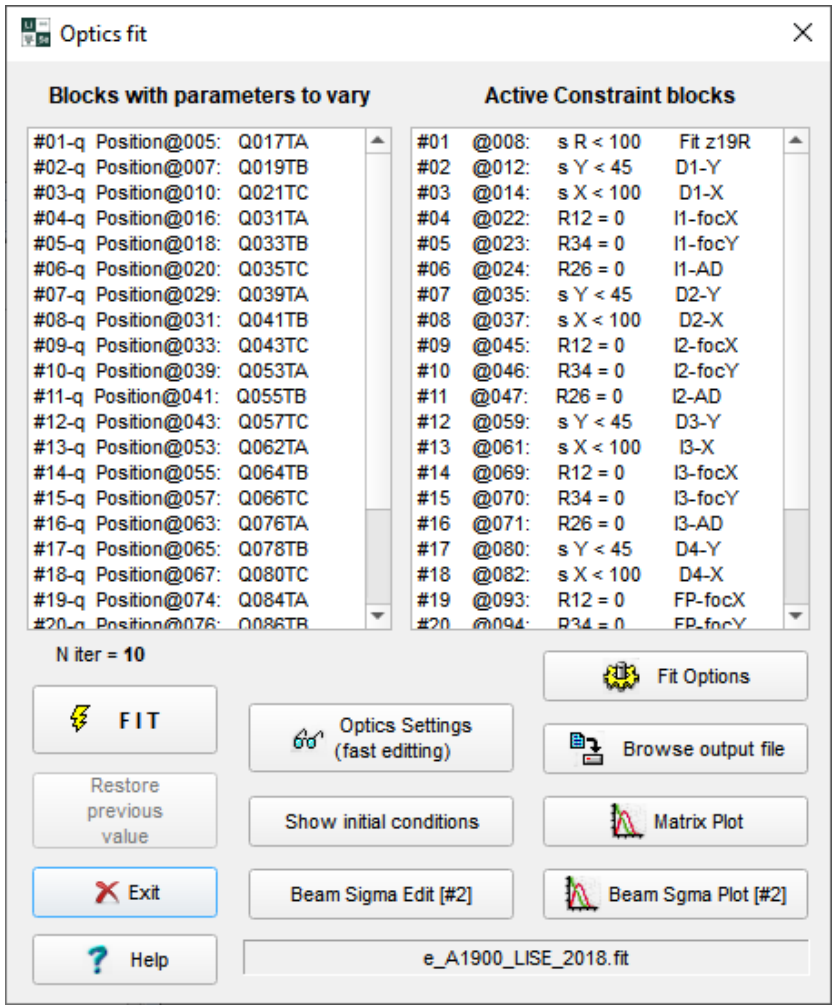






LISE cute status 09/01

```
//-------------------------------------------------------------------------
// 14.12.11   01/09/20
// d_Optics_fit dialog      : DONE!
// d_Data_fitMinimization   : redesign 100%, connection 75%
```



