



LISE⁺⁺_{cute} v.18.6: Major developments by topic

Oleg B. Tarasov

Senior Research Scientist

tarasov@frib.msu.edu

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v.18.6
08/15/26

Summary of focused modifications in the 18.5 development line leading to the 18.6 release.

The 18.5.* development series was especially focused on automation, Prompt Radiation, light-particle backgrounds, secondary-reaction physics, and long-run calculation reliability.

- Major development of Silent Mode and automated batch calculations
- Major development of the Prompt Radiation utility
- Light-particle production analysis and physics-model updates
- Secondary-reaction physics improvements
- Calculation stability, memory management, and long-run reliability
- Configuration, charge-state, wedge/profile, and user-interface improvements
- Development and integration of GEMINI++ 3.3.0 and ETACHA 4.8.13

LISE++ Silent Mode: Command-line flow / batch workflow

Command-line flow

```
LISE++.exe file.lpp -s -Brho1=5.25 -calcAll -trans -deposition -radiation -save
```

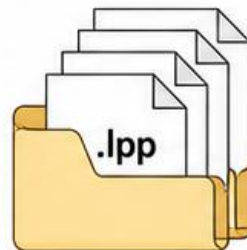
- 1 Parse command-line keys
- 2 Open LISE++ file (.lpp)
- 3 Clear restored calculations in silent mode
- 4 Optional setup: load isotope list, apply Brho1, tune optics
- 5 Run transmission calculation: FOI / list / all nuclei
- 6 Write standard outputs: .res5, optional .res1 / .res2 / .res6
- 7 Optional Power Deposition report
- 8 Optional Prompt Radiation run
- 9 Optional save and exit



**No dialogs,
gauges, or
interactive
interruptions**

Batch workflow

Multiple LISE++ files
(.lpp)



e.g., parameter
combinations

Launcher
(Windows .bat /
shell / Python script)



Repeated silent
LISE++ runs

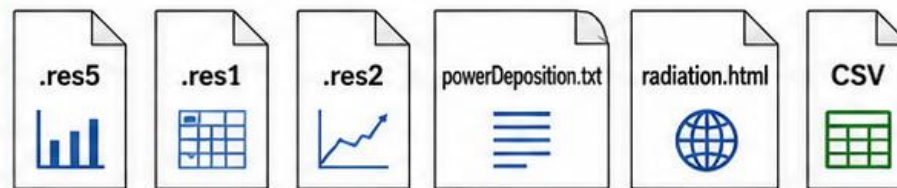
```
LISE++.exe ... -s
```

```
LISE++.exe ... -s
```

⋮

```
LISE++.exe ... -s
```

Results (per run)



Post-processing
(Python analysis)



Excel summary /
large-scale scan results



Applications

- Systematic parameter scans
- PAC4 / ARIS studies
- AI/ML-friendly workflows

Silent Mode was expanded into a practical non-interactive calculation workflow for large sets of LISE++ files. This is the central automation development direction of v.18.5 and the foundation for large-scale scans, Python processing, AI/ML studies, and software-agent control of LISE++.

- automatic transmission/rate calculations for FOI, isotope lists, or all nuclei
- optics tuning and first-rigidity control with `-Brho1=<value>`
- automatic .res output files plus optional save of modified LISE files
- silent Power Deposition output with `-deposition / -dep`
- silent Prompt Radiation workflow with `-radiation / -rad`
- calculation gauges, dialogs, prompts, and modal warnings suppressed or logged

Manuals:

[Running LISE++ in silent mode \(v18.2\)](#)

[Silent mode update: command line flow \(v18.6\)](#) *new!*

Several useful tools are included with the LISE++ installation in:

`C:\Program Files\LISEcute\tools\`

In particular:

- `LISE_batch_template.xlsx` — an Excel template for creating LISE++ batch files;
- `lise_info_to_excel.py` — a Python script for collecting information and calculation results from multiple LISE files into an Excel summary.

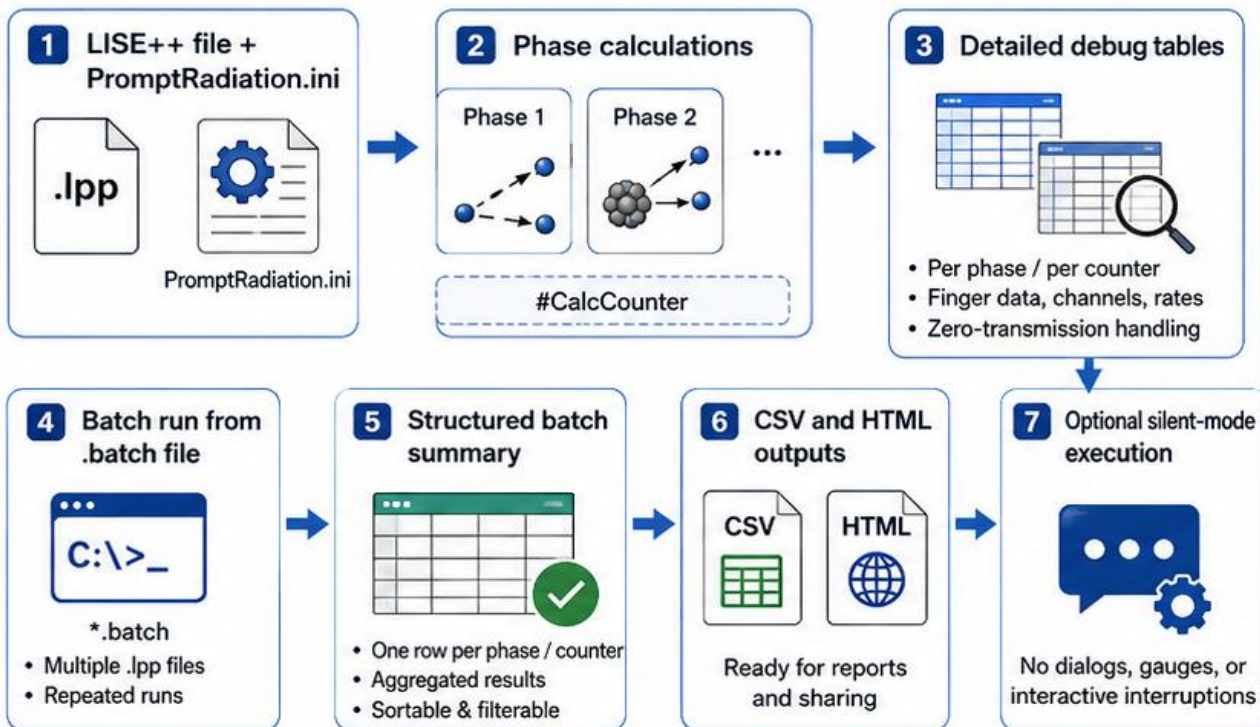
The attached file `LISE_Info_Summary_r113.xlsx` demonstrates an example of using LISE++ batch calculations together with the Python summary script.

