

Light Particle production utility

Subject 6 | LISE versions: 18.8.83-91 | 16 to 17 October 2026

This series adds a direct production-report workflow for light nuclei, then extends it with independent INI settings, batches, configurable species, final-observation X acceptance and mixed slit configurations. The utility reuses the established two-phase LISE calculation path while reporting production quantities separately from radiation dose. [1, 2]

1 Production workflow and reports

Main revisions: 18.8.83-86 | Sources [1, 2]

Open Calculations / Transmission and rate / Light particles production, immediately after ARIS Radiation analysis. The production window opens without a password; radiation access retains its existing gate. It shares the PromptRadiation.pri calculation infrastructure through an explicit production mode.

Reports group results by isotope, target/wedge charge states and reaction mechanism, with summed rates, rate-weighted mean energies and energy widths for each phase. HTML and text exports retain production tables and batch summaries. Rates use raw LISE values without the radiation light-Z yield multiplier. Dose, shielding, radiation-monitor and location-factor output is omitted.

The original hydrogen/helium scope expands through boron. MaximumZ accepts 1 to 5, default 5, corresponding to hydrogen, helium, lithium, beryllium and boron. Collection uses all calculated isotopes through that limit, independently of the graph display cap. Optional X plots use production titles and the same species filter.

2 Final observation acceptance

Main revision: 18.8.87 | Sources [1, 2]

XBoundaryMm defines a finite positive half-width in mm, default 500. Accepted production integrates the actual X distribution from minus to plus this value at the final observation block. It is not an additional aperture applied at every slit. The X plot displays the same interval and boundary markers.

The integral includes accepted tails even when a distribution's mean lies outside the interval. One acceptance interval replaces thresholded radiation-zone slicing for production output. RateCutoff is applied to the accepted rate after this integration, rather than independently to spatial slices.

Settings and isolation

Each production window owns its settings. They are applied during the synchronous calculation and the active radiation configuration is restored afterward. Shared result signals are accepted only by a window with an outstanding request. File actions include Load INI, Save INI as, Use default INI and Save production report. [1, 2]

Scope. The reported rates depend on the loaded beamline, reaction settings, species selection and final acceptance. This series introduces a production workflow and configuration support; it does not establish a new light-particle reaction model or a calibrated beamline benchmark.

3 Mixed slit configurations and target capacity

Main revisions: 18.8.88 and 18.8.90 | Sources [1-3]

Combined slit treatments assigns independent Phase 1 or Phase 2 behavior to one through four distinct enabled slits upstream of the observation block. Phase 1 retains the normal slit. Phase 2 uses the existing finger and Cu/Cr material treatment. All chosen replacements coexist in one transport calculation; unlisted blocks retain their normal settings.

Enumeration runs all 2 to the power N assignments: four slits give 16 configurations, including all Phase 1 and all Phase 2. Without enumeration, only the selected mixed assignment runs. Combination mode uses these assignments instead of the legacy single-slit wedge/catcher overrides and PhaseCalc. The first listed slit is the least-significant enumeration bit. [2]

Validation rejects duplicate, disabled or downstream slit selections and insufficient target capacity before modifying the beamline. Temporary blocks, original enable states and calculations are restored or cleared between configurations. Each configuration has its own final X acceptance. Configuration totals are alternatives and are never added across combinations.

Secondary-target storage expands to eight targets so simultaneous slit materials and existing beamline targets can be represented. The capacity check includes the primary target separately. Targets 1 and 2 retain separate rate thresholds; targets 3 through 8 share the third threshold through a safe accessor in both collection and transmission. Existing three-threshold settings and INI keys remain compatible. [1, 3]

4 INI batches folders and report clearing

Main revisions: 18.8.84 and 18.8.89-91 | Sources [1-3]

Run Batch reads one INI path per nonempty, noncomment line. Quoted paths are accepted; relative entries resolve beside the batch file. Missing files and invalid settings are logged and skipped. Combination-enabled INIs expand into multiple calculations, so the number of batch entries need not equal the number of runs. Reports identify the configuration and phase; the last batch INI remains active. [2]

Bundled templates are in LightParticles beside the executable, with a matching LightParticles folder in the user's LISE documents area. Missing editable templates are seeded without overwriting custom files. The default is LightParticle.ini. Explicitly selected INIs remain usable from any directory, and Prompt Radiation continues to use Radiation/PromptRadiation.ini.

