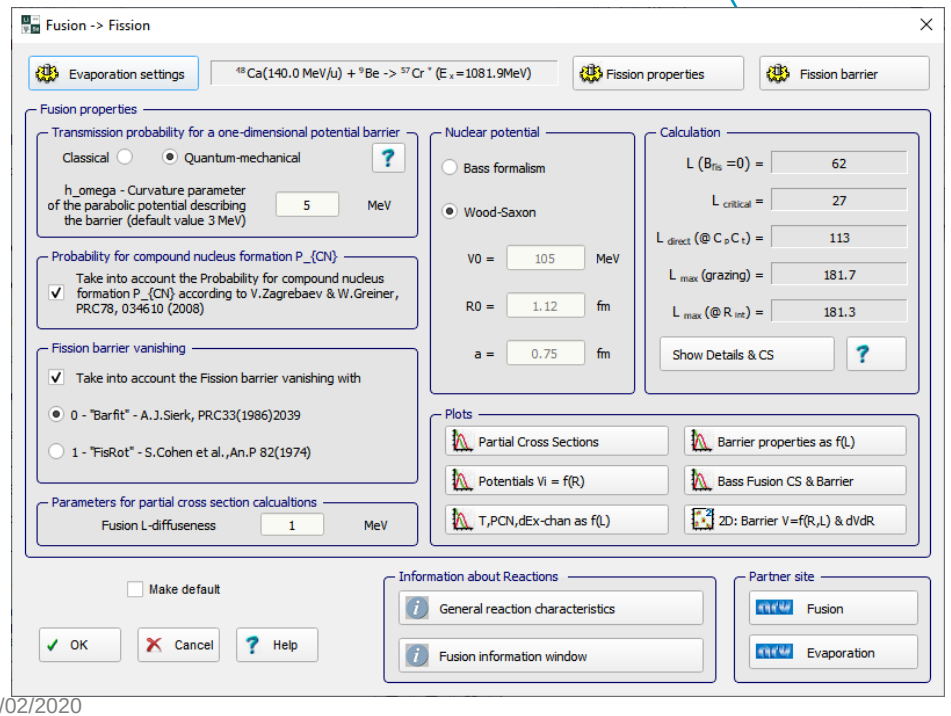
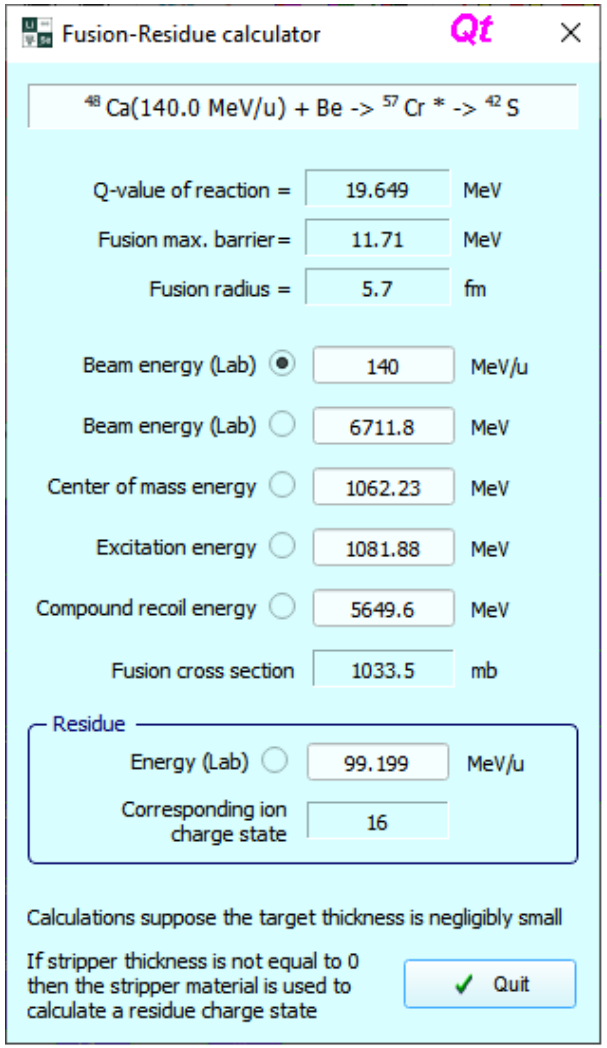
# LISE cute status 05/29-06/03 (6 days)

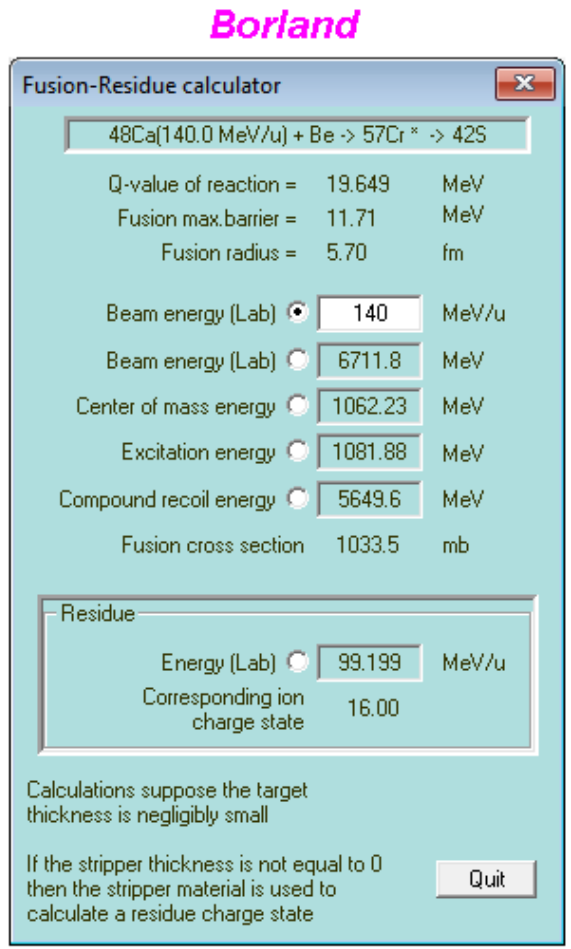
```
//-------------------------------------------------------------------------------
// 14.6.8 05/29/20

// * d_Calculator_fusionResidue     : DONE!
// * d_Mechanism_fusion             : DONE! (except output file)

// -- substituion  QWindow for Qwidget for parent parameter
//     everywhere in the code
// -- revision "o_clas_physics" according to version v.13
// -- revision "o_MC_fission" according to version v.13
// -- revision "o_Cinematique" according to version v.13
// -- revision "o_Reaction" according to version v.13
// -- revision "o_brho_beta" according to version v.13%
```