The information stored inside LISE files has also been extended so that calculation settings and results can be extracted more reliably by Python scripts.

LISE++ Prompt Radiation: Major developments

Key developments in versions 18.5.24–18.5.78

Prompt Radiation workflow



Batch processing

Process many cases automatically and reliably

Zero-transmission robustness

Improved handling prevents errors and missing results

Silent-mode integration

Fully automated runs for large studies and workflows

Main updates



1 Calculation counters and INI-aware table titles

- Added #CalcCounter for unique identification of each calculation (Phase 1, Phase 2, ...).
- Table titles now include INI parameters for full traceability.



2 Toolbar actions, log saving, and cleanup of debug windows

- Added toolbar actions for saving logs and debug tables.
- Batch runs automatically close and clear debug windows.
- Reduced clutter and better memory management.



3 Run Batch command with one row per phase/counter

- Batch results now list one row per phase/counter.
- Clear mapping between input case, phase, and counter.
- Easier sorting, filtering, and comparison.



4 Structured batch result tables

- Columns include isotope, location, reaction, DB.x, rate, and power.
- Consistent layout for CSV and HTML outputs.
- Improves readability and integration with analysis tools.



5 Robust handling and export

- Robust handling of temporary Finger blocks and zero-transmission cases (no crashes, no missing rows).
- CSV and HTML export of batch results.
- Full support for silent-mode execution.



Better radiation studies

More reliable calculations and results



Clearer batch results

Structured, comparable, and export-ready

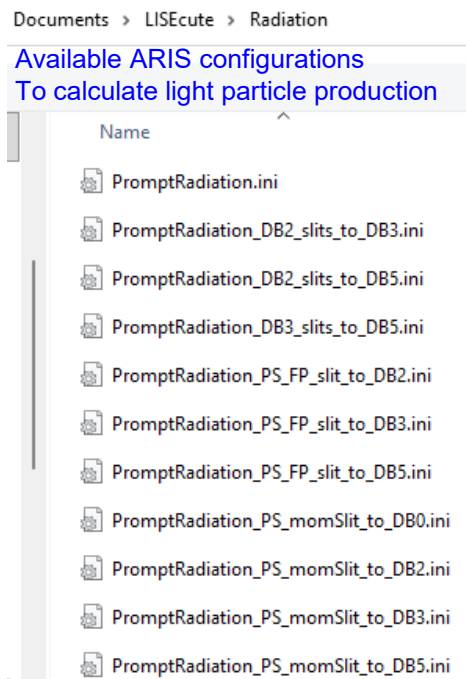


ARIS background analysis

High-quality data for advanced workflows

Prompt Radiation was developed from a mostly interactive utility into a structured analysis tool with logs, tables, counters, batch operation, export functions, and Silent Mode integration.

- calculation counters and INI-aware detailed-table titles
- HTML log saving and cleanup of detailed debug windows
- Run Batch command for sequential Prompt Radiation INI files
- structured batch-summary table with phase, block, rate, power, and isotope fields
- improved Phase-2 / Finger-block handling and zero-transmission robustness
- CSV export for detailed tables and batch summaries



Available ARIS configurations
To calculate light particle production

Available ARIS batch files
to run ARIS configurations
to calculate light particle production

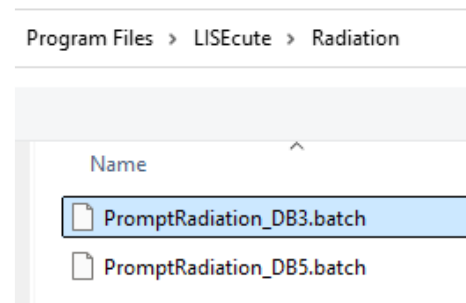


Table:
Prompt Radiation batch-summary table for reaction $82\text{Se} + \text{C} \rightarrow 59\text{Ca}$.
Batch file: PromptRadiation_DB3.batch

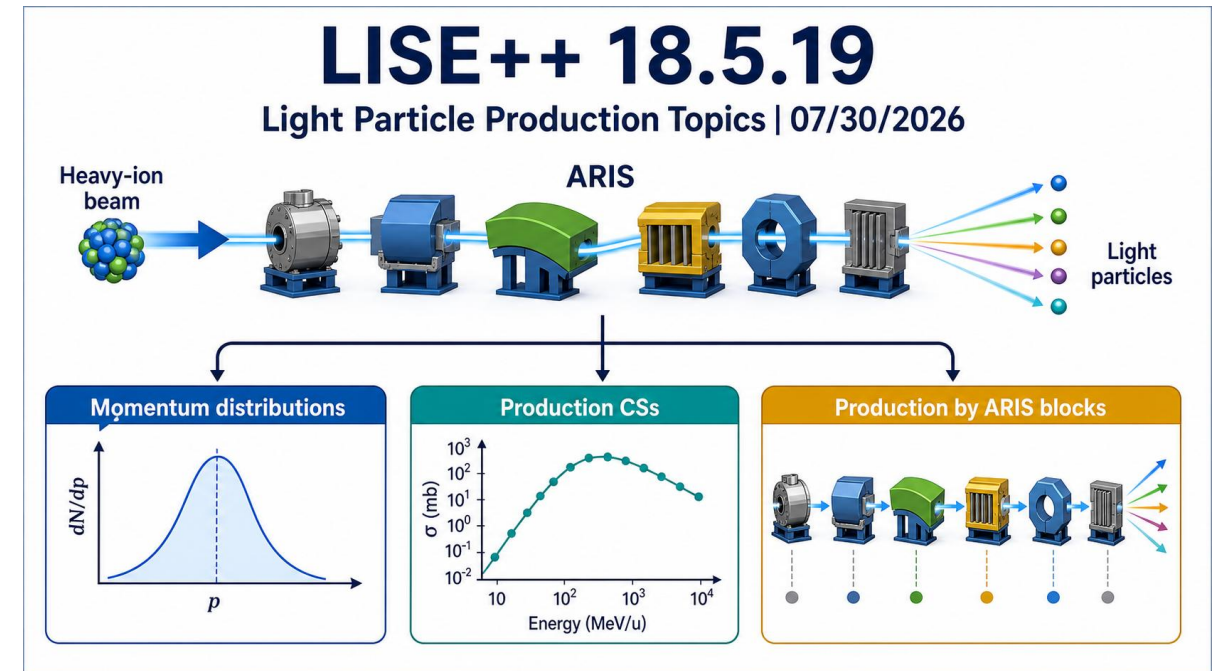
Prompt Radiation Batch Summary - PromptRadiation_DB3.batch

	#CalcCounter	Phase	INI-file	Slits Block	DB.x block	Total Rate pps	Power W	Isotope	Location	Reaction	DB.x mm	Rate pps
1	#1	1	PromptRadiation_PS_momSlit_to_DB0	PS_Mom_slits	BTS02	1.39e+08	2.72e-02	4He	P4m	PF	-1.43e+02	4.17e+07
2	#2	2	PromptRadiation_PS_momSlit_to_DB0	PS_Mom_slits	BTS02	1.68e+08	2.10e-02	4He	P2p_L	PF	8.37e+02	8.85e+07
3	#3	1	PromptRadiation_PS_momSlit_to_DB2	PS_Mom_slits	CD1_BTS05	6.36e+02	7.72e-08	2H	P5	T1	3.72e-02	4.46e+02
4	#4	2	PromptRadiation_PS_momSlit_to_DB2	PS_Mom_slits	CD1_BTS05	6.22e+05	6.61e-05	2H	P5_L	PF	4.07e+01	6.20e+05
5	#5	1	PromptRadiation_PS_FP_slit_to_DB2	PS_FP_slit	CD1_BTS05	1.25e+03	1.52e-07	2H	P5	T1	3.69e-02	8.82e+02
6	#6	2	PromptRadiation_PS_FP_slit_to_DB2	PS_FP_slit	CD1_BTS05	8.46e+07	1.03e-02	4He	P3m_L	PF	-2.74e+02	2.29e+07
7	#7	1	PromptRadiation_PS_momSlit_to_DB3	PS_Mom_slits	CD2_BTS06	2.58e+06	1.78e-04	2H	P2m	T2	-7.11e+02	5.53e+05
8	#8	2	PromptRadiation_PS_momSlit_to_DB3	PS_Mom_slits	CD2_BTS06	2.63e+06	1.83e-04	2H	P2m_L	T2	-7.11e+02	5.53e+05
9	#9	1	PromptRadiation_PS_FP_slit_to_DB3	PS_FP_slit	CD2_BTS06	2.58e+06	1.78e-04	2H	P2m	T2	-7.11e+02	5.53e+05
10	#10	2	PromptRadiation_PS_FP_slit_to_DB3	PS_FP_slit	CD2_BTS06	2.59e+03	2.77e-07	2H	P5_L	T2	1.77e+01	2.01e+03
11	#11	1	PromptRadiation_DB2_slits_to_DB3	DB2 slits	CD2_BTS06	5.16e+06	3.56e-04	2H	P2m	T2	-7.11e+02	1.11e+06
12	#12	2	PromptRadiation_DB2_slits_to_DB3	DB2 slits	CD2_BTS06	5.02e+06	3.67e-04	2H	P2m_L	T2	-7.02e+02	1.10e+06

Versions 18.5.24–18.5.41, 18.5.73–18.5.75, 18.5.78

A separate development line was devoted to light-particle production and its impact on ARIS background estimates. These studies are directly connected to Prompt Radiation and reactions in slits, wedges, and other materials.

- analysis of momentum distributions for light particles
- production cross-section studies for protons, H isotopes, He isotopes, and alpha particles
- production-by-ARIS-block analysis for secondary-particle background estimates
- connection to Prompt Radiation and material/slit reaction background calculations
- charged H/He angular scans limited to 160 degrees before building reaction angular distributions
- support for improved light-particle and radiation-background estimates



18.5.19 Light particle production topics (07/30/2026)

[- momentum distributions](#)