Version 18.8.91 relocates the bundled files and installation-manifest entries to LightParticles. Old user copies under Radiation are neither deleted nor automatically migrated; load them explicitly and save them to the new folder if needed.

Clear page. The toolbar button and Options command, also available as Ctrl+L, clear the displayed report and reset its text formatting. Settings, INIs and the beamline are retained. Clearing is blocked during a calculation or batch. The command was introduced under File in 18.8.89 and moved to Options in 18.8.91.

5 Validation and version references

Recorded checks cover defaults and invalid settings, the fixed P2/P2/P1/P1 assignment, all 16 unique four-slit combinations, final-observation distribution integration, secondary-target thresholds and runtime/menu organization. The X-integral test includes a uniform distribution and a Gaussian tail whose mean is outside the accepted interval. Threshold tests cover targets 1 through 8 and propagation of edits to the third threshold. [2, 3]

The initial feature passed MinGW and MSVC release builds and a Windows UI check of menu order and password-free opening. Later records document MSVC x64 Release builds with Qt 6.7.0 and Visual Studio 2022 through 18.8.91. The 18.8.91 record reports manifest and batch-reference checks plus three C++ regression executables passing. [1, 3]

Validation limit. These are configuration, integration and build checks. The records do not claim an end-to-end numerical comparison of all 16 configurations for a particular beamline or automated GUI interaction coverage. This report adds no new calculation, build or timing benchmark.

LISE version	Delivered behavior
18.8.83	Direct production window, raw light-nucleus rates and phase reports.
18.8.84	Independent production INIs, defaults, batches and settings restoration.
18.8.85	MaximumZ selection through boron; all calculated isotopes are collected.
18.8.86	Optional production X distributions, persisted as ShowXPlots.
18.8.87	Final-observation XBoundaryMm acceptance and post-acceptance cutoff.
18.8.88	Mixed slit treatments, up to 16 assignments and eight-target storage.
18.8.89	Guarded Clear page action and Ctrl+L shortcut.
18.8.90	Eight-target capacity check and safe shared thresholds for later targets.
18.8.91	Clear page under Options; dedicated LightParticles folders and manifest.

Together these entries cover all nine versions in 18.8.83-91. For reproducible comparisons, retain the loaded LISE beamline, active production INI, batch list, assignment labels and final-observation settings alongside the exported report.

[1] L_Init/lise_version.h, entries 18.8.83-91.

[2] doc/LightParticle_INI_Batch.txt, retained Git revision a7066db. The guide defines the INI schema, batch syntax, slit treatment, acceptance, folder migration and test scope.

[3] Archived release records: build/light-particles-18.8.83-commit.txt, build/secondary_targets_18.8.90_commit.txt and build/light_particle_18.8.91_commit.txt. Companion construction report recorded in Git: doc/LISE_LightParticle_Construction_18.8.91.docx.

Implementation and test references: d_PromptRadiation/o_promptRad_Detailed.h and .cpp; w_Main/MainWindow_initDir.h; tests/light_particle_tests.cmd; tests/light_particle_settings_test.cpp; tests/light_particle_xcut_test.cpp; tests/secondary_target_settings_test.cpp; tests/light_particle_layout_test.ps1. Existing tests were inspected for scope; historical pass results above come from the release records.