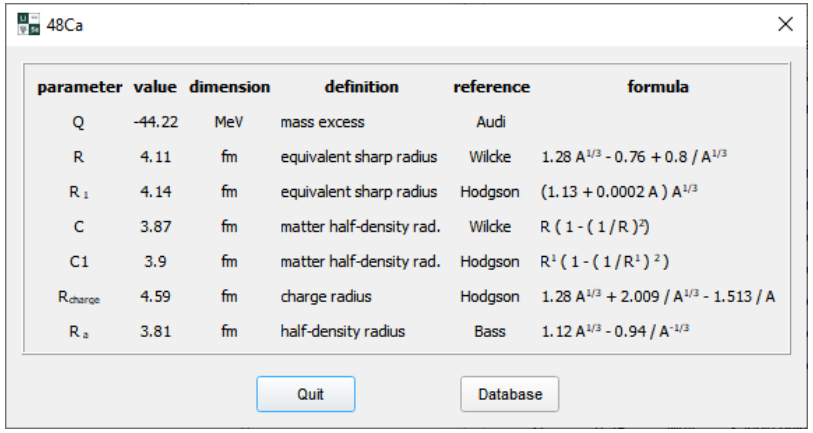



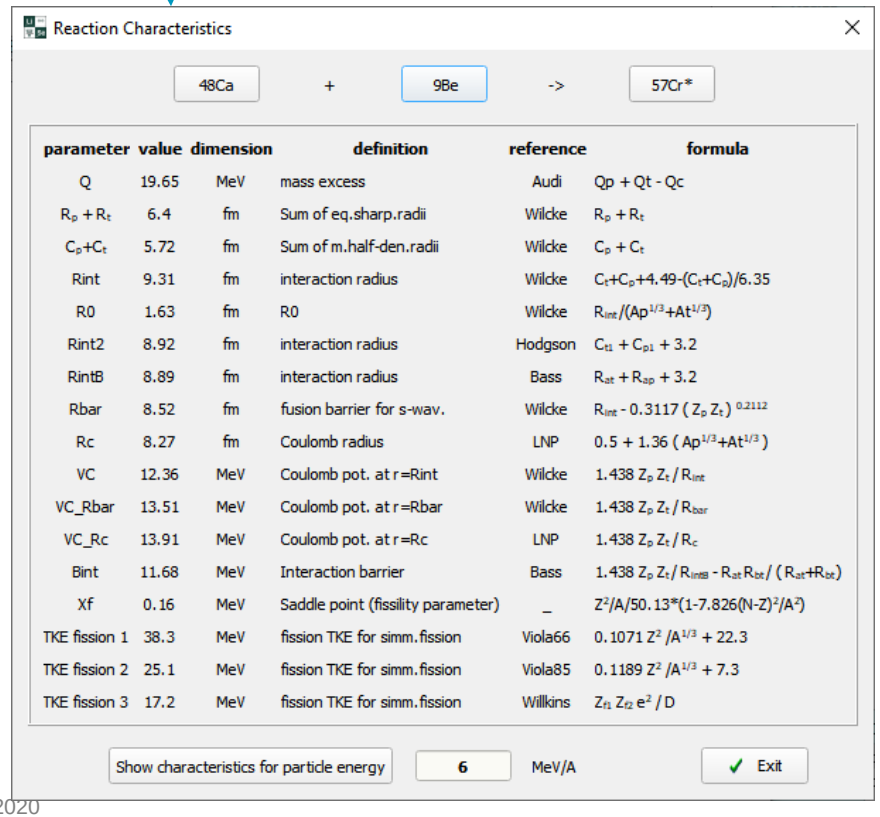



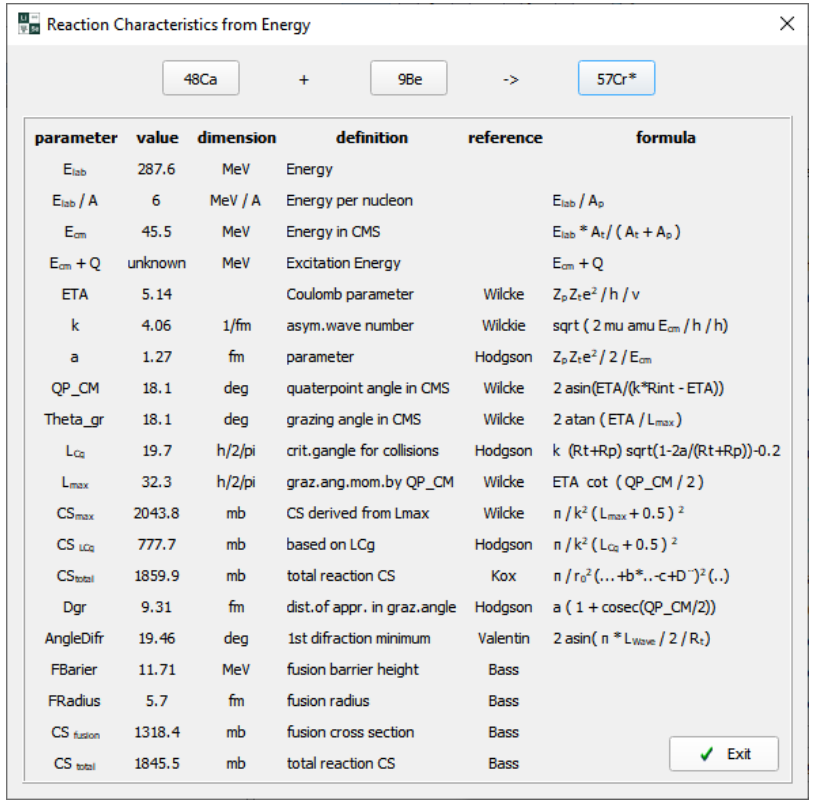
# LISE cute status 05/30 (1)

```
//-----------------------------------------------------------------------------
// 14.6.9 05/30/20
// * d_ReactionCharacter  : DONE!   --> results 100%  correspond to Borland
// * d_Participant        : DONE!   --> results 100%  correspond to Borland
// * d_RCE                : DONE!   --> results 100%  correspond to Borland

// * d_Mechanism_fusion  -- output file in html format: DONE!
// CN0_base & CN0_baseT dialogs should be remade
// in order to exclude their UIs (write forms manually) and join them
```