c:/LISEcute/_install/results/e_A1900_LISE_2018.fit

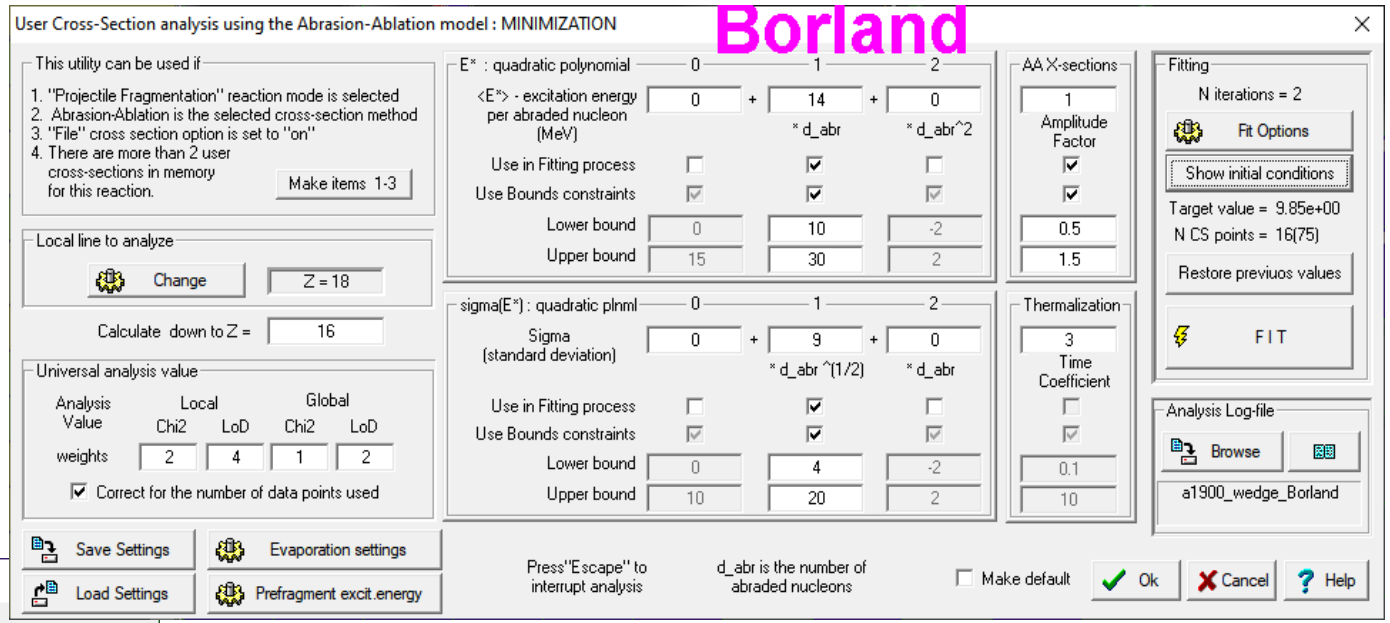
Save As Print

```
chi2: Initial  0.0118576  and Final 0.00170461  LISE fit reduced values
chi1: Initial   0.501378  and Final 0.0373305  LISE fit reduced values

Parameters:          LeftBound      Initial        RightBound   |  Final
#01-q: Q017TA       -1.0e+099  <  +1.048e+001  <  +1.0e+099   | +1.047e+001
#02-q: Q019TB       -2.0e+001  <  -9.768e+000  <  +0.0e+000   | -9.769e+000
#03-q: Q021TC       +0.0e+000  <  +7.057e+000  <  +2.0e+001   | +7.060e+000
#04-q: Q031TA       +0.0e+000  <  +8.590e+000  <  +2.0e+001   | +8.589e+000
#05-q: Q033TB       -2.0e+001  <  -1.058e+001  <  +0.0e+000   | -1.058e+001
#06-q: Q035TC       +0.0e+000  <  +9.304e+000  <  +2.0e+001   | +9.303e+000
#07-q: Q039TA       -1.0e+099  <  +9.320e+000  <  +1.0e+099   | +9.320e+000
#08-q: Q041TB       -2.0e+001  <  -1.045e+001  <  +0.0e+000   | -1.045e+001
#09-q: Q043TC       +0.0e+000  <  +8.573e+000  <  +2.0e+001   | +8.573e+000
#10-q: Q053TA       +0.0e+000  <  +8.009e+000  <  +2.0e+001   | +8.009e+000
#11-q: Q055TB       -2.0e+001  <  -1.063e+001  <  +0.0e+000   | -1.063e+001
#12-q: Q057TC       +0.0e+000  <  +9.655e+000  <  +1.0e+001   | +9.655e+000
#13-q: Q062TA       +0.0e+000  <  +9.661e+000  <  +2.0e+001   | +9.661e+000
#14-q: Q064TB       -2.0e+001  <  -1.064e+001  <  +0.0e+000   | -1.064e+001
#15-q: Q066TC       +0.0e+000  <  +8.009e+000  <  +2.0e+001   | +8.009e+000
#16-q: Q076TA       +0.0e+000  <  +8.573e+000  <  +2.0e+001   | +8.573e+000
#17-q: Q078TB       -2.0e+001  <  -1.044e+001  <  +0.0e+000   | -1.044e+001
#18-q: Q080TC       +0.0e+000  <  +9.310e+000  <  +2.0e+001   | +9.310e+000
#19-q: Q084TA       +0.0e+000  <  +9.122e+000  <  +2.0e+001   | +9.122e+000
#20-q: Q086TB       -2.0e+001  <  -1.013e+001  <  +0.0e+000   | -1.013e+001
#21-q: Q088TC       +0.0e+000  <  +8.261e+000  <  +2.0e+001   | +8.261e+000