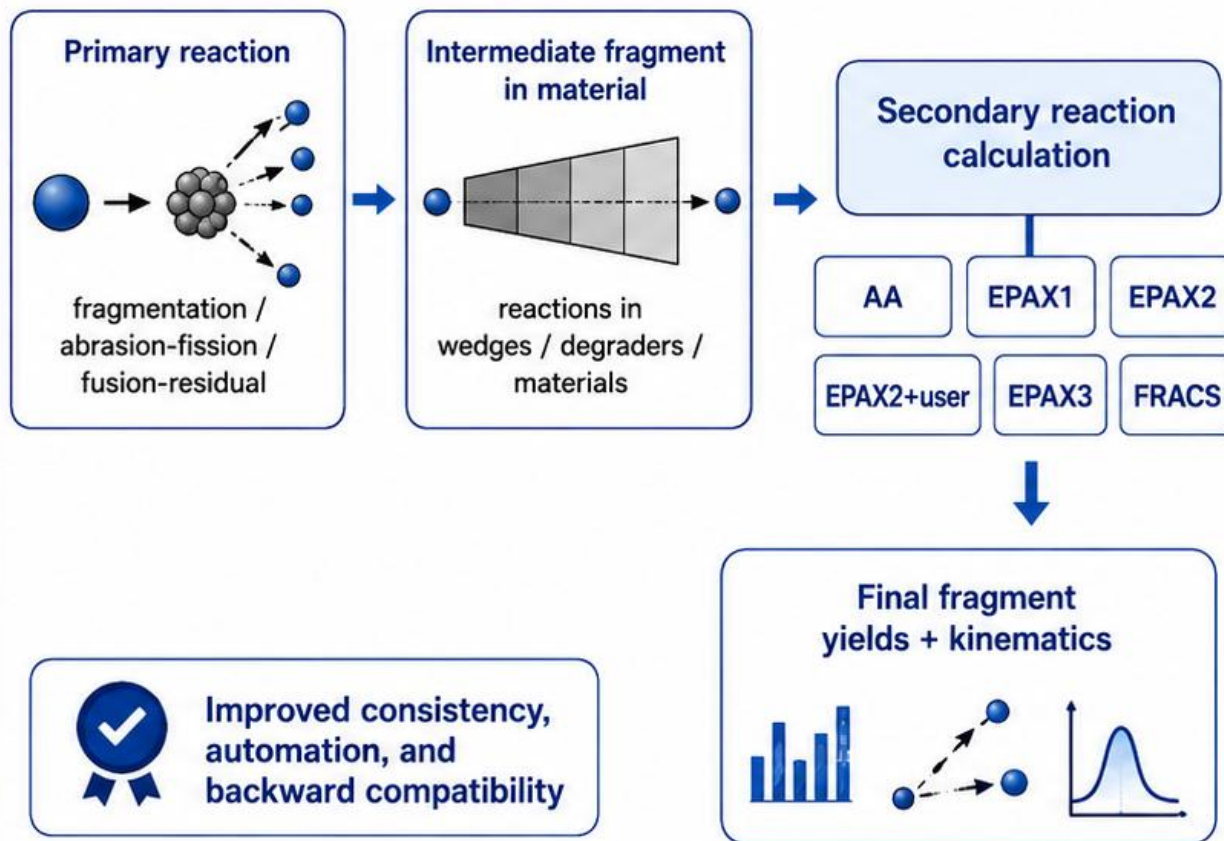
[- production CSs](#)

[- production by ARIS blocks](#)

LISE++ Secondary Reactions: Major updates

Key developments in versions 18.5.55–18.5.84

Secondary-reaction workflow



Main updates

- Kinematics and plot stability**
 - Added regular after-target Energy and Brho comparison curves
 - Improved overlay/slice behavior for small NP values
 - Corrected array cleanup and conversion-axis sizing
- Cross-section consistency**
 - Abrasion-Fission reduced cross sections now honor selected Calc/Fit or File/User primary source
 - Calculated fallback used when file data are missing
- Secondary Abrasion-Ablation**
 - AA can be used for the secondary step independently of the primary reaction mode
 - Expanded cache validation
 - Intermediate cross sections can be exported for study
- Silent-mode and user feedback**
 - Warning/information messages routed through QMessageBox
 - No modal interruptions in silent or batch calculations
 - Status/progress reporting and visible gauge handling improved
- Unified model order and compatibility**
 - Secondary-reaction model order aligned with regular projectile-fragmentation models
 - Old LISE++ files and option files are converted automatically
 - Read-path hardening prevents legacy misinterpretation



More reliable physics



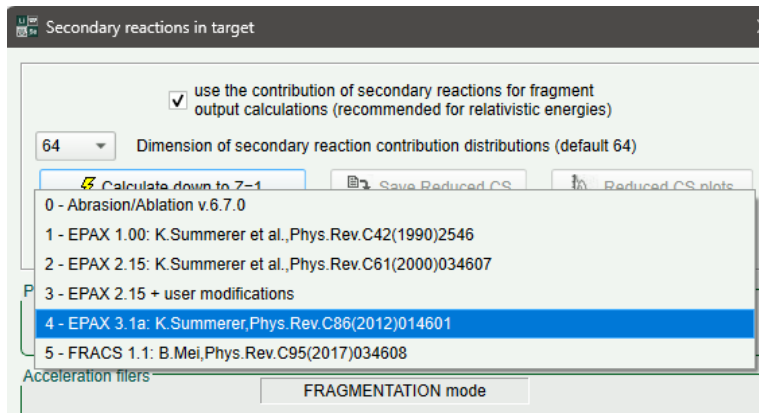
Better batch workflows



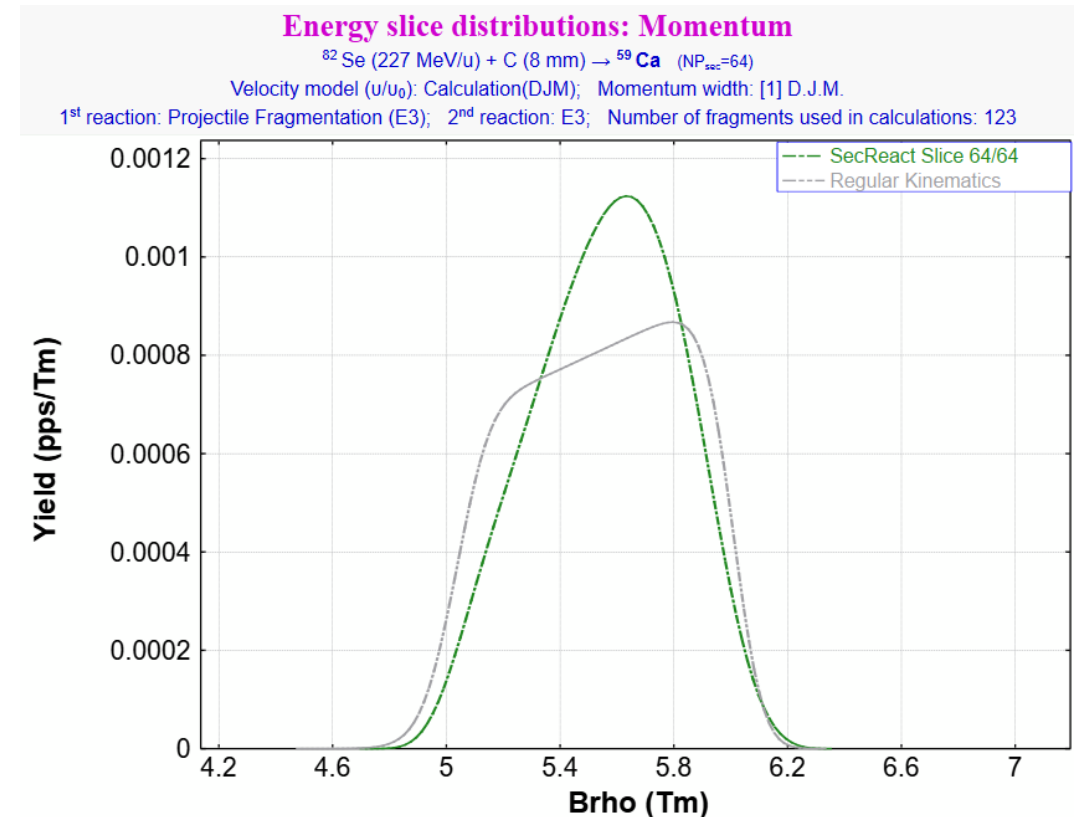
Legacy-file support

Secondary-reaction calculations received both physics corrections and compatibility improvements, with special attention to Abrasion-Fission, Abrasion-Ablation, kinematics, and model-selection consistency.

- regular after-target Energy and Brho curves added to secondary-reaction kinematics plots
- Abrasion-Fission reduced cross sections honor Calc or File/User primary CS selection
- Abrasion-Ablation enabled as an independent secondary-reaction step
- secondary-AA cache validation and intermediate cross-section diagnostic output
- PF and secondary-reaction CS model ordering unified
- conversion and hardening for old LISE++ files and old/unversioned option files



Utilities	1D-Plot	2D-Plot	Databases
CODES: Charge, Global, PACE4, etc.			
Radioactivity, decay			
Reactions utilities			- Reaction's Characteristics - Angular Straggling & Rutherford scattering probabilities in compound - Differential cross sections: LAB -> COM converter - Electromagnetic excitation plots - Create an initial file for nucleon pick-up (beta) - Secondary reaction kinematics - Rate & transmission calculation : batch mode - User cross-sections analysis using Abrasion-Ablation model - Reaction Dynamics Explorer (under development)
Plots : Energy loss, Ranges, Straggling, etc.			
FRIB / NSCL / ISOL rates			
FRIB / Europe / RIKEN primary beam lists			
Set-up utilities			
Range optimizer (Gas cell utility)			
Stripper foil lifetimes			



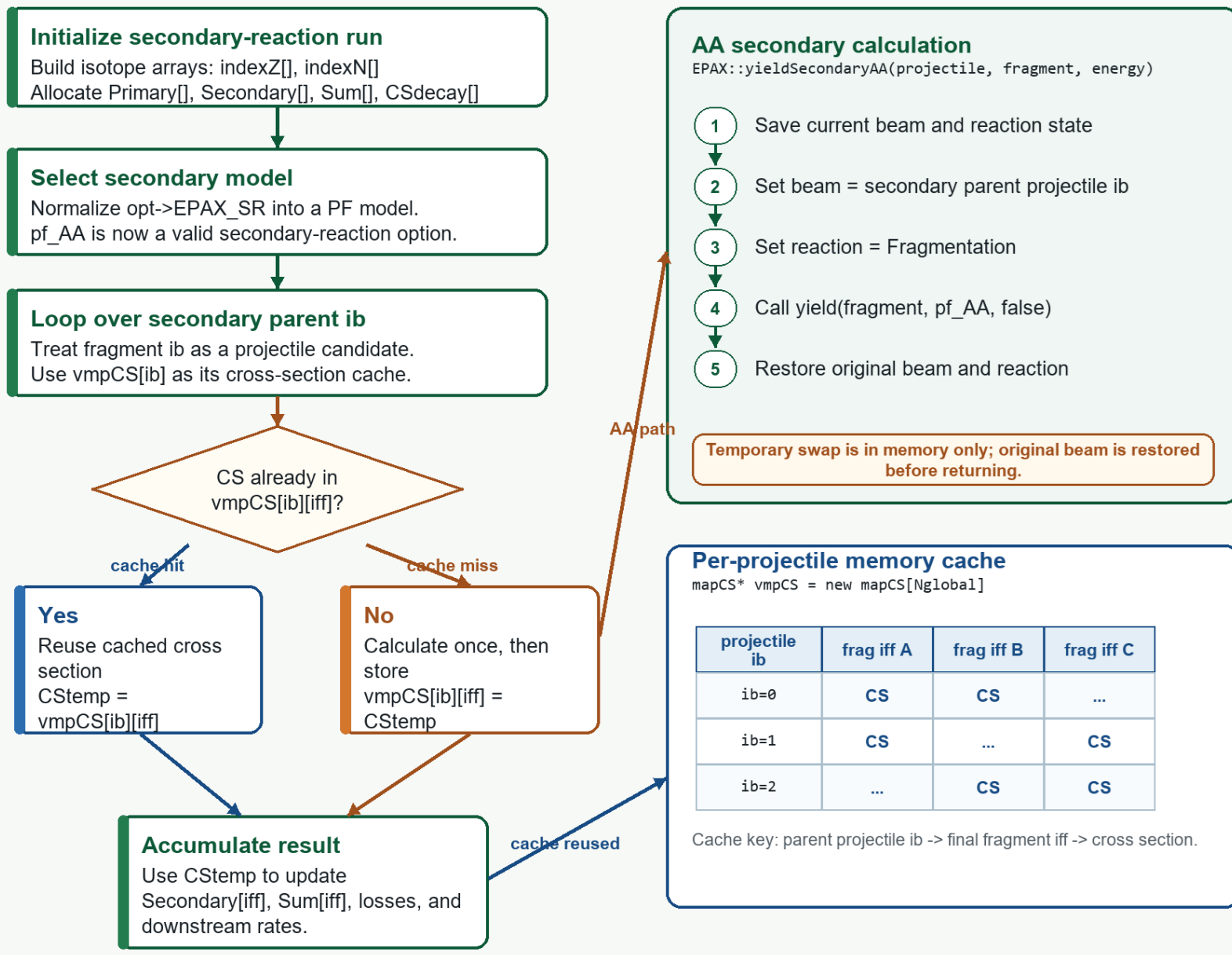
No disk swapping. Each secondary projectile uses in-memory beam substitution and a per-projectile CS cache