# LISE cute status 05/30 (2)

```
//-------------------------------------------------------------------------
// 14.6.9 05/30/20
// * d_ReactionCharacter   : DONE!    --> results 100%  correspond to Borland
// * d_Participant         : DONE!    --> results 100%  correspond to Borland
// * d_RCE                 : DONE!    --> results 100%  correspond to Borland

// * d_Mechanism_fusion  -- output file in html format: DONE!
// CN0_base & CN0_baseT dialogs should be remade
// in order to exclude their UIs (write forms manually) and join them
```

file:///C:/LISEcute/_install/results/1.html

Fusion Details

$^{48}$Ca(6.0 MeV/u) + $^{9}$Be -> $^{57}$Cr$^{*}$ ($E_x$=65.2MeV)

$E_{LAB}$ = 287.65 MeV, $E_{CM}$ = 45.52 MeV

**Fusion -> Residues**

***this file in browser***

**Settings**

| | |
|---|---|
| Nuclear Potential | Wood-Saxon |
| WS parameters | 105.0, 1.12, 0.75 |
| $P_{CN}$ (probability of compound formation) | Yes (take into account Quasi-Fission) |
| $P_{CN}$ at L=0 | 1.00e+00 |
| Fission barrier vanishing | Yes (take into account Fast Fission) |
| Transmssion probabilty for a 1-dimensional barrier | Quantum-Mechanical |
| Curvature parameter of the parabolic potential | 5.00 |
| Fusion L-diffuseness | 1.00 |

**Momentum (*h*)**

| | | |
|---|---|---|
| L ($B_{fis}$=0) | 47 | |
| L critical | 42 | ($E_{crit}$=80.2115 MeV) |
| L direct (Geom.AA) | 24.1 | |
| L direct @ CpCt | 31 | used in calculations |
| $L_{max}$ (grazing) | 32.3 | used in calculations |
| $L_{max}$ (LISE @ $R_{int}$) | 32.8 | |

**Cross sections (mb)**

-- Partial (LISE$^{++}$)

| | |
|---|---|
| Interaction | 2.114e+03 |
| Compound | 1.328e+03 |
| Quasi-Fission | 4.580e+02 |
| Direct+QE | 3.285e+02 |

-- Compound 1st step de-excitation channels (LISE$^{++}$)

| | |
|---|---|
| **Fusion-Residue** | 2.150e+01 |
| Fusion-Fission | 1.306e+03 |
| Fusion-Breackup | 0.000e+00 |

-- Cross section used in calculations (beginning of target)

| | |
|---|---|
| Complete Fusion | 1.318e+03 |
| *Use this factor for rates* | 1.01 |

-- Bass cross section calculations

| | | |
|---|---|---|
| Fusion cross section | 1.318e+03 | mb |
| Fusion barrier | 11.71 | MeV |
| Fusion radius | 5.70 | fm |
| Barrier position | 9.10 | fm |

**Distances (fm)**

| | | |
|---|---|---|
| R_interaction (Wilcke) | 9.31 | |
| Cp+Ct (half density radii) | 5.72 | |
| LISE Barrier position(@L=0) | 9.98 | B(L=0)=10.647 MeV |
| Dgr (distance of approach) | 9.31 | |
| a (Ruth.or ETA/k) [fm] | 1.27 | |
| k (wave number) [1/fm] | 4.06 | |

**Grazing Angle (deg)**

| | |
|---|---|
| Center-of-mass system | 18.10 |
| Laboratory system | 2.83 |

**Compound excitation energy (MeV)**

*pay attention : the compound may be do not exist at these momenta*

| | |
|---|---|
| @ L=0 | 65.17 |
| @ L(Bfis=0)=47 | -43.05 |
| @ Lcritical=42 | -21.47 |
| @ Ldirect =31 | 17.58 |
| @ Lmaximum =32.8 | 11.92 |

Fusion Details

Save Print

Fusion Details

***HTML-format***

$^{48}$Ca(6.0 MeV/u) + $^{9}$Be -> $^{57}$Cr$^{*}$ ($E_x$=65.2MeV)

$E_{LAB}$ = 287.65 MeV, $E_{CM}$ = 45.52 MeV

**Fusion -> Residues**

**Settings**

| | |
|---|---|
| Nuclear Potential | Wood-Saxon |
| WS parameters | 105.0, 1.12, 0.75 |
| $P_{CN}$ (probability of compound formation) | Yes (take into account Quasi-Fission) |
| $P_{CN}$ at L=0 | 1.00e+00 |
| Fission barrier vanishing | Yes (take into account Fast Fission) |
| Transmssion probabilty for a 1-dimensional barrier | Quantum-Mechanical |
| Curvature parameter of the parabolic potential | 5.00 |
| Fusion L-diffuseness | 1.00 |

**Momentum (ℏ)**

| | | |
|---|---|---|
| L ($B_{fis}$=0) | 47 | |
| L critical | 42 | ($E_{crit}$=80.2115 MeV) |
| L direct (Geom.AA) | 24.1 | |
| L direct @ CpCt | 31 | used in calculations |
| $L_{max}$ (grazing) | 32.3 | used in calculations |
| $L_{max}$ (LISE @ $R_{int}$) | 32.8 | |

**Cross sections (mb)**

-- Partial (LISE$^{++}$)

| | |
|---|---|
| Interaction | 2.114e+03 |
| Compound | 1.328e+03 |
| Quasi-Fission | 4.580e+02 |
| Direct+QE | 3.285e+02 |

-- Compound 1st step de-excitation channels (LISE$^{++}$)

| | |
|---|---|
| **Fusion-Residue** | 2.150e+01 |
| Fusion-Fission | 1.306e+03 |
| Fusion-Breackup | 0.000e+00 |

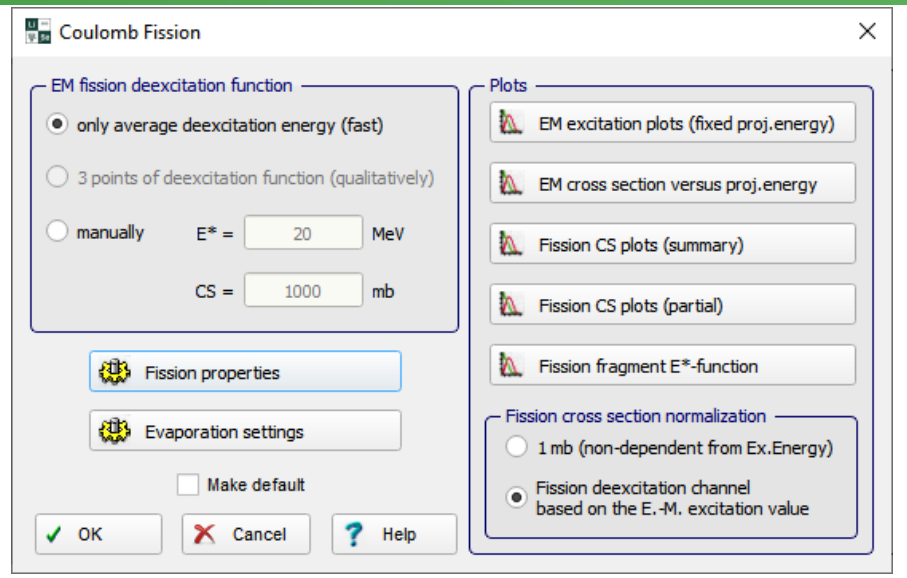
***difference with Borland. it will be investigated tomorrow***

-- Cross section used in calculations (beginning of target)

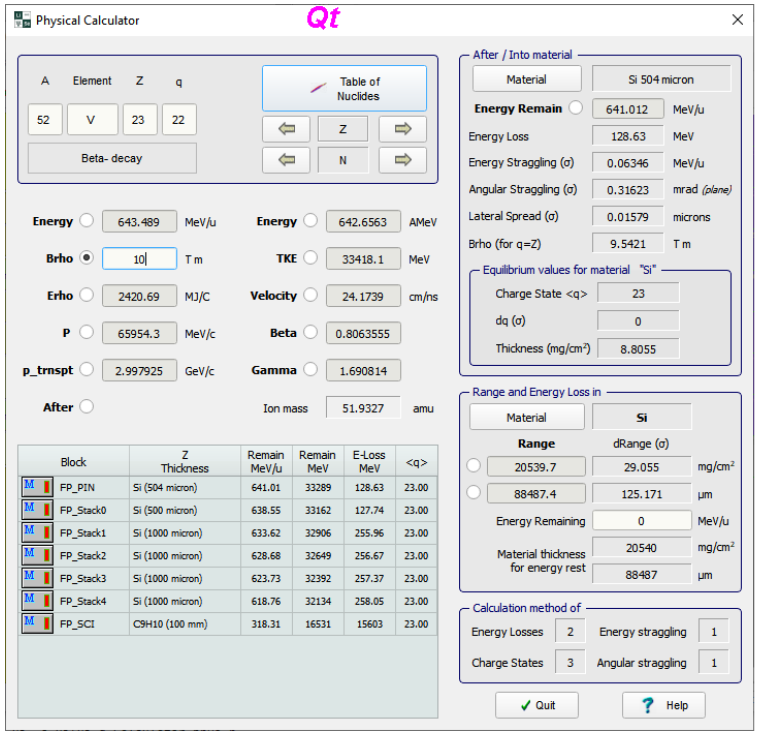
| | |
|---|---|
| Complete Fusion | 1.318e+03 |
| *Use this factor for rates* | 1.01 |

# LISE cute status 05/31

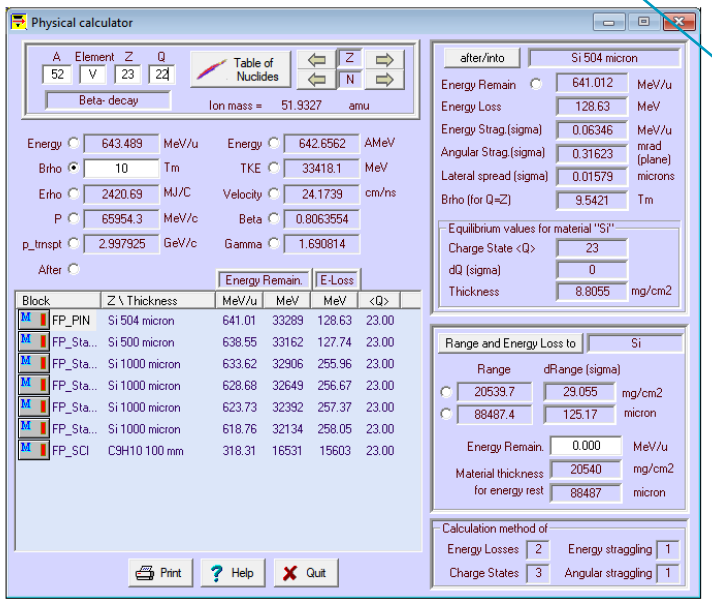
```
//-------------------------------------------------------------------------
// 14.6.10 05/31/20
// * d_Mechanism_coulombFission     : DONE!
// * d_Mechanism_abrasionFission    : redesign 100%, connection 10%
// * d_Calculator_phys              : DONE!  --> results 100%  correspond to Borland
```

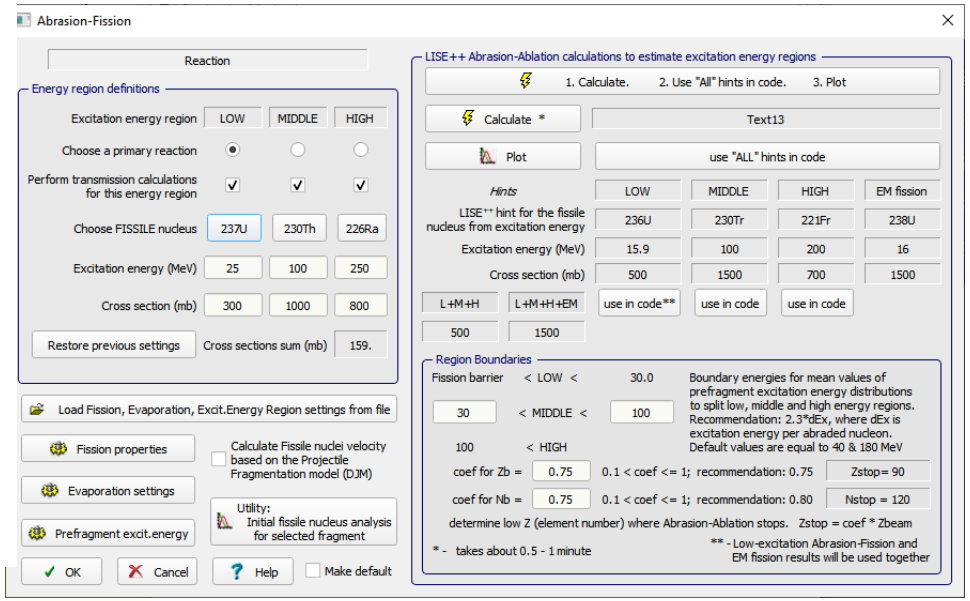



Qt



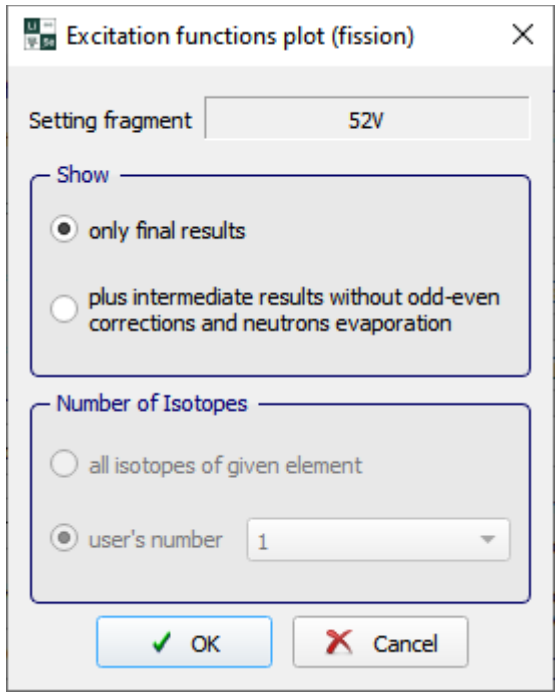

Borland

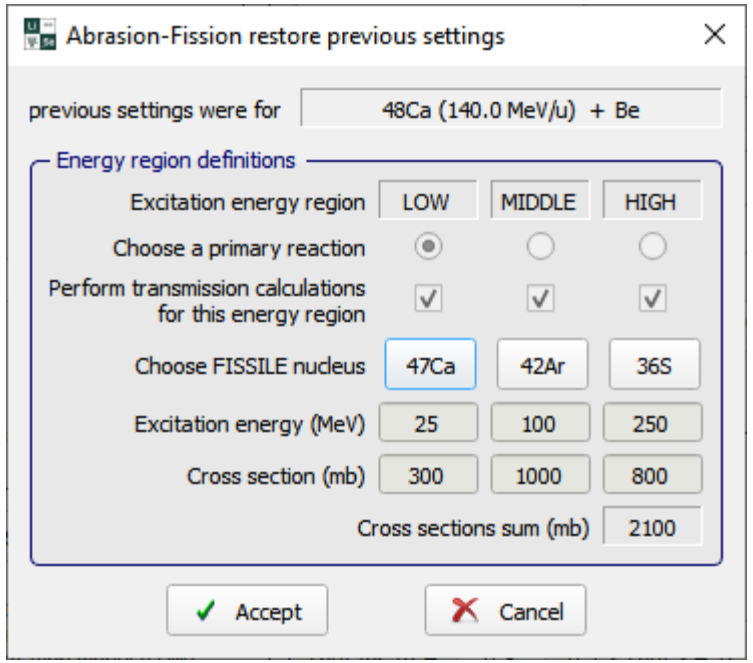


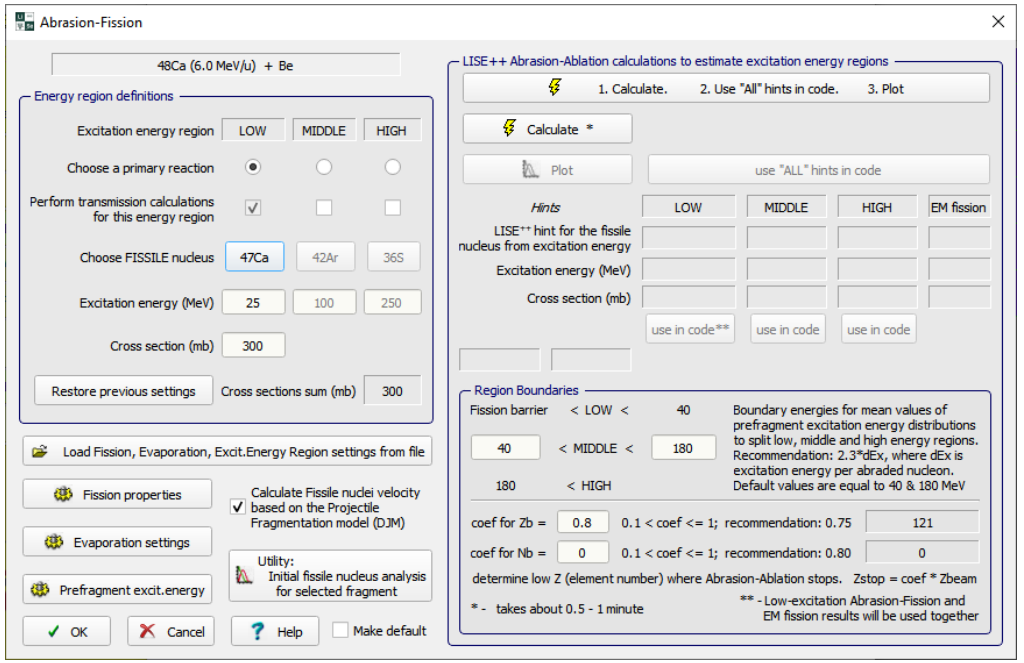



# LISE cute status 06/01

```
//-------------------------------------------------------------------------
// 14.6.11 06/01/20
// * d_Mechanism_abrasionFission        : redesign 100%, connection 50%
// * d_Mechanism_abrasionFissionRestore : redesign 100%, connection 50%
// * d_Number_Isotopes                  : DONE!
```



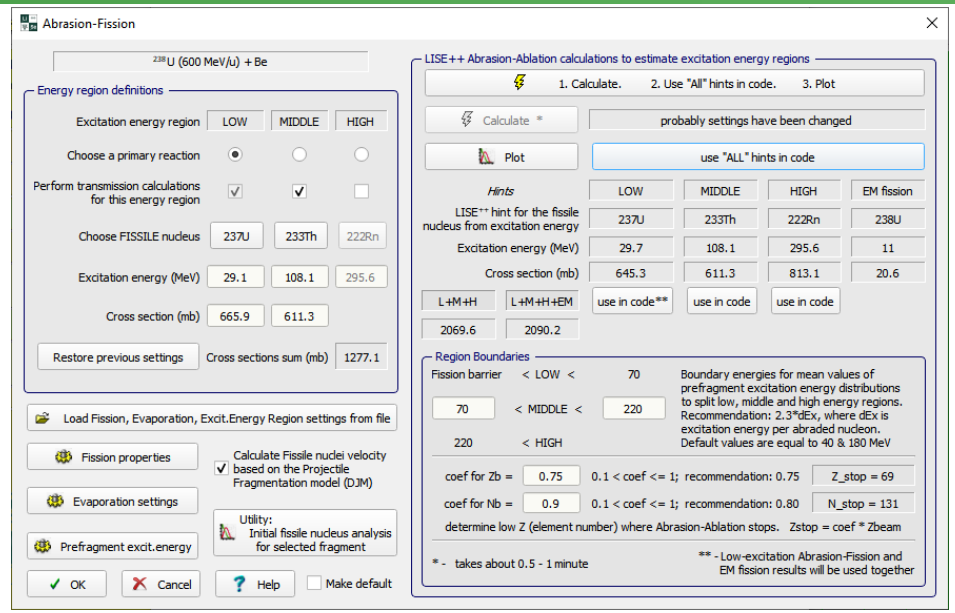



# LISE cute status 06/02

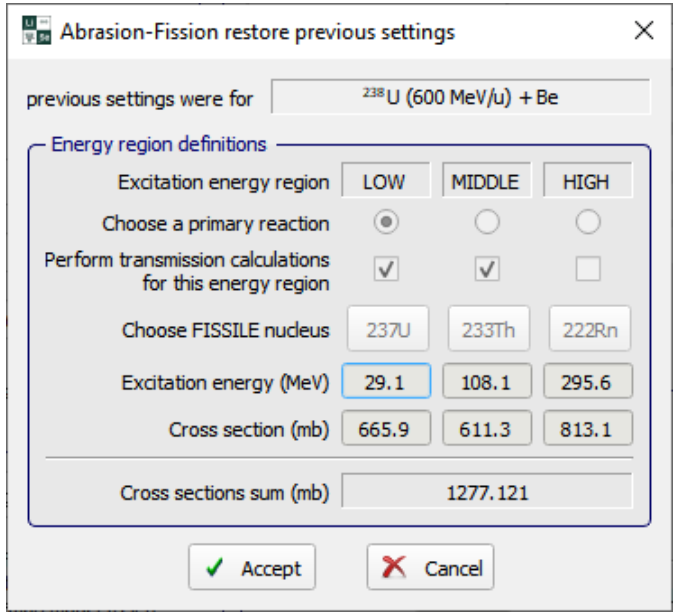
```
/------------------------------------------------------------------------
// 14.6.12 06/02/20
// * d_Mechanism_abrasionFission       : redesign 100%, connection 80%
// * d_Mechanism_abrasionFissionRestore : DONE!

// * dialog names and locations revision

// * creation of excel dialog summary file => tt/dialog_status_v*.xlsx
//   will be use for
//    - the incoming LISE porting presentation,
//    - understanding of current situation (so without plots 55% dialogs done),
//    - and further planning
```




| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Directory | Subdirectory | Dialog | re-Design, % | Link, % | DONE | Plots total | Plots done | Bench-mark | | Comments | | date | size |
| 110 | | d_MC | | d_rays_generator | | | | | | | | | | 03/31/20 | 75930 |
| 111 | | d_Mechanism | | d_AbrasionFission_initFN | | | | | | | | | | 03/31/20 | 36351 |
| 112 | | d_Mechanism | | d_Fragmentation_convolution | 100 | 100 | 1 | 2 | 0 | | | | | 05/21/20 | 57124 |
| 113 | | d_Mechanism | | d_Fragmentation_convolutionPlot | | | | | | | | | | 03/31/20 | 12176 |
| 114 | | d_Mechanism | | d_Fragmentation_friedman | 100 | 100 | 1 | 0 | 0 | | | | | 05/20/20 | 17986 |
| 115 | | d_Mechanism | | d_Fusion_info | 100 | 100 | 1 | 0 | 0 | | | | | 05/28/20 | 32573 |
| 116 | | d_Mechanism | | d_Fusion_plotCS | | | | | | | | | | 03/31/20 | 29393 |
| 117 | | d_Mechanism | | d_Mechanism | 100 | 100 | 1 | 0 | 0 | | | | | 05/21/20 | 94738 |
| 118 | | d_Mechanism | | d_Mechanism_abrasionFission | 100 | 80 | | 2 | 0 | | | | | 05/31/20 | 71642 |
| 119 | | d_Mechanism | | d_Mechanism_abrasionFissionResto | 100 | 100 | 1 | 0 | 0 | | | | | 06/01/20 | 21567 |
| 120 | | d_Mechanism | | d_Mechanism_coulombFission | 100 | 100 | 1 | 5 | 0 | | | | | 05/31/20 | 16704 |
| 121 | | d_Mechanism | | d_Mechanism_fissionProperties | 100 | 100 | 1 | 3 | 0 | | | | | 05/25/20 | 37200 |
| 122 | | d_Mechanism | | d_Mechanism_fragmentation | 100 | 100 | 1 | 2 | 0 | | | | | 05/20/20 | 111114 |
| 123 | | d_Mechanism | | d_Mechanism_fusion | 100 | 100 | 1 | 6 | 0 | | | | | 05/30/20 | 49569 |
| 124 | | d_Mechanism | | d_Suppression_chargeStates | 100 | 100 | 1 | 0 | 0 | | | | | 05/16/20 | 10727 |
| 125 | | d_Mechanism | | d_Suppression_fissionCS | 100 | 100 | 1 | 0 | 0 | | | | | 05/25/20 | 7687 |
| 126 | | d_Options | | d_Comments | | | | | | | | | | 04/06/20 | 2919 |
| 127 | | d_Options | | d_CS_files | 100 | 60 | | 1 | 0 | | | | | 05/04/20 | 28046 |
| 128 | | d_Options | | d_NewVersion | | | | | | | | | | 03/31/20 | 8505 |
| 129 | | d_Options | | d_Options | 100 | 100 | 1 | 1 | 0 | | | | | 04/24/20 | 49272 |