6 e25065 analysis results

Oleg Tarasov's four-slide study, Light Particle Production by Blocks for e25065, dated 18 October 2026, applies the utility in LISE++ 18.8.100. This is a later application example of the workflow developed in 18.8.83-91. It compares 58Sc without a DB2 wedge, 58Sc with a 0.5 mm DB2 wedge, and 61Ca with a 2 mm DB2 wedge. The three input filenames share the BL5.1292Tm setting tag. [4]

P1 is the standard slit treatment. P2 includes the finger and Cu/Cr material treatment, allowing particles to pass through slit materials and accounting for secondary particles produced there. The presentation reports rates at DB3 and DB5 for regular P1 calculations and a comparison labelled combined P1+P2. [4, slide 1]

Setting	Location	Regular P1 (pps)	Reported P1+P2 (pps)	Ratio
58Sc, no wedge	DB3	110	3.4e7	3.09e5
58Sc, no wedge	DB5	19.4	6.8e3	351
58Sc, 0.5 mm	DB3	39.6	4.7e5	1.19e4
58Sc, 0.5 mm	DB5	2.02	4.3e3	2.13e3
61Ca, 2 mm	DB3	12.7	4.3e5	3.39e4
61Ca, 2 mm	DB5	0.0058	6.6e3	1.14e6

Table 1. Rates transcribed from the slide 1 overview. Ratios are calculated from those rounded values and shown to about three significant figures; they compare the reported rows and are not fitted physical enhancement factors.

The overview shows that material-related contributions can dominate the reported downstream rates, particularly when the ordinary transmitted rate is small. For 61Ca at DB5, 0.0058 pps and 6.6e3 pps differ by about 1.14 million. The two 58Sc settings have lower reported DB3 material-including rates when the 0.5 mm DB2 wedge is present: 3.4e7 versus 4.7e5 pps. These comparisons belong to the stated settings. [4]

The overview's combined row is reproduced as reported. The detailed slides contain alternative slit-treatment assignments; their rates must not be added to create a new configuration total. Standard and material-including rows also use different transport/production treatments, so their ratio is not an isolated cross-section correction or a pure transmission efficiency.

The panels headed Power Deposition contain rate-analysis tables with Allfrags, ProjFrag and secondary-target contributions. They support inspection of particle populations along the beamline. No deposited-power value in watts is extracted from those panels, and particle rates alone do not determine deposited power.

7 Selected batch configurations and interpretation

The detailed slides identify light-particle species and mechanism labels for individual configurations. Table 2 selects the highlighted high-rate DB3 rows and representative DB5 rows; these are configuration-specific outputs, distinct from the slide 1 overview. [4, slides 2-4]

Setting	Selected DB3 configuration	Selected DB5 configuration
58Sc, no wedge	3.381e7 pps; leading 4He/PF contribution 3.089e7 pps.	5.491e3 pps; leading 3H/T2 contribution 4.600e3 pps.
58Sc, 0.5 mm	4.737e5 pps; leading 2H/T3 contribution 2.777e5 pps.	4.305e3 pps; leading 3H/T2 contribution 3.843e3 pps.
61Ca, 2 mm	4.336e5 pps; leading 2H/T3 contribution 2.240e5 pps.	4.472e3 pps; leading 3H/T2 contribution 3.485e3 pps.

Table 2. Production is the selected row total; the leading-isotope entry is its contribution. PF/T2/T3 are retained exactly as mechanism codes shown in the presentation. The selected DB5 rows are not summed with other assignments.

The selected high-rate DB3 row changes from a 4He/PF-dominated result without the DB2 wedge to 2H/T3-dominated results for the two wedge settings. The selected DB5 examples are led by tritons. Other assignments in the slides have smaller rates or no rows passing the selected cutoff; that message should not be read as proof of zero physical production.

		58Sc no db2 wedge		58Sc with db2 wedge		61Ca with wedge	
		rate (pps)		rate (pps)		rate (pps)	
		at DB3	at DB5	at DB3	at DB5	at DB3	at DB5
P1-mode	regular calculations	110	19.4	39.6	2.02	12.7	5.80E-03
combined P1+P2	include passing material slits, reaction in slits	3.4E+07	6.8E+03	4.7E+05	4.3E+03	4.3E+05	6.6E+03

Figure 1. Original comparison table from slide 1. Rates are in particles per second at DB3 and DB5 for the three settings. P1 is regular slit treatment; P1+P2 includes passage through slit material and secondary nuclear reactions. Source [4].