Disk output

MakeSecondaryAAFile(...) is optional diagnostic / plot output after calculation. It is not a disk swap used to compute AA cross sections.

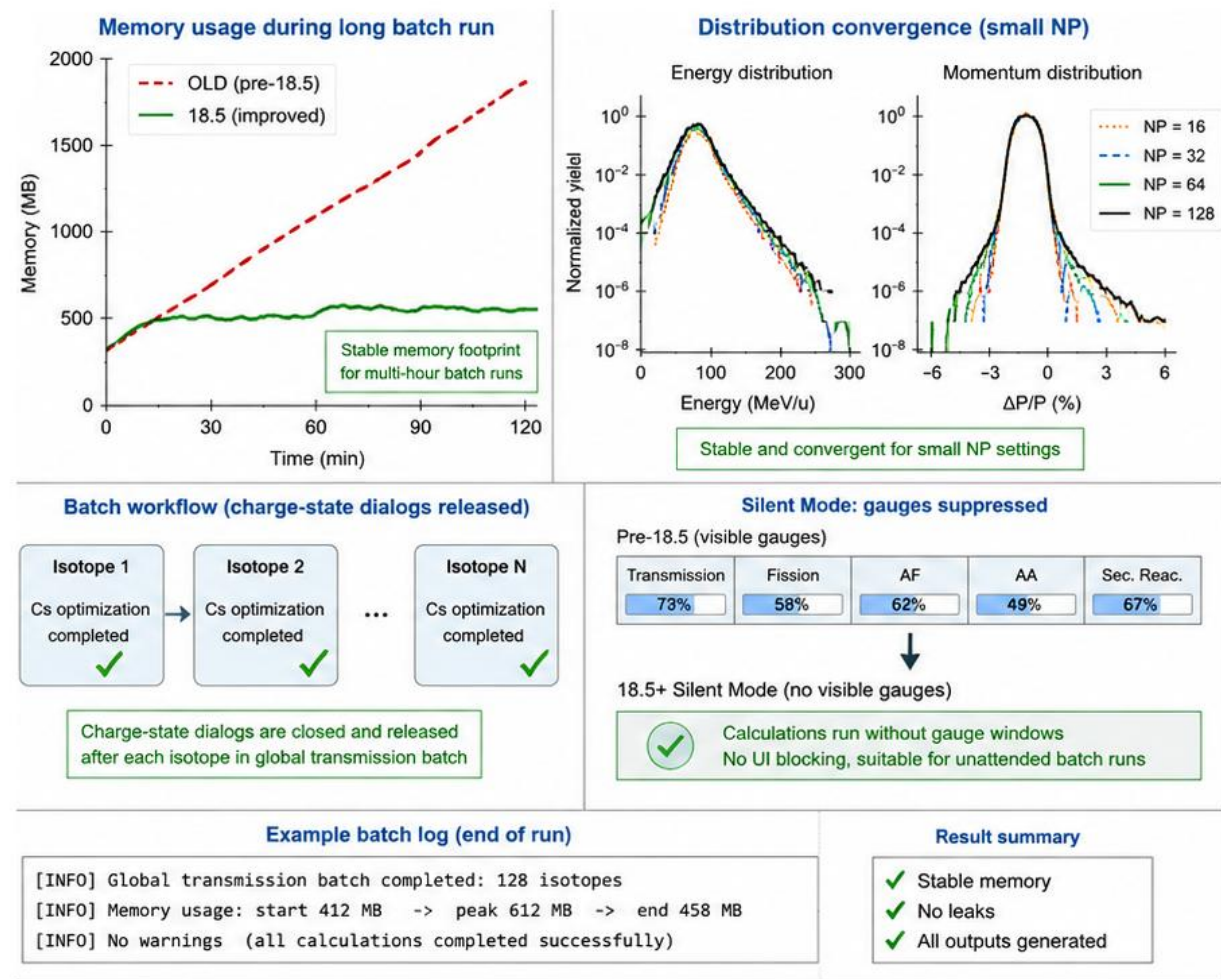
Source code anchors:

d_Secondary/o_SR.cpp, d_Secondary/o_SR_kinematics.cpp,
o_Phys/c_EPAX_AA.cpp



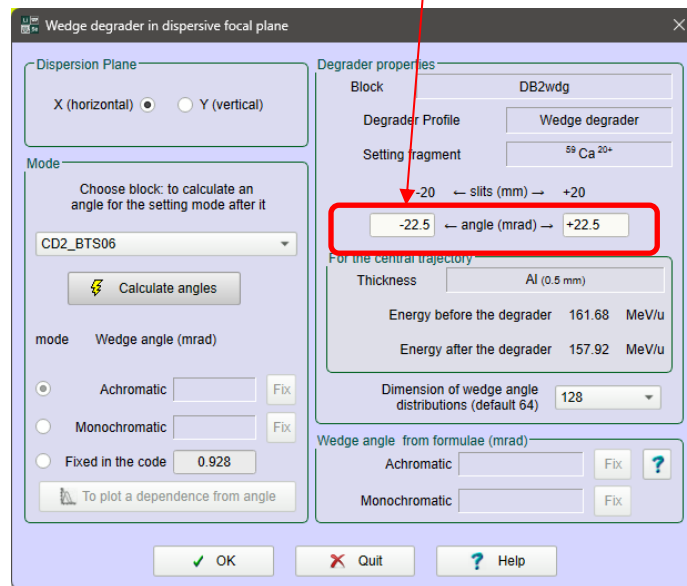
Long calculations and repeated batch workflows exposed several old ownership and dialog-path issues. The 18.5 line reduced memory growth, improved array cleanup, and made calculation paths safer for unattended operation.

- 2D drawing-method initialization and 1D distribution editor issues corrected
- global transmission batch releases charge-state dialogs after each isotope
- secondary-reaction cache arrays and contribution arrays use matching cleanup
- kinematic distribution conversions stabilized for small NP settings
- fission, AF, AA, and secondary-reaction gauges suppressed in Silent Mode
- improved reliability for long MSVC/MinGW batch and reaction-in-material calculations



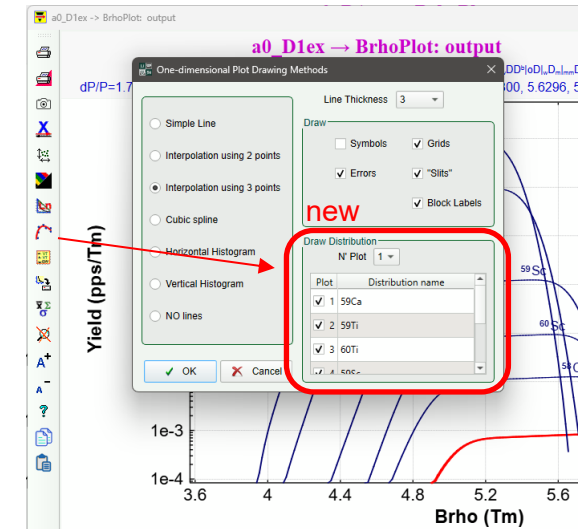
The 18.5 series also improved user-facing workflows and saved metadata, especially where charge states, wedges/materials, configuration output, and custom-profile windows are involved.

- custom-profile plot and content windows remain accessible and are cleaned on dialog exit
- focus recovery and deterministic placement for profile and polynomial windows
- satellite-window location selection redesigned as a table-based dialog
- standardized charge-state labels and wedge/material separators
- Info Part records compact PF and SecR model labels and material reaction flags
- **editable wedge-angle limits** and option-file Version/LISE + SavedDate metadata



```
(===== Info Part =====)
82Se (227 MeV/u, 2149 pA) + C (8 mm) --> PF(E3),SecR(E3); dP/P=1.75%
FOI --> 59Ca 20+ 20+ 20+ 20+ 20+ 20+ 20+ 20+ 20+ 20+; Z-q=0,0 w 0,0,0 w
FOI --> Rate=1.85e-04 (1.85e-04) pps; Trans=19.4% [noSR] (46.7% Overall)
ALL --> Ncalc=93, Sum=9.672e-2 pps
Brho--> First "a0_D1ex"=5.7800 Tm, Last "CD4_BTS08"=5.5377 Tm
Wedges :
#1: A1 (1.1 mm) angle[Custom]=-12.087 mrad; Reactions=On
#2: A1 (0.5 mm) angle[Wedge]=0.928 mrad; Reactions=On
```

✓ Z-q=0,0 w 1,1,1 w 1 m 1,1



Window satellite locations

Satellite location mode

Use	Animation	Navigation	Spectrometer scheme	Legacy code
☐ 1 Left top	Left top	Left top	Left top	LT : ANS (version 13)
☐ 2 Left top	Left top	Left top	Left top	LT : SAN
☐ 3 Right bottom	Right bottom	Left top	Left top	LT : S ; RB : NA
☐ 4 Left top	Left top	Right bottom	Left top	LT : AN ; RB : S
☐ 5 Left top	Left top	Left bottom	Left top	LT : AN ; LB : S
☐ 6 Left bottom	Left bottom	Left top	Left top	LT : S ; LB : AN
☒ 7 Left middle	Left middle	Left top	Left top	LT : S ; LM : AN
☐ 8 Left bottom	Left bottom	Right bottom	Left top	LB : SN ; RB : A

A - Animation
N - Navigation
S - Spectrometer scheme

LT - left top
LB - left bottom
RB - right bottom
LM - left middle

☐ Make default

- GEMINI++ 3.3.0 integrated into the LISE++ package

[Link: v.3.3 \(08/15/2026\)](#)

- GEMINI++ optimization: about 1.6x faster
- New residual, gamma and IMF angular-distribution tables and plots
- Center-of-mass spectra and improved yield-table output
- New 1D/2D plotting tools with Gaussian fits and "Plot All" options
- Migration to double precision and MinGW/MSVC warning cleanup

GEMINI++ 3.3.0: Major developments

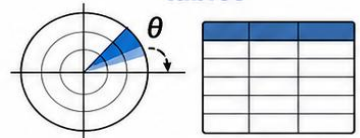
Key updates from the 2026 development cycle

1 Performance optimization



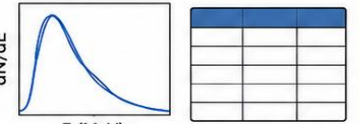
- Project-wide optimization
- Profiling of bottleneck points
- ~1.6x faster**

2 Angular-distribution tables



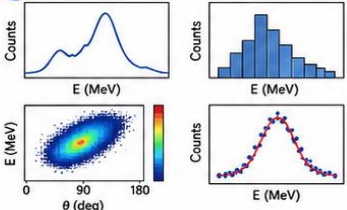
- Residual angular-distribution tables
- Gamma angular-distribution tables
- IMF angular-distribution tables
- PACE-style table layout

3 New analysis outputs



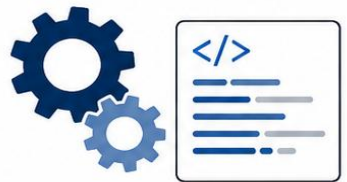
- Center-of-mass spectra
- IMF production table
- Improved yield-table output

4 Plotting tools



- New 1D/2D plotting windows
- 4 plot types for each table
- "Plot All" option
- Gaussian fits for 1D plots

5 Code modernization



- Migration to double precision
- MinGW / MSVC warning cleanup
- Version metadata synchronized

6 GUI improvements



- Result-window scrollbar support
- About-dialog attribution
- Consolidated 2026 GUI development


Faster calculations


Richer analysis


Improved usability

Development by Arjun Ray and Oleg Tarasov

- ETACHA4 4.8.13 integrated into the LISE++ package
- ETACHA4 updates: mode-34 correction and expanded batch/command-line operation
- new ETACHA4 batch options include mode keys, optional detailed logs, and mode-suffixed CSV files

Links

- [ETACHA 4.8.13: Method 34 correction, Batch file update](#)
- [ETACHA Batch File Manual](#)

ETACHA4 4.8.13: Major developments

Key updates in the 2026 development cycle

1 Batch command-line workflow



```
ETACHA4.exe input.betacha -r -q -v=23 -i=1 -e=1
```

- Run .betacha files directly from command line
- "-r" starts calculations automatically
- "-q" closes ETACHA after completion
- Parsing of "-r" and "-q" is order-independent

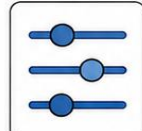
2 Batch input format



Ab	Zb	Qb	Eb	At	Zt	thickness	density

- One row = one projectile-target calculation
- Spaces, tabs, or commas are accepted
- Comment lines begin with "!" or ";"
- Generated ".etacha" file created for each row

3 Global mode keys



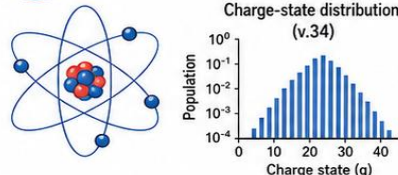
-v = 23, 3, 34, 4, 45

-i = 0 or 1

-e = 0 or 1

- Command-line keys apply to all rows in a batch run
- Ionization: 0 = CDW-EIS, 1 = PWBA
- Excitation: 0 = Symmetric, 1 = PWBA
- Same .betacha file can be rerun with different mode sets

4 Version 34 correction



Charge-state distribution (v.34)

Population

Charge state (q)

- v.34 charge-state population output corrected
- Independent n=4 shell Y(4) is now included
- v.34 option re-enabled in the user interface
- Use v.34 only with ETACHA 4.8.10 or newer

5 Outputs and logging



YourFile_results_v23i0e1.csv

- Batch summary CSV always written
- Effective mode suffix included in CSV name
- Detailed ".txt" files created only with "-L" or "-log"
- Without "-L", autorun still writes CSV + generated .etacha files

6 Builds, documentation, and benefits



- Batch execution manual refreshed
- MinGW and MSVC release builds rebuilt successfully
- Better unattended automation and model comparisons
- Clearer reproducible batch studies



Better batch automation

Streamlined command-line workflow with reliable autorun and logging.



Flexible model comparison

Easily rerun batches with different mode sets for consistent comparisons.



Reproducible output files

Standardized CSV summaries and generated .etacha files ensure reproducibility.

ETACHA development integrated into the LISE++ 18.6 package

- 18.5.19 — Light-particle production topics: momentum distributions, production CSs, production by ARIS blocks
- 18.5.20–18.5.43 — Prompt Radiation and non-Prompt-Radiation updates after 18.5.19
[18.5.20 - 18.5.43: Summary report by versions \(04/08/2026\)](#)
- 18.5.44–18.5.64 — consolidated modification report by versions
[18.5.44 - 18.5.64: Summary report by versions \(08/08/2026\)](#)
- 18.5.65–18.5.69 — Silent Mode, Info Part metadata, secondary-reaction feedback, PF identifiers
[18.5.65 - 18.5.69: Summary report by versions \(08/10/2026\)](#)
- 18.5.70–18.6.0 — Silent Mode extensions, Prompt Radiation CSV, SR model unification, GEMINI++/ETACHA4, release packaging
[18.5.70 - 18.6.00: Summary report by versions \(08/15/2026\)](#)

Final focused 18.6 message:

The 18.5 development line made LISE⁺⁺ more automation-ready, strengthened Prompt Radiation and light-particle background studies, improved secondary-reaction physics, and improved reliability for long-running calculations.