

**v.18.2**  
03/27/26

**LISE++ v18.2** introduces major extensions in silent-mode operation, including new keys for plotting, transmission, energy output, separator tuning, and saving results. A new `QoMessageBox` class and updated SSL error handling remove blocking message dialogs in silent mode. The release also adds the new **FOI Spatial & Momentum Distributions** result, improves  $B_{rho}$  tuning and calculation tools, updates the Table of Nuclides with newly observed isotopes, extends proton-radioactivity calculations to  $L_{max} = 4$ , and refines result-file formatting and settings handling.

- Silent mode functionality update
- FOI spatial and momentum distributions
- Table of Nuclides update and others

**Notes:**

Creation of List of Isotopes (\*.listiso)  
Introduction to the Silent Mode

[https://lise.frib.msu.edu/17/17\\_05\\_silentMode.pdf#page=3](https://lise.frib.msu.edu/17/17_05_silentMode.pdf#page=3)  
[https://lise.frib.msu.edu/17/17\\_05\\_silentMode.pdf#page=5](https://lise.frib.msu.edu/17/17_05_silentMode.pdf#page=5)

Version 18.2 significantly extends silent-mode functionality, making it more suitable for batch execution and automated workflows. Added new class QoMessageBox to redirect QMessageBox output to qDebug in silent mode

## Previous silent-mode keys:

- **-s** silent mode; generates output "res5". Without a listiso file, only the FOI is calculated
- **-listiso** loads the list of isotopes for calculation; used for outputs res1, res2, and res5

## New silent-mode keys added:

- **-xyp** spatial and momentum distributions for the FOI; generates output "res6"
- **-tuneAll** for separator tuning and calculation of all  $B_{rho}$  values
- **-tuneFirst** tune the separator based on the first dipole  $B_p$  value
- **-tuneLast** tune the separator based on the last dipole  $B_p$  value
- **-trans** transmission results; generates output "res1"
- **-energy** energy and ToF results; generates output "res2"
- **-save** save tuning and calculation to the same LISE file

*Running in Silent mode example:* "c:\Program Files\LISEcute\LISE++.exe" march.lpp -listiso=march.listiso -s -xyp -tuneLast -energy -trans

The user can monitor separator tuning using the `-trans` or `-energy` keys. These options generate result files (#1 or #2) where Brho values are plotted.

- `-trans` transmission results; generates output "res1"

```
S:\experiments\_FRIB/e21080_208Pb/LISE/Brho3.10Tm/LISE_EPAX3_simple/195Ta_w0.6_w0.2_br3.98_EPAX3.res1
```

Save As Print PrintView Search Consolas 9

Configuration : SODSSSSDSWDDSDSDSDMSMWDMSMDMSMM  
Momentum Acceptance dP/P : 1.76%

Block	Name	Principal characteristics
Drift	BTS01a_PTS	standard
Rotate	rotate_PS	
Dipole	BTS01b_D1ex	Brho=3.9800 Tm (B=0.9950 T)
Drift	BTS01c_D1081	standard
Drift	Beam_Dump	slits
Drift	Frag_Catchers	slits X=> -55.0 : +55.0
Drift	BTS01d	standard
Dipole	BTS01e_WDG	Brho=3.9800 Tm (B=0.9950 T)
Drift	PS_Mom_slits	slits X=> -50.0 : +50.0 Y=> -100.0 : +100.0
Wedge	PS_wdg	A1977Mg11 0.6 mm Angle=-1.5mrad
Dipole	BTS02	Brho=3.3934 Tm (B=0.8483 T)
Dipole	BTS03	Brho=3.3934 Tm (B=0.8483 T)
Drift	PS_FP_slit	slits X=> -10.0 : +10.0 Y=> -150.0 : +150.0
Rotate	unrotate_PS	
Drift	correction_matrix	slits
Dipole	CD1_BTS05	Brho=3.3934 Tm (B=0.7416 T)
Drift	DB2_slits	slits X=> -20.0 : +20.0 Y=> -50.0 : +50.0
Wedge	DB2_Wedge	A1977Mg11 0.2 mm Angle=0.0mrad
Dipole	CD2_BTS06	Brho=3.1483 Tm (B=0.6880 T)
Material	DB3_PPAC0	A1 12 micron
Drift	DR3_slit	slits X=> -8.0 : +8.0