Full analysis presentation: [LightParticlesProduction_61Ca.pdf](#)

[4] O. Tarasov, Light Particle Production by Blocks for e25065, LISE++ 18.8.100, 18 October 2026, slides 1-4. Source: 18_08_100_LightParticlesProduction_61Ca.pptx, supplied from S:/experiments/___FRIB/e25065_61Ca_Grzywacz/LISE-final/MH-10-16/. The study results are transcribed historical calculations; no new LISE transport calculation or experimental validation is claimed.

8 Original analysis for 58Sc without a DB2 wedge



⁵⁸Sc withOUT DB2 wedge



Light particles

Light Particle batch summary: LightParticle DB3 only.batch

Calculation	Phase	INI	Slit block	Calculation block	Production (pps)	Top isotope	Mechanism	Top rate (pps)	Slit treatments	Comments
#1	Combined	LightParticle_PS_momslit_to_DB3	PS_Mom_slits	CD2_BT506	6.362e+01	2H	T1	3.307e+01	PS_FP_slit=P1; DB2 slits=P1	
#2	Combined	LightParticle_PS_momslit_to_DB3	PS_Mom_slits	CD2_BT506	2.302e+03	2H	T2	2.196e+03	PS_FP_slit=P2; DB2 slits=P1	
#3	Combined	LightParticle_PS_momslit_to_DB3	PS_Mom_slits	CD2_BT506	0.000e+00				PS_FP_slit=P1; DB2 slits=P2	no light-particle rows passed the selected cutoff
#4	Combined	LightParticle_PS_momslit_to_DB3	PS_Mom_slits	CD2_BT506	3.351e+07	4He	PF	3.089e+07	PS_FP_slit=P2; DB2 slits=P2	
#5	Combined	LightParticle_PS_FP_slit_to_DB3	PS_FP_slit	CD2_BT506	6.552e+01	2H	T1	3.307e+01	DB2 slits=P1	
#6	Combined	LightParticle_PS_FP_slit_to_DB3	PS_FP_slit	CD2_BT506	0.000e+00				DB2 slits=P2	no light-particle rows passed the selected cutoff
#7	1	LightParticle_DB2_slits_to_DB3	DB2 slits	CD2_BT506	6.362e+01	2H	T1	3.307e+01		
#8	2	LightParticle_DB2_slits_to_DB3	DB2 slits	CD2_BT506	0.000e+00					no light-particle rows passed the selected cutoff

Batch complete. Use File / Save production report to export all results and this summary.

58Sc @ DB3
no DB2 wedge

Light Particle batch summary: LightParticle DB5 only.batch

Calculation	Phase	INI	Slit block	Calculation block	Production (pps)	Top isotope	Mechanism	Top rate (pps)	Slit treatments	Comments
#9	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	0.000e+00				PS_FP_slit=P1; DB2 slits=P1; DB3_slit=P1; DB4_slit=P1	no light-particle rows passed the selected cutoff
#10	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	1.783e+02	2H	T2	1.692e+02	PS_FP_slit=P2; DB2 slits=P1; DB3_slit=P1; DB4_slit=P1	no light-particle rows passed the selected cutoff
#11	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	0.000e+00				PS_FP_slit=P1; DB2 slits=P2; DB3_slit=P1; DB4_slit=P1	no light-particle rows passed the selected cutoff
#12	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	0.000e+00				PS_FP_slit=P2; DB2 slits=P2; DB3_slit=P1; DB4_slit=P1	no light-particle rows passed the selected cutoff
#13	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	0.000e+00				PS_FP_slit=P1; DB2 slits=P1; DB3_slit=P2; DB4_slit=P1	no light-particle rows passed the selected cutoff
#14	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	0.000e+00				PS_FP_slit=P2; DB2 slits=P2; DB3_slit=P2; DB4_slit=P1	no light-particle rows passed the selected cutoff
#15	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	0.000e+00				PS_FP_slit=P1; DB2 slits=P1; DB3_slit=P1; DB4_slit=P2	no light-particle rows passed the selected cutoff
#16	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	9.761e+01	3H	T2	6.549e+01	PS_FP_slit=P2; DB2 slits=P2; DB3_slit=P2; DB4_slit=P1	no light-particle rows passed the selected cutoff
#17	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	1.926e+01	2H	T1	1.825e+01	PS_FP_slit=P1; DB2 slits=P1; DB3_slit=P1; DB4_slit=P2	
#18	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	1.370e+03	2H	T2	1.356e+03	PS_FP_slit=P2; DB2 slits=P2; DB3_slit=P1; DB4_slit=P2	
#19	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	0.000e+00				PS_FP_slit=P1; DB2 slits=P2; DB3_slit=P1; DB4_slit=P2	no light-particle rows passed the selected cutoff
#20	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	0.000e+00				PS_FP_slit=P2; DB2 slits=P2; DB3_slit=P1; DB4_slit=P2	no light-particle rows passed the selected cutoff
#21	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	0.000e+00				PS_FP_slit=P1; DB2 slits=P1; DB3_slit=P2; DB4_slit=P2	no light-particle rows passed the selected cutoff
#22	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	0.000e+00				PS_FP_slit=P2; DB2 slits=P1; DB3_slit=P2; DB4_slit=P2	no light-particle rows passed the selected cutoff
#23	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	0.000e+00				PS_FP_slit=P1; DB2 slits=P2; DB3_slit=P2; DB4_slit=P2	no light-particle rows passed the selected cutoff
#24	Combined	LightParticle_PS_momslit_to_DB5	PS_Mom_slits	CD4_BT508	5.491e+03	3H	T2	4.600e+03	PS_FP_slit=P2; DB2 slits=P2; DB3_slit=P2; DB4_slit=P2	
#25	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BT508	0.000e+00				DB2 slits=P1; DB3_slit=P1; DB4_slit=P1	no light-particle rows passed the selected cutoff
#26	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BT508	0.000e+00				DB2 slits=P2; DB3_slit=P1; DB4_slit=P1	no light-particle rows passed the selected cutoff
#27	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BT508	0.000e+00				DB2 slits=P1; DB3_slit=P2; DB4_slit=P1	no light-particle rows passed the selected cutoff
#28	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BT508	0.000e+00				DB2 slits=P2; DB3_slit=P2; DB4_slit=P1	no light-particle rows passed the selected cutoff
#29	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BT508	1.926e+01	2H	T1	1.825e+01	DB2 slits=P1; DB3_slit=P1; DB4_slit=P2	
#30	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BT508	0.000e+00				DB2 slits=P2; DB3_slit=P1; DB4_slit=P2	no light-particle rows passed the selected cutoff
#31	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BT508	0.000e+00				DB2 slits=P1; DB3_slit=P2; DB4_slit=P2	no light-particle rows passed the selected cutoff
#32	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BT508	0.000e+00				DB2 slits=P2; DB3_slit=P2; DB4_slit=P2	no light-particle rows passed the selected cutoff
#33	1	LightParticle_DB2_slits_to_DB5	DB2 slits	CD4_BT508	0.000e+00					no light-particle rows passed the selected cutoff
#34	2	LightParticle_DB2_slits_to_DB5	DB2 slits	CD4_BT508	0.000e+00					no light-particle rows passed the selected cutoff
#35	1	LightParticle_DB3_slits_to_DB5	DB3 slits	CD4_BT508	0.000e+00					no light-particle rows passed the selected cutoff
#36	2	LightParticle_DB3_slits_to_DB5	DB3 slits	CD4_BT508	0.000e+00					no light-particle rows passed the selected cutoff