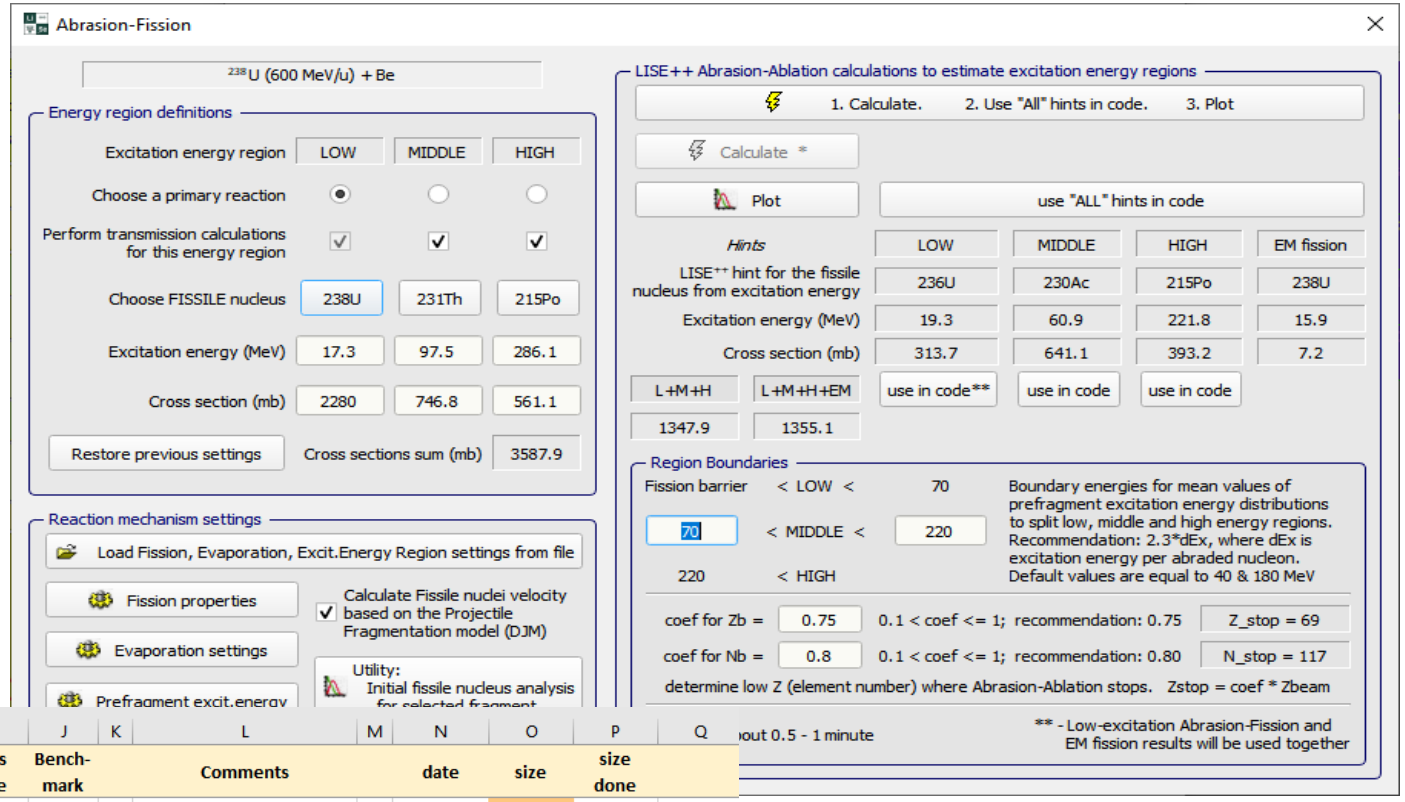


# LISE cute status 06/03

```
//-------------------------------------------------------------------------
// 14.7.1 06/03/20
// * d_Mechanism_abrasionFission        : DONE!

// Revision of early commented lines "Qt-temp"
// Cascade calculations now are agreed between Borland and Qt

// It was last reaction mechanism dialog.
// The Middle version number has been increased
```