#22-q: Q098TA       +0.0e+000  <  +7.670e+000  <  +2.0e+001   | +7.670e+000
#23-q: Q100TB       -2.0e+001  <  -8.789e+000  <  +0.0e+000   | -8.789e+000
#24-q: Q102TC       +0.0e+000  <  +4.213e+000  <  +1.0e+001   | +4.213e+000

-------------------------------------------------------------------------------

Constraint values:    Initial       Final       Precision   (Fin-Des)/P |    Desired
#01: Fit z19R       +9.749e+001   +9.748e+001     1.0e-001 +8.054e-004|  < 100
#02: D1-Y           +3.983e+001   +3.979e+001     1.0e-001 +5.459e-005|  < 45
#03: D1-X           +7.136e+001   +7.141e+001     1.0e-001  0          |  < 100
#04: I1-focX        -9.199e-006   -5.261e-007     1.0e-004 +5.261e-003|  = 0
#05: I1-focY        -8.766e-005   -8.921e-005     1.0e-002 +8.921e-003|  = 0
#06: I1-AD          -7.583e-005   -9.766e-007     1.0e+000 +9.766e-007|  = 0
#07: D2-Y           +3.093e+001   +3.099e+001     1.0e+000  0          |  < 45
#08: D2-X           +7.795e+001   +7.799e+001     1.0e+000  0          |  < 100
#09: I2-focX        +3.369e-006   +1.124e-007     1.0e-003 +1.124e-004|  = 0
#10: I2-focY        -1.004e-004   -1.037e-004     1.0e-002 +1.037e-002|  = 0
#11: I2-AD          -1.839e-005   -2.014e-006     1.0e-001 +2.014e-005|  = 0
#12: D3-Y           +3.033e+001   +3.038e+001     1.0e+000  0          |  < 45
#13: I3-X           +7.025e+001   +7.030e+001     1.0e-001  0          |  < 100
#14: I3-focX        -3.677e-006   -1.694e-007     1.0e+000 +1.694e-007|  = 0
#15: I3-focY        -8.288e-005   -9.322e-005     1.0e-002 +9.322e-003|  = 0
#16: I3-AD          -2.497e-005   +1.122e-006     1.0e-002 +1.122e-004|  = 0
#17: D4-Y           +3.718e+001   +3.724e+001     1.0e+000 +4.260e-007|  < 45
#18: D4-X           +7.006e+001   +7.012e+001     1.0e+000  0          |  < 100
#19: FP-focX        -4.300e-006   +3.913e-007     1.0e-003 +3.913e-004|  = 0
#20: FP-focY        -1.627e-004   -2.108e-004     5.0e-001 +4.217e-004|  = 0
```

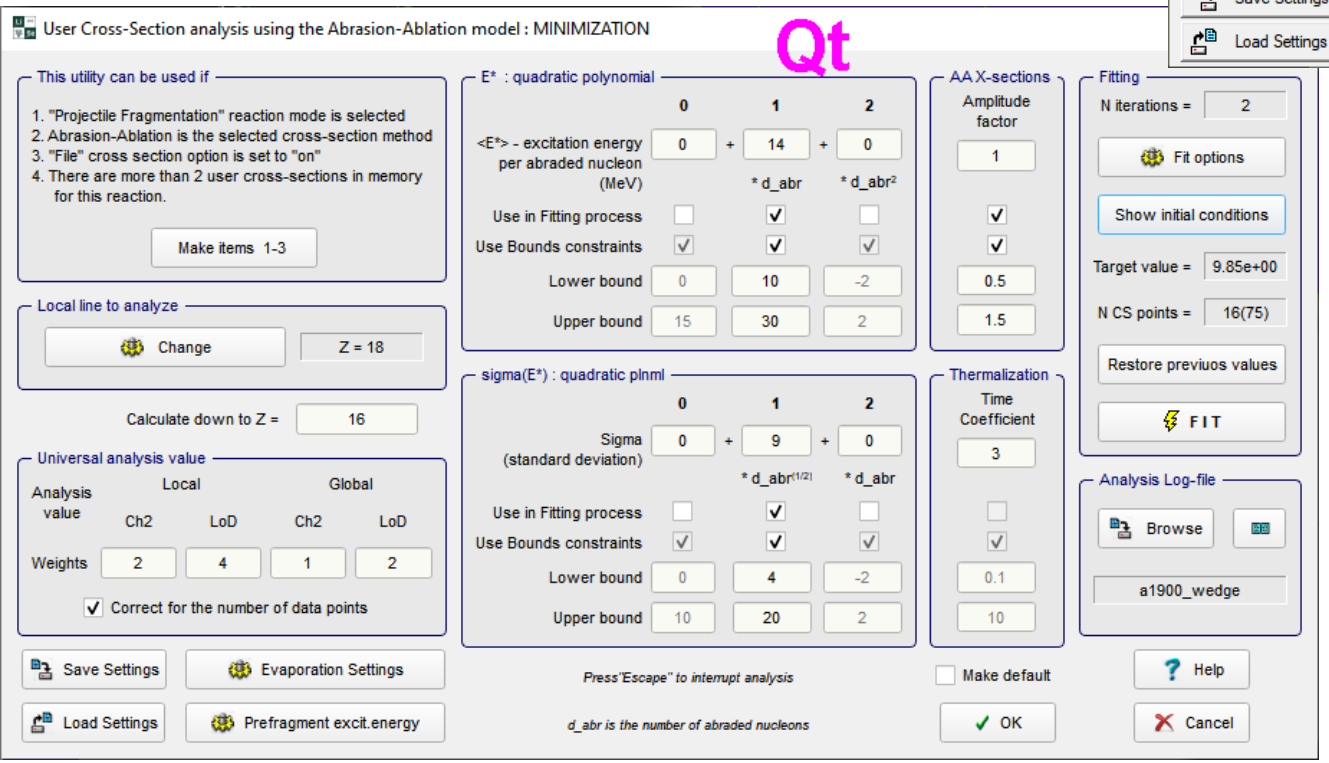
LISE cute status 09/02 (a)

```
//-------------------------------------------------------------------------------
// 14.12.12   09/02/20
// Revision: Bunch of different changes by Ksenia (~30 files)
// correction in d_Range_optimizer because of crash

// Implementation files  c_Graph2.*, c_Graph_cm, c_Graph_tool
// c_Plot_util, c_Plot_2, c_Plot_rgd, c_Plot_spectr
// from Borland to Qt

// d_Data_fitMinimization   : DONE!
```

Borland



Qt



LISE cute status 09/02 (b)

```
//-------------------------------------------------------------------------
// 14.12.12   09/02/20
// Revision: Bunch of different changes by Ksenia (~30 files)
// correction in d_Range_optimizer because of crash

// Implementation files  c_Graph2.*, c_Graph_cm, c_Graph_tool
// c_Plot_util, c_Plot_2, c_Plot_rgd, c_Plot_spectr
// from Borland to Qt

// d_Data_fitMinimization   : DONE!
```

Borland

c:\program files (x86)\lise\results\a1900_wedge_Borland.mfit

Print

```
48Ca (240.0 MeV/u)  +  C; ****  Local line Z = 18; Last Z=16
NP=32; SE:"DB0+Cal2" Density:"auto" GeomCor:"On" Tunlg:"auto" FisBar=#1  BarFac=1.00  Modes=1010 100
No Intrin.Thermalztn; LimitTemp: No
-------------------------------------------------------------------------------

N => Local: init=16, final=16;   Total: init=75, final=75

TARGET VALUEs: Initial    9.85469  and Final   5.56211  LISE++ reduced values

Parameters:          LeftBound      Initial       RightBound |  Final
1. Energy #a1        +1.0e+01  <  +1.4000e+01  <  +3.0e+01   | +1.2324e+01
2.  Sigma #a1        +4.0e+00  <  +9.0000e+00  <  +2.0e+01   | +1.1097e+01
3. AA CS-factor      +2.0e-01  <  +1.0000e+00  <  +1.5e+00   | +4.6505e-01

-------------------------------------------------------------------------------

Final Excitation Energy Parameters
Energy (a0,a1,a2) : +0.0000e+00         +1.2324e+01         +0.0000e+00
Sigma  (a0,a1,a2) : +0.0000e+00         +1.1097e+01         +0.0000e+00
AA CS-factor:       +4.6505e-01
-------------------------------------------------------------------------------


Chi-name             Coef       ChiBoxI    ChiBox     Chi_calc
chi2_local           2.0        2.104      0.949      1.897
LogDif_local         4.0        0.507      0.428      1.712
chi2_total           1.0        2.559      1.111      1.111
LogDif_total         2.0        0.530      0.421      0.843

-------------------------------------------------------------------------------


Levenberg-Marquardt returned 10.0 in 10 iter, reason 3
Termination reason: 3 - stopped by itmax


Minimization info:
0: 2.949e+01         ||e||_2 at initial p
1: 8.473e+00         ||e||_2
2: 3.246e+00         ||J^T e||_inf
3: 1.237e+00         ||Dp||_2
4: 1.274e-02         mu/max[J^T J]_ii
5: 10                # iterations
6: 3                 reason for terminating
7: 62                # function evaluations
8: 10                # Jacobian evaluations
9: 10                # linear systems solved, i.e. # attempts for reducing error

-------------------------------------------------------------------------------
```

c:/LISEcute/_install/results/a1900_wedge.mfit

Save As Print

Qt

```
48Ca (240.0 MeV/u)  +  C; ****  Local line Z = 18; Last Z=16
NP=32; SE:"DB0+Cal2" Density:"auto" GeomCor:"On" Tunlg:"auto" $Fis$Bar=#1  Bar$Fac$=1.00
Modes=$1010 1000 110$
No Intrin.Thermalztn; LimitTemp: No
-------------------------------------------------------------------------------

N => Local: init=16, final=16;   Total: init=75, final=75

TARGET VALUEs: Initial    9.85469  and Final   5.76225  LISE++ reduced values

Parameters:          LeftBound      Initial       RightBound |  Final
1. Energy #a1        +1.0e+001  <  +1.4000e+001  <  +3.0e+001   | +1.1966e+001
2.  Sigma #a1        +4.0e+000  <  +9.0000e+000  <  +2.0e+001   | +9.1404e+000
3. AA CS-factor      +2.0e-001  <  +1.0000e+000  <  +1.5e+000   | +5.8923e-001

-------------------------------------------------------------------------------

Final Excitation Energy Parameters
Energy (a0,a1,a2) : +0.0000e+000        +1.1966e+001        +0.0000e+000
Sigma  (a0,a1,a2) : +0.0000e+000        +9.1404e+000        +0.0000e+000
AA CS-factor:       +5.8923e-001
-------------------------------------------------------------------------------


Chi-name             Coef       ChiBoxI    ChiBox     Chi_calc
chi2_local           2.0        2.104      0.867      1.734
LogDif_local         4.0        0.507      0.456      1.826
chi2_total           1.0        2.559      1.322      1.322
LogDif_total         2.0        0.530      0.440      0.880

-------------------------------------------------------------------------------


Termination reason: USER BREAK after 425 evaluations!

Settings at Target Value minimum: evaluation 119, iteration 2


Minimization info:
0: 2.949e+001        ||e||_2 at initial p
1: 8.863e+000        ||e||_2
2: 2.276e+000        ||J^T e||_inf
3: 0.000e+000        ||Dp||_2
4: 9.504e-004        mu/max[J^T J]_ii
5: 10                # iterations
6: 3                 reason for terminating
7: 1757              # function evaluations
```

LISE cute status 09/03

//--
// 14.12.13 09/03/20

// correction of files (Icons, numberKillZero, and so on)

// Update of c_Plot*.* files to Qt

// Implementation of files w_Graph.*, w_Graph_block.*, w_Graph_block2.*
// from Borland to Qt

// d_About : redesign 100%, connection 30%

LISE cute status 09/04

```
//---------------------------------------------------------------------------
// 14.12.14   09/04/20
// d_Fission_barrier : 2 plots connected!

// Implementation of files  w_Graph_charges.cpp,
// w_Graph_E, w_Graph_second, w_Graph_gamma
// from Borland to Qt
```

57 files contains 114 Graphs (Plots)
(some of them even contains 3 and 4 graphs per file)

1 file (2 plots) have been connected to the Graph library

LISE dialogs porting status

09/04

	Directory	Subdirectory	Dialog	re-Design, %	Link, %	DONE	Plots total	Plots done	Bench-mark	CN_base/ method	base work?	Choose initial nucleus	choose IN/ works?	Borland base	Borland choose nucleus	Comments	date	size	size done	
210	w_Stuff		d_FRIB_isotopes	100	100	1	0			N/A							03/31/20	3078	3078	
211	w_Stuff		d_Password	100	100	1	0			N/A							03/31/20	2234	2234	
212	w_Stuff		d_Transmission_statistics	100	100	1	0			0T - show	Yes		No	1-create	1-create		05/28/20	60991	60991	
213	w_Stuff		d_Value_input	100	100	1				N/A							04/15/20	3401	3401	
214	w_Stuff		w_Gauge	100	100	1				N/A							03/31/20	5122	5122	
215																				
216		total		213		sum	212	99.3%										4.85E+06	4.82E+06	99.3%
217		procent			completely done		210	98.6%												

08/28

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1		Directory	Subdirectory	Dialog	re-Design, %	Link, %	DONE	Plots total	Plots done	Bench-mark		Comments		date	size	size done	
212		w_Stuff		d_Transmission_statistics	100	100	1	0						05/28/20	60991	60991	
213		w_Stuff		d_Value_input	100	100	1							04/15/20	3401	3401	
214		w_Stuff		w_Gauge	100	100	1							03/31/20	5122	5122	
215																	
216			total		213		sum	210	98.5%						4.85E+06	4.77E+06	98.3%
217			procent			completely done		206	96.7%								

6 dialogs have been completed for this period, 3 dialogs are still left

LISE dialogs (non yet completed)

Directory	Dialog	re-Design, %	Link, %	DONE
w_Stuff	d_About	80	30	0.3
d_Options	d_Secondary_targetStatistics	100	50	0.5
w_Bi	d_BI	100	80	0.8

Next week

Connection files to the LISE^{++} Graph Library

Oleg partially on the next week: participation in the NSCL experiment and RIKEN workshop

Example of connection (d_Fission_barrier)

```
//WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
void TFissionBarrierDlg::CmPlotL()
{
if(!PermitFlag)return;

char str[200];

#define n_draw  2

double xmax=qMax(Lbfis1,SELMAX)+10;
int ixmax = int(xmax+0.5);
double y1max=0, y2max=0;
int Vanish1=0;

//======================================================================
distribution *result1[2];
distribution *result2[2];
char **str_legend=new char*[n_draw];
double *factor=new double[n_draw];


TGraph* graph = new TGraph(this, 1);
graph->show();

sprintf(str,"%s fission barrier properties", Ce->name(10));
graph->set_title(str);
graph->PatienceOn();


for(int i=0; i<n_draw; i++)
   {
   result1[i]=new distribution(0, ixmax, ixmax, "Barrier", "MeV");
   result2[i]=new distribution(0, ixmax, ixmax, "Yrast", "MeV");
   str_legend[i]=new char[50];
   strcpy(str_legend[i], FisBar_name[i]);
   factor[i]=1;
   }
```

```
for(int L=0; L<=ixmax; L++)
 {
   double FisBar0, Yrast0, FBmax0, Yrast1;
   BARFIT(Ce->A(), Ce->Z(), L, FisBar0, Yrast0, FBmax0);
 FisBar0 *= opt->BarFac;
   result1[0]->input_fn(L, FisBar0);

 double FisBar1 = FissionBarrier(Ce, L, opt->BarFac, fb_Cohen, true);
   if(FisBar1<=0 && Vanish1==0) Vanish1=L;
   result1[1]->input_fn(L, FisBar1);

   y1max = qMax(FisBar0, y1max);      y1max=qMax(FisBar1, y1max);

 if(FisBar1>0) Yrast1 = YRAST(Ce->A(), Ce->Z(), L);
   else        Yrast1 = -777;                          //   03/18/2015  v.9.10.44

   if(Yrast0 <= 0) Yrast0 = -777;                          //   03/18/2015  v.9.10.44
   result2[0]->input_fn(L, Yrast0);
   result2[1]->input_fn(L, Yrast1);

   y2max=qMax(Yrast0, y2max);      y2max=qMax(Yrast1, y2max);
 }

//================================================================================


graph->PatienceOff();
graph->CreatePlots(2);


graph->Plots[0]->set_window(0,  1000, 500,0,1, 0, ixmax, 0,y1max+1, false);
graph->Plots[1]->set_window(500,1000,1000,0,1, 0,ixmax, 0,y2max+1, false);

graph->Plots[0]->init_distribution(2, result1, str_legend, factor, true, true,PM_INTER2,false);
graph->Plots[1]->init_distribution(2, result2, str_legend, factor, true, true,PM_INTER2,false);

const char *s1 ="Angular Momentum, hbar";
graph->Plots[0]->set_axis_title(s1, "Fission Barrier, MeV");
graph->Plots[1]->set_axis_title(s1, "Yrast, MeV");

graph->Plots[0]->set_sub_title("Fission Barrier");
graph->Plots[1]->set_sub_title("Yrast Line");
```

```
sprintf(str, "Barfac=%.2f     Corrections [Odd-Even: \"%s\"  Shell: \"%s\"]",opt->BarFac,
            (opt->FisBarOddEvenCorrections == 1 ? "yes" : "no"),
            (opt->FisBarShellCorrections   == 1 ? "yes" : "no"));

graph->textline(str,1);

sprintf(str, "Fission barriers vanish at L=%d (BarFit) & at L=%d (FisRot)",int(SELMAX), Vanish1);
graph->textline(str,2);

//-----------------------------------------------------------------

for(int i=0;i<n_draw;i++)
        { delete result1[i]; delete result2[i]; delete str_legend[i]; }

delete[] str_legend;
delete[] factor;
//=========================================================================
}
```