58Sc @ DB5
no DB2 wedge

Power Deposition

			Rate analysis by reactions	
#	Block	All frags	ProjFrag	SecTarg1
1	Target	1.79e+12	1.79e+12	0
2	Stripper	1.79e+12	1.79e+12	0
3	a0_PTS	4.39e+11	4.39e+11	0
4	rotate_PS	4.39e+11	4.39e+11	0
5	a0_D1ex	4.39e+11	4.39e+11	0
6	BTS01c_D105	4.39e+11	4.39e+11	0
7	Beam_Dump	2.18e+10	2.18e+10	0
8	Frag_Catche	2.18e+10	2.18e+10	0
9	BTS01d	2.18e+10	2.18e+10	0
10	a0_WDG	2.18e+10	2.18e+10	0
11	PS_Mom_slit	1.66e+08	1.66e+08	0
12	PS_wdg	1.65e+08	1.65e+08	0
13	BTS02	1.65e+08	1.65e+08	2.10e+04
14	BTS03	1.65e+08	1.65e+08	2.10e+04
15	correction_1	1.65e+08	1.65e+08	2.10e+04
16	PS_FP_slit	1.32e+02	2.30e+01	1.09e+02
17	unrotate_PS	1.32e+02	2.30e+01	1.09e+02
18	CD1_BT505	1.15e+02	2.30e+01	9.20e+01
19	DB2 slits	1.15e+02	2.30e+01	9.20e+01
20	CD2_BT506	1.11e+02	2.27e+01	8.81e+01
21	DB3_PPAC0	1.11e+02	2.27e+01	8.80e+01
22	DB3_slit	1.11e+02	2.27e+01	8.80e+01
23	DB3_PPAC1	1.11e+02	2.27e+01	8.80e+01
24	DB3_wdg	1.11e+02	2.27e+01	8.80e+01
25	DB3_TID	1.10e+02	2.23e+01	8.73e+01
26	CD3_BT507	9.51e+01	2.06e+01	7.45e+01
27	DB4_slit	1.95e+01	1.93e+01	1.75e-01
28	DB4_PPAC	1.95e+01	1.93e+01	1.75e-01
29	CD4_BT508	1.95e+01	1.93e+01	1.75e-01
30	DB5_PPACs	1.94e+01	1.93e+01	1.75e-01
31	DB5_slit	1.89e+01	1.88e+01	1.69e-01
32	DB5_TID	1.85e+01	1.84e+01	1.66e-01
33	dummy	1.85e+01	1.84e+01	1.66e-01
34	DB5_PIN	1.84e+01	1.83e+01	1.66e-01
35	DB5_PIN2	1.83e+01	1.81e+01	1.65e-01

Oleg Tarasov @ MSU 10/18/2026

Figure 2. Original slide 2. DB3 and DB5 batch results and reaction-rate analysis for the 58Sc setting without a DB2 wedge. Source [4].

9 Original analysis for 58Sc with a DB2 wedge



⁵⁸Sc with DB2 wedge (0.5 mm)



Light particles

Power Deposition

Light Particle batch summary: LightParticle DB3 only.batch

Calculation	Phase	INI	Slits block	Calculation block	Production (pps)	Top isotope	Mechanism	Top rate (pps)	Slit treatments	Comment
#1	Combined	LightParticle_PS_monSlit_to_DB3	PS_Mom_slits	CD2_BTS06	2.163e+01	7Li	T1	5.225e+00	PS_FP_slit=P1; DB2 slit=P1	
#2	Combined	LightParticle_PS_monSlit_to_DB3	PS_Mom_slits	CD2_BTS06	2.980e+03	2H	T2	2.890e+03	PS_FP_slit=P2; DB2 slit=P1	
#3	Combined	LightParticle_PS_monSlit_to_DB3	PS_Mom_slits	CD2_BTS06	0.000e+00				PS_FP_slit=P1; DB2 slit=P2	no light-particle rows passed the selected cutoff
#4	Combined	LightParticle_PS_monSlit_to_DB3	PS_Mom_slits	CD2_BTS06	4.737e+01	2H	T3	2.077e+05	PS_FP_slit=P2; DB2 slit=P2	
#5	Combined	LightParticle_PS_FP_slit_to_DB3	PS_FP_slit	CD4_BTS06	2.335e+01	7Li	T1	5.225e+00	DB2 slit=P1	
#6	Combined	LightParticle_PS_FP_slit_to_DB3	PS_FP_slit	CD4_BTS06	0.000e+00				DB2 slit=P2	no light-particle rows passed the selected cutoff
#7	1	LightParticle_DB2_slits_to_DB3	DB2 slits	CD2_BTS06	2.163e+01	7Li	T1	5.225e+00		
#8	2	LightParticle_DB2_slits_to_DB3	DB2 slits	CD2_BTS06	0.000e+00					no light-particle rows passed the selected cutoff

Batch complete. Use File / Save production report to export all results and this summary.

Light Particle batch summary: LightParticle DB5 only.batch

Calculation	Phase	INI	Slits block	Calculation block	Production (pps)	Top isotope	Mechanism	Top rate (pps)	Slit treatments	Comment
#9	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	0.000e+00				PS_FP_slit=P1; DB2 slit=P1; DB3 slit=P1; DB4 slit=P1	no light-particle rows passed the selected cutoff
#10	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	0.000e+00				PS_FP_slit=P2; DB2 slit=P1; DB3 slit=P1; DB4 slit=P1	no light-particle rows passed the selected cutoff
#11	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	0.000e+00				PS_FP_slit=P1; DB2 slit=P2; DB3 slit=P1; DB4 slit=P1	no light-particle rows passed the selected cutoff
#12	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	0.000e+00				PS_FP_slit=P2; DB2 slit=P2; DB3 slit=P1; DB4 slit=P1	no light-particle rows passed the selected cutoff
#13	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	0.000e+00				PS_FP_slit=P1; DB2 slit=P1; DB3 slit=P2; DB4 slit=P1	no light-particle rows passed the selected cutoff
#14	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	0.000e+00				PS_FP_slit=P2; DB2 slit=P1; DB3 slit=P2; DB4 slit=P1	no light-particle rows passed the selected cutoff
#15	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	0.000e+00				PS_FP_slit=P1; DB2 slit=P2; DB3 slit=P2; DB4 slit=P1	no light-particle rows passed the selected cutoff
#16	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	4.905e+01	3H	T2	4.834e+01	PS_FP_slit=P2; DB2 slit=P2; DB3 slit=P2; DB4 slit=P1	
#17	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	0.000e+00				PS_FP_slit=P1; DB2 slit=P1; DB3 slit=P1; DB4 slit=P2	no light-particle rows passed the selected cutoff
#18	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	0.000e+00				PS_FP_slit=P2; DB2 slit=P1; DB3 slit=P1; DB4 slit=P2	no light-particle rows passed the selected cutoff
#19	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	0.000e+00				PS_FP_slit=P1; DB2 slit=P2; DB3 slit=P1; DB4 slit=P2	no light-particle rows passed the selected cutoff
#20	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	3.431e+01	3H	T4	3.431e+01	PS_FP_slit=P2; DB2 slit=P2; DB3 slit=P1; DB4 slit=P2	
#21	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	3.512e+01	4He	T1	3.512e+01	PS_FP_slit=P1; DB2 slit=P1; DB3 slit=P2; DB4 slit=P2	
#22	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	7.689e+02	2H	T2	7.689e+02	PS_FP_slit=P2; DB2 slit=P1; DB3 slit=P2; DB4 slit=P2	
#23	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	0.000e+00				PS_FP_slit=P1; DB2 slit=P2; DB3 slit=P2; DB4 slit=P2	no light-particle rows passed the selected cutoff
#24	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slits	CD4_BTS06	4.305e+03	3H	T2	3.843e+03	PS_FP_slit=P2; DB2 slit=P2; DB3 slit=P2; DB4 slit=P2	
#25	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS06	0.000e+00				DB2 slit=P1; DB3 slit=P1; DB4 slit=P1	no light-particle rows passed the selected cutoff
#26	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS06	0.000e+00				DB2 slit=P2; DB3 slit=P1; DB4 slit=P1	no light-particle rows passed the selected cutoff
#27	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS06	0.000e+00				DB2 slit=P1; DB3 slit=P2; DB4 slit=P1	no light-particle rows passed the selected cutoff
#28	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS06	0.000e+00				DB2 slit=P2; DB3 slit=P2; DB4 slit=P1	no light-particle rows passed the selected cutoff
#29	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS06	0.000e+00				DB2 slit=P1; DB3 slit=P1; DB4 slit=P2	no light-particle rows passed the selected cutoff
#30	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS06	0.000e+00				DB2 slit=P2; DB3 slit=P1; DB4 slit=P2	no light-particle rows passed the selected cutoff
#31	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS06	3.512e+01	4He	T1	3.512e+01	DB2 slit=P1; DB3 slit=P2; DB4 slit=P2	
#32	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS06	0.000e+00				DB2 slit=P2; DB3 slit=P2; DB4 slit=P2	no light-particle rows passed the selected cutoff

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Figure 3. Original slide 3. DB3 and DB5 batch results and reaction-rate analysis for the 58Sc setting with a 0.5 mm DB2 wedge. Source [4].

			Rate analysis by reactions		
#	Block	All frags	ProjFrag	SecTarg1	SecTarg2
1	Target	1.79e+12	1.79e+12	0	0
2	Stripper	1.79e+12	1.79e+12	0	0
3	a0_PTS	4.39e+11	4.39e+11	0	0
4	rotate_PS	4.39e+11	4.39e+11	0	0
5	a0_D1ex	4.39e+11	4.39e+11	0	0
6	BTS01c_D1	4.39e+11	4.39e+11	0	0
7	Beam_Dump	9.39e+09	9.39e+09	0	0
8	Frag_Catch	9.39e+09	9.39e+09	0	0
9	BTS01d	9.39e+09	9.39e+09	0	0
10	a0_WDG	9.39e+09	9.39e+09	0	0
11	PS_Mom_s	1.49e+08	1.49e+08	0	0
12	PS_wdg	1.48e+08	1.48e+08	0	0
13	BTS02	1.48e+08	1.48e+08	1.26e+04	0
14	BTS03	1.48e+08	1.48e+08	1.26e+04	0
15	correction	1.48e+08	1.48e+08	1.26e+04	0
16	PS_FP_slit	4.54e+01	2.41e+00	4.30e+01	0
17	unrotate_P	4.54e+01	2.41e+00	4.30e+01	0
18	CD1_BTS05	4.12e+01	2.41e+00	3.88e+01	0
19	DB2 slits	4.12e+01	2.41e+00	3.88e+01	0
20	DB2wdg	4.10e+01	2.40e+00	3.86e+01	0
21	CD2_BTS06	3.96e+01	2.36e+00	3.72e+01	2.24e-02
22	DB3_PPAC1	3.96e+01	2.36e+00	3.72e+01	2.24e-02
23	DB3_slit	2.37e+00	2.36e+00	8.16e-03	2.58e-04
24	DB3_PPAC2	2.37e+00	2.36e+00	8.16e-03	2.58e-04
25	DB3_wdg	2.37e+00	2.36e+00	8.16e-03	2.58e-04
26	DB3_TID	2.32e+00	2.31e+00	8.02e-03	2.54e-04
27	CD3_BTS07	2.11e+00	2.10e+00	7.28e-03	2.42e-04
28	DB4_slit	2.02e+00	2.02e+00	5.82e-03	1.01e-04
29	DB4_PPAC	2.02e+00	2.02e+00	5.82e-03	1.01e-04
30	CD4_BTS08	2.02e+00	2.02e+00	5.82e-03	1.01e-04
31	DB5_PPAC1	2.02e+00	2.02e+00	5.82e-03	1.01e-04
32	DB5_slit	1.95e+00	1.94e+00	5.61e-03	1.01e-04
33	DB5_TID	1.91e+00	1.90e+00	5.51e-03	9.86e-05
34	dummy	1.91e+00	1.90e+00	5.51e-03	9.86e-05
35	DB5_PIN	1.90e+00	1.89e+00	5.48e-03	9.80e-05

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10 Original analysis for 61Ca with a DB2 wedge



⁶¹Ca with DB2 wedge (2 mmt)



Light particles

Light Particle batch summary: LightParticle DB3 only batch

Calculation	Phase	INI	Slits block	Calