

Isomer gamma data and shared interface updates

Subject 11 | LISE versions: 18.8.114-117 | 23 October 2026

These revisions centralize shared stylesheets and integrate IsomerAPI gamma data directly into LISE through a common IsomerCore interface. Gamma registration gains source and half-life controls; Show Transmission gains emitting-level and transition metadata. Classic results and established timing/intensity conventions are retained. The integration collects cascade lines but does not solve coupled cascade feeding kinetics. [1, 2] Figure 1 shows the source and half-life controls; Figure 2 shows the corresponding gamma-line metadata display.

Figure 1. Gamma detection dialog with IsomerAPI selected. The highlighted controls set the minimum parent half-life to 0.1 μs and the cascade stopping half-life to 30 μs ; 30 μs is the example setting, rather than the 20 μs default.

1 Shared stylesheets and resource paths

LISE version 18.8.114 | Sources [1, 3]

The shared main, dark and light stylesheets move from `w_Main` to the top-level styles directory. `lise.qrc` embeds the relocated files, and the LISE, Global, Gemini, ETACHA4, PACE, Kantele and Charge loaders use the new `:/styles` resource paths. The stylesheet contents are unchanged.

The release record reports matching Git blob hashes, successful Qt resource listing and generation, and updated paths in all seven consumers. No full application build or GUI smoke test was performed specifically for this relocation. The change organizes shared resources without introducing a new theme design. [3]

2 Direct isotope requests and reusable data

Main revision: 18.8.115 | Sources [1, 2]

LISE requests gamma data for an explicit isotope A,Z through IsomerCore and consumes a level/transition buffer in memory. It does not launch the IsomerAPI application or write an intermediate exchange file. The GUI-independent core uses Qt Core/SQL and QSQLITE. The LISE integration keeps the SQLite connection open and caches isotope results for repeated calculations and chart queries.

IsomerAPI data are read from LISErootPATH/lisecfg/nndc_DB_fullScan.sqlite. Explicit source selection validates the database; errors do not silently select classic data. Classic remains the default, including for older option files. Source descriptions accompany isotope details, plots and exports. [2]

Isomeric states: $\gamma/\text{frag} = 4.74\text{e-}03$ $IT = 3.01\text{e+}01$ /s

Isomer gamma source: IsomerAPI; parent $T_{1/2} \geq 0.1$ us; cascade stop $T_{1/2} \geq 30$ us

E_{γ} , keV	$T_{1/2}$, μs	E_{level} , keV	J^{π}	M_{γ}	$IT_{\text{ratio}} \& I_{\gamma}$	Efficiency	γ -AcqGate	Product
144.7	3.190e-01	2673.7	(8+)	(E2)	1.0e-01	4.28e-02	5.81e-01	2.49e-03
908.3	3.190e-01	2529	(6+)	—	1.0e-01	1.22e-02	5.81e-01	7.10e-04
890.5	3.190e-01	1620.7	(4+)	—	1.0e-01	1.24e-02	5.81e-01	7.20e-04
730.2	3.190e-01	730.2	2+	—	1.0e-01	1.42e-02	5.81e-01	8.26e-04

Figure 2. Show Transmission gamma-line output for IsomerAPI using the settings in Figure 1. The added columns identify the emitting-level energy, spin/parity and gamma multipolarity. All four lines retain the parent-isomer half-life of 0.319 μs for the existing calculation.

Cascade collection

The request reads the complete isotope, groups database rows by level ID and retains distinct outgoing transitions. Parent selection uses the minimum half-life and optional parent IDs. Traversal stops at ground state or a daughter at or above the configured cascade stopping half-life. Shared daughters are expanded once per parent; missing links and cycles produce warnings rather than invented daughters or unlimited traversal. [2]

Reuse and refresh. Changing half-life limits clears LISE's buffers without reopening the connection. External database edits require a refresh of cached data, for example by restarting LISE or changing its limits. An explicit invalidate interface is available in the source. The isotope cache belongs to LISE rather than to IsomerCore itself. [2]

3 Gamma registration settings and display

Main revisions: 18.8.115-116 | Sources [1, 2]

The Gamma registration dialog selects Classic database or IsomerAPI and exposes the IsomerAPI minimum parent half-life and cascade stopping half-life. Their defaults are 0.1 and 20 microseconds, respectively. These controls serve different purposes: one selects eligible parents; the other stops traversal at sufficiently long-lived daughters. Figure 1 illustrates these controls with a cascade stopping half-life of 30 μ s, overriding the 20 μ s default for this example.