- `-energy` energy and ToF results; generates output "res2"

```
S:\experiments\_FRIB/e21080_208Pb/LISE/Brho3.10Tm/LISE_EPAX3_simple/195Ta_w0.6_w0.2_br3.98_EPAX3.res2
```

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Reaction : Projectile Fragmentation

Mechanism : Vopt/Vbeam=Convolution Momentum=[3] Convolution  
: Velocity options - Exceed=Yes g=0.950 MeV/fm^2  
: G\_Sigma0=90.0 G\_SigmaD=200.0 G\_SigmaM=87.0 Sigma0conv=160.0 MeV/c  
: mode=Excitation from Abrasion Model coef=1.0000 shift=-1.0000

Methods : Cross Section=4 Charge states=3 EnergyLoss=4 NP=32 NPevap=64  
: Secondary reactions=Off

Configuration : SODSSSSDSWDDSDSDSDMSMWDMSMDMSMM  
Momentum Acceptance dP/P : 1.76%

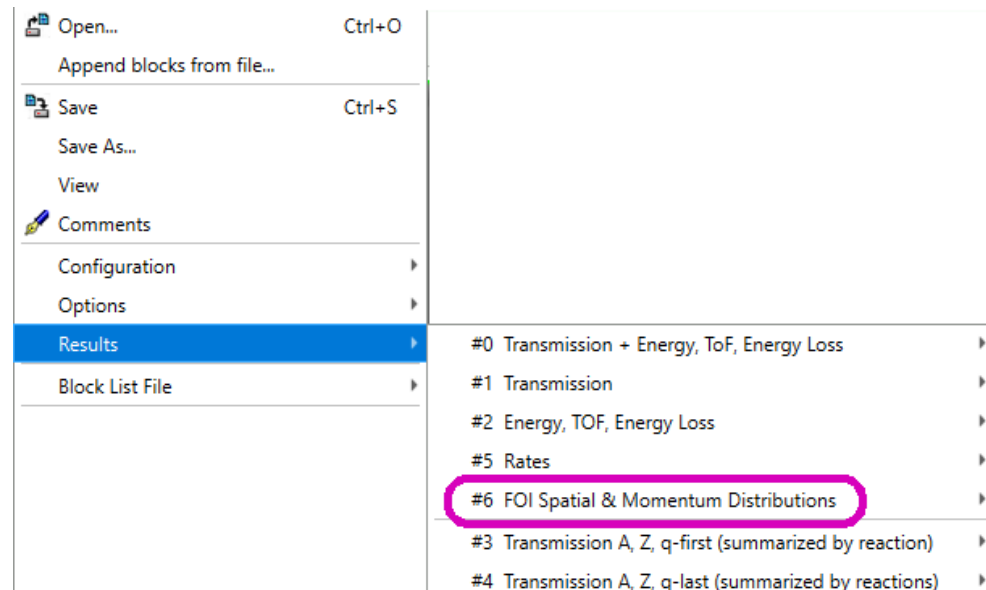
Block	Name	Principal characteristics
Drift	BTS01a_PTS	standard
Rotate	rotate_PS	
Dipole	BTS01b_D1ex	Brho=3.9800 Tm (B=0.9950 T)
Drift	BTS01c_D1081	standard
Drift	Beam_Dump	slits
Drift	Frag_Catchers	slits X=> -55.0 : +55.0
Drift	BTS01d	standard
Dipole	BTS01e_WDG	Brho=3.9800 Tm (B=0.9950 T)
Drift	PS_Mom_slits	slits X=> -50.0 : +50.0 Y=> -100.0 : +100.0
Wedge	PS_wdg	A1977Mg11 0.6 mm Angle=-1.5mrad
Dipole	BTS02	Brho=3.3934 Tm (B=0.8483 T)
Dipole	BTS03	Brho=3.3934 Tm (B=0.8483 T)
Drift	PS_FP_slit	slits X=> -10.0 : +10.0 Y=> -150.0 : +150.0
Rotate	unrotate_PS	
Drift	correction_matrix	slits
Dipole	CD1_BTS05	Brho=3.3934 Tm (B=0.7416 T)
Drift	DB2_slits	slits X=> -20.0 : +20.0 Y=> -50.0 : +50.0

## A major new feature in v18.2 is the introduction of FOI Spatial & Momentum Distributions

This includes:

- Results menu updates with a new command for FOI Spatial & Momentum Distributions
- Completion of result #6 FOI Spatial & Momentum Distributions
- Addition of a rotation flag for the spatial-distribution display in result #6
- Integration of corresponding plotting support into silent mode via `-xyp`

This feature expands the analysis and visualization tools for the fragment of interest, both in the GUI and in batch mode



```
S:\experiments\_FRIB/e21080_208Pb/LISE/Brho3.10Tm/LISE_EPAX3_simple/195Ta_w0.6_w0.2_br3.98_EPAX3.res6
```

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FoI: 195Ta 71+ 71+ 71+ 71+ 71+ 71+ 71+  
 Projectile Fragmentation  
 Distribution dimension (NP) = 32  
 Step=(xN-x0)/NP

Block Name	XYP	x0	xN	Step	0	1	2	3	4	5	6	7	8	9	10
Stripper	X	-0.900	0.900	0.05625	1.111e-02	1.916e-02	3.189e-02	5.127e-02	7.956e-02	1.192e-01	1.724e-01	2.408e-01	3.247e-01	4.226e-01	5.311e-01
BTS01a_PTS	X	-16.064	16.064	1.00400	1.552e-07	6.037e-06	4.946e-05	2.073e-04	7.333e-04	2.338e-03	6.722e-03	1.745e-02	4.091e-02	8.666e-02	1.660e-01
rotate_PS	X rot	-21.780	21.780	1.36122	0.000e+00	2.752e-10	9.042e-09	1.436e-07	1.583e-06	1.377e-05	9.787e-05	5.728e-04	2.768e-03	1.107e-02	3.669e-02
BTS01b_D1ex	X rot	-96.505	55.763	4.75838	0.000e+00	5.825e-10	0.000e+00	5.890e-08	4.759e-07	6.896e-06	6.583e-05	5.564e-04	4.014e-03	2.401e-02	1.036e-01
BTS01c_D1081	X rot	-121.693	57.518	5.60032	9.310e-09	8.091e-07	5.330e-06	3.858e-05	1.967e-04	9.819e-04	4.589e-03	1.962e-02	7.213e-02	2.035e-01	4.218e-01
Beam_Dump	X rot	-121.693	57.518	5.60032	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12
Frag_Catchers	X rot	-121.693	57.518	5.60032	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12	1.000e-12
BTS01d	X rot	-262.760	149.733	12.89041	0.000e+00	1.218e-09	0.000e+00	3.097e-08	0.000e+00	4.438e-07	4.199e-06	0.000e+00	3.125e-05	0.000e+00	0.000e+00
BTS01e_WDG	X rot	-163.781	346.518	15.94685	8.842e-07	4.717e-06	2.923e-04	4.885e-03	3.972e-02	1.728e-01	4.349e-01	7.241e-01	9.139e-01	9.877e-01	1.000e+00
PS_Mom_slits	X rot	-53.333	53.333	3.33333	4.400e-02	3.750e-01	7.403e-01	8.294e-01	8.691e-01	9.088e-01	9.275e-01	9.430e-01	9.584e-01	9.738e-01	9.883e-01
PS_wdg	X rot	-53.333	53.333	3.33333	4.400e-02	3.750e-01	7.403e-01	8.294e-01	8.691e-01	9.088e-01	9.275e-01	9.430e-01	9.584e-01	9.738e-01	9.883e-01
BTS02	X rot	-114.202	113.795	7.12491	0.000e+00	8.503e-07	1.238e-05	1.284e-04	9.891e-04	5.677e-03	2.440e-02	7.936e-02	1.978e-01	3.855e-01	6.042e-01
BTS03	X rot	-79.142	80.256	4.98119	3.727e-06	1.698e-05	7.014e-05	2.627e-04	8.918e-04	2.745e-03	7.661e-03	1.938e-02	4.447e-02	9.248e-02	1.744e-01
PS_FP_slit	X rot	-10.667	10.667	0.66667	4.900e-02	4.033e-01	7.777e-01	8.468e-01	8.640e-01	8.812e-01	8.983e-01	9.155e-01	9.327e-01	9.498e-01	9.599e-01
unrotate_PS	X	-1.721	1.721	0.10755	1.111e-02	1.916e-02	3.189e-02	5.127e-02	7.956e-02	1.192e-01	1.724e-01	2.408e-01	3.247e-01	4.226e-01	5.311e-01
correction_matrix	X	-1.721	1.721	0.10755	1.111e-02	1.916e-02	3.189e-02	5.127e-02	7.956e-02	1.192e-01	1.724e-01	2.408e-01	3.247e-01	4.226e-01	5.311e-01
CD1_BTS05	X	-27.443	27.716	1.72374	0.000e+00	1.773e-02	1.553e-05	5.639e-04	9.366e-03	7.631e-02	3.122e-01	6.737e-01	9.089e-01	9.780e-01	9.903e-01
DB2_slits	X	-21.333	21.333	1.33333	3.354e-04	1.533e-02	9.179e-02	5.431e-01	7.707e-01	9.218e-01	9.753e-01	9.871e-01	9.924e-01	9.951e-01	9.951e-01
DB2_Wedge	X	-21.333	21.333	1.33333	3.354e-04	1.533e-02	9.179e-02	2.804e-01	5.431e-01	7.707e-01	9.218e-01	9.753e-01	9.871e-01	9.924e-01	9.951e-01
CD2_BTS06	X	-17.162	17.231	1.29278	0.000e+00	1.292e-07	1.292e-07	1.292e-07	1.292e-07	1.292e-07	1.292e-07	1.292e-07	1.292e-07	1.292e-07	1.292e-07

## D. Nuclear data updates

The Table of Nuclides was updated with:

- Newly observed  $^{231}\text{Am}$
- Newly observed  $^{235}\text{Bk}$
- Seven additional isotopes from RIKEN

These updates keep the nuclear database current and improve support for recent isotope discoveries

## E. Physics-model extension

The proton-radioactivity module was extended by increasing `ProtonRadioactivity Lmax` up to 4

This broadens the supported range of angular momentum values in related calculations

## F. Output and file-handling improvements

Several infrastructure and output-related improvements were added:

- Updated format for transmission-into-target information in result files
- Added `SaveLiseIni` in the `CheckNewVersionOfCode` loop of `MainWindow`

## Output and result-file formatting

**18.1.1** — 02/20/2026

- Updated the format of transmission-into-target output in result files

## Proton radioactivity

**18.1.2** — 03/03/2026

- Increased `ProtonRadioactivity Lmax` up to 4

## Silent-mode dialog and settings handling

**18.1.3, 18.1.5, 18.1.15** — 03/23/2026 to 03/27/2026

- Updated `TNewVersionDlg::sslErrors(const QList<QSslError> &errors)` to avoid interactive `QMessageBox` prompts
- Added `SaveLiseIni` in the `CheckNewVersionOfCode` loop of `MainWindow`
- Added new class `QoMessageBox` to redirect `QMessageBox` output to `qDebug` in silent mode

## Table of Nuclides update

**18.1.4** — 03/23/2026

- Added newly observed  $^{231}\text{Am}$  and  $^{235}\text{Bk}$  to the Table of Nuclides
- Added 7 isotopes from RIKEN

## FOI spatial and momentum distributions

**18.1.6, 18.1.7, 18.1.10** — 03/27/2026

- Modified the Results menu and added new command FOI Spatial & Momentum Distributions
- Completed implementation of result #6 FOI Spatial & Momentum Distributions
- Added rotation flag for spatial distributions in result #6

## Silent-mode output and plotting keys

**18.1.8, 18.1.11, 18.1.13** — 03/27/2026

- Added new silent-mode key `-xyp` to plot spatial and momentum distributions
- Added new silent-mode keys `-energy` and `-trans`
- Added new key `-save`

## Silent-mode separator tuning

**18.1.9, 18.1.12, 18.1.14** — 03/27/2026

- Added new silent-mode key `-tune` to tune the fragment separator and calculate all `Brho` values
- Added new silent-mode keys `-tuneFirst` and `-tuneLast`
- Added new integer option argument in `calc_all_brho_downstream` and `calc_all_brho_upstream`