summary from excel dialog status file

| | Directory | Subdirectory | Dialog | re-Design, % | Link, % | DONE | Plots total | Plots done | Bench-mark | Comments | date | size | size done | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 209 | d_Utilities | Reaction | d_RCE | 100 | 100 | 1 | 0 | | | | 05/30/20 | 47274 | 47274 | |
| 210 | d_Utilities | Reaction | d_ReactionCharacter | 100 | 100 | 1 | 0 | | | | 05/30/20 | 49303 | 49303 | |
| 211 | d_Utilities | Solenoid | d_Solenoid | | | | | | | | 03/31/20 | 17507 | 0 | |
| 212 | d_Utilities | Solenoid | d_Twinsol | | | | | | | | 03/31/20 | 65380 | 0 | |
| 213 | w_Bi | | d_BI | | | | | | | | 03/31/20 | 20524 | 0 | |
| 214 | w_Converter | | converter | 100 | 100 | 1 | | | | | 03/31/20 | 64297 | 64297 | |
| 215 | w_IsoTable | | NuclideInfo | 90 | 70 | 0.7 | | | | | 03/31/20 | 12906 | 9034.2 | |
| 216 | w_Main | | MainWindow | 90 | 70 | 0.7 | | | | | 05/19/20 | 89905 | 62933.5 | |
| 217 | w_Stuff | | d_about | | | | | | | | 04/01/20 | 18415 | 0 | |
| 218 | w_Stuff | | d_FRIB_isotopes | | | | | | | | 03/31/20 | 3078 | 0 | |
| 219 | w_Stuff | | d_Password | | | | | | | | 03/31/20 | 2234 | 0 | |
| 220 | w_Stuff | | d_Transmission_statistics | 100 | 100 | 1 | 0 | | | | 05/28/20 | 60991 | 60991 | |
| 221 | w_Stuff | | d_Value_input | 100 | 100 | 1 | | | | | 04/15/20 | 3401 | 3401 | |
| 222 | w_Stuff | | w_Gauge | 100 | 100 | 1 | | | | | 03/31/20 | 5122 | 5122 | |
| 223 | | | | | | | | | | | | | | |
| 224 | | total | 221 | | sum | 108 | 48.9% | | | | | 5.16E+06 | 3.21E+06 | 62.2% |
| 225 | | procent | | | completely done | 96 | 43.4% | | | | | | | |
| 226 | | | | | | | | | | | | | | |

# LISE$^{++}$ porting schedule (v.6 from 06/03)


MICHIGAN STATE UNIVERSITY

| | | week | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Month | | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 8 | 9 | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 11 |
| | | Day | 16 | 23 | 30 | 6 | 13 | 20 | 27 | 4 | 11 | 18 | 25 | 1 | 8 | 15 | 22 | 29 | 6 | 13 | 20 | 27 | 3 | 10 | 17 | 24 | 31 | 7 | 14 | 21 | 28 | 5 | 12 | 19 | 26 | 2 |
| SetupPanel | Layout, Timer | | 75% | | | 0.2 | | | | | | | | | 0.6 | | | | | | | 0.3 | | | | | | | | | | | | | | |
| Blocks edit | 7 dispersive | | | | | | 1 | 0.5 | 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 1 | 1 | | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 non-disp | | 100% | 1 | 0.8 | 0.4 | 1 | 1 | 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Configuration dialogs | Setup | | 100% | | | | | | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SetupQ | | | | | | | | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reaction mechanism dialogs | re-design | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| | connection internal | | 100% | | | | | | | | | 1 | 0.7 | 0.7 | | | | | | | | | | | | | | | | | | | | | | |
| | connection external | | | | | | | | | | | | 0.8 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| Options dialogs | Options | | 40% | | | | | | | | | | 0.3 | 0.3 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | |
| fits, stuff, database | Plots, ... | | | | | | | | | | | | | | 0.2 | 0.2 | 0.2 | 0.2 | | | | | | | | | | | | | | | | | | |
| Plots | .... | | 0% | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | 1 | | | | | | | | | | |
| 6 4 2 | 9.8 | | | | | | | | | | | | | | | | 0.2 | 0.8 | 0.8 | 0.8 | 0.8 | | 0.2 | 0.2 | 0.2 | 0.2 | | | 0.8 | 0.8 | | | | | | |
| Calculators | | | 30% | | | | | | | | | | | | | | | | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | |
| 5 1 4 | 4.8 | | | | | | | | | | | | | | | | | | 0.2 | 0.2 | 0.2 | 0.2 | | | | | | | | | | | | | | |
| Dynamical menu | | | 0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.5 | | | |
| 0.5 0.5 0 | 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monte Carlo calculations | | | 0% | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | | | | | | | |
| 5 3 2 | 4.4 | | | | | | | | | | | | | | | | | | | | | | | | 0.8 | 0.2 | 0.2 | 0.2 | | | | | | | | |
| Utilities | | | 20% | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | | | |
| 8.5 1.5 7 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | | | |
| Read/Write | Files | | 40% | | | | | | | | | | | | | | | | | | | | | 0.3 | 0.3 | | | | | | | | | | | |
| | Options | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Restore/Document LISE structure | initialization/closing | | 40% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | rerdaw, cleaning | | | | | 0.2 | | | | | | | | | | | | | | | | | 0.3 | | | | | | | 0.5 | | | | | | |
| Windows | ShowLIST | | | | | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ShowBMP | | 90% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.5 0.5 0 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tune separator | Update | | 50% | | 0.2 | | | | | | | | | | | | 0.2 | | | | | | | | | | | | | | | | | | | |
| 0.5 0.5 0 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Transmission calculation | trans one | | | | | | | | | | | | 0.2 | | | | 0.4 | | | | | | | 0.3 | 0.3 | | | | | | | | | | | |
| | trans area | | 20% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | secondary reactions | | | | | | | | | | | | | | | | | | | | | | | 0.2 | 0.2 | | | | | | | | | | | |
| Table of Nuclides | sizes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | trans cells | | 30% | | | | | | | | | | | | | | | | | | | 0.5 | 0.5 | | | | | | | | 0.8 | | | | | |
| 2 2 0 | 1.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Satelites | Connection | | | | | | | | | | | | | | 0.2 | 0.8 | | | | | | | | | | | | | | | | | | | | |
| | Spectrometer scheme | | 0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SmTableOfNuclides | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | StatusBar | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.3 | | | | | | |
| Creaton of multiplatform versions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | | |
| Installation of multiplatform versions | | | 0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | | |
| 4 0 4 | 5.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.3 | 0.8 | | |
| benchamrks | | | 0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ATIMA 1.4 | | | 0% | | | | | | | | | | | | | | | | | | | | | | | | 0.5 | 0.5 | | | | | | | | |
| LIBRARIES (Global, Charge ... ) | | | 0% | | | | | | | | | | | | | | | | | | | | | | | | 0.3 | 0.3 | | | | | | | | |
| Vacation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 3 3 | 2 | | | | | | | | | | | | | | | | | 1 | 1 | | | | | | | | | | | | | | | | | |

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| 0.5 | 0.5 |