Make default persists the source and limits under GammaDetector in the option file. Accepting the dialog refreshes gamma results. The integration checks OK/Cancel behavior, source switching and classic round trips. Source loading preserves the existing parent-half-life and gamma-intensity conventions. [1, 2, 4]

Version 18.8.116 revises the Designer layout and labels. Half-life fields display values such as 0.1 and 20 without trailing zeros while retaining six-decimal input precision and validation. The IsomerAPI rows are shown or hidden through isomerLimitsLayout, replacing the removed container-widget references. The selected source and revised layout are preserved. [1]

4 Gamma line metadata in Show Transmission

Main revision: 18.8.117 | Sources [1, 2, 4]

The source summary formats the $1/2$ in $T_{1/2}$ as a subscript. The gamma-line table adds E_level in keV, Jpi and M_gamma after half-life for both Classic database and IsomerAPI sources. Missing data display a dash; database text is escaped before rich-text display. [1]

Level energy, spin/parity and gamma multipolarity pass through the shared buffer into LISE, including for daughter cascade lines. Their emitting-level identity is kept distinct from the parent-isomer half-life used by the gamma calculation. For a daughter transition, the new columns describe its emitting daughter level while the established timing calculation still uses the parent half-life. The focused Qt test checks that distinction. [4] In Figure 2, the 730.2 keV line is associated with the 730.2 keV, 2+ daughter level, while its half-life column retains the parent value of 0.319 μ s. The screenshot uses IsomerAPI; the same metadata columns are available for Classic database results.

Calculation convention and scientific scope

Each returned gamma retains its parent isomer's half-life and isomer ratio, together with the stored gamma intensity, for the existing flight-time, gate and detector-efficiency calculation. The integration preserves the existing fallback for missing or out-of-range intensities. It does not introduce new branch normalization or a coupled feeding-time solution. [2]

Interpretation. More complete cascade collection and richer metadata improve data access and inspection. They should not be interpreted as a new time-dependent cascade population model. Changes in source or half-life limits can change the returned line set and should be recorded when comparing results.

5 Validation and version references

The retained Qt tests report no failures for database lifetime/filtering, traversal, source switching and gamma-source behavior. The MSVC metadata test checks emitting daughter energy, spin/parity and multipolarity while retaining the parent half-life. It also checks cache invalidation, source limits, missing links and cyclic paths. [4]

The production integration log reports successful requests for ^{78}Zn and ^{132}Sn , dialog OK/Cancel behavior, an exact classic round trip, option persistence, independent databases and a 60-line buffer. The larger buffer check supports the removal of the previous 50-line assumption. The revision history also records corrected isomer-array deallocation. [1, 4]

Version 18.8.115 records validation with the MinGW application build. MSVC build/link records accompany the updated Gamma dialog and Show Transmission work in 18.8.116-117. The stylesheet relocation has its separate resource/hash validation. These are retained software checks, not a new comparison with measured gamma yields. No application rebuild or new numerical benchmark was performed for this subject report.

Version mapping

18.8.114. Relocates unchanged shared stylesheets and updates the seven application resource consumers.

18.8.115. Integrates IsomerCore isotope requests, source selection, half-life controls, connection reuse, isotope caching, persistence and larger line buffers.

18.8.116. Updates the Gamma registration layout, half-life labels, compact numeric displays and layout-based row visibility.

18.8.117. Adds Show Transmission emitting-level energy, spin/parity and gamma multipolarity, safe text display and subscript half-life formatting.

Source references

[1] `L_Init/lise_version.h`, entries 18.8.114-117, dated 23 October 2026.

[2] `g_Isomer/core/README.txt`; `g_Isomer/core/IsomerCore.h` and `.cpp`; `L_Element/IsomerGammaSource.h` and `.cpp`. These describe the shared buffer, request limits, source/cache ownership and retained calculation convention.

[3] `doc/RELEASE_18_8_114.txt`, shared stylesheet relocation and resource/hash validation.

[4] `g_Isomer/core/tests/IsomerCore_test.cpp`, `IsomerGammaSource_test.cpp` and `Liselsomer_integration.cpp/.py`. Retained results: `build/isomer_core_test/results.txt`; `build/isomer_gamma_test/results.txt`; `build/isomer-metadata-msvc-test/results.txt`; `build/lise_isomer_integration/results.log`.

Build evidence: `build/Desktop_Qt_6_7_0_MinGW_64_bit-Release/isomer-final-build.log`; `build/Desktop_Qt_6_7_0_MSVC2019_64bit-Release/gamma-ui-build.log` and `isomer-metadata-link.log`. This report reflects the retained source and evidence inspected on 23 October 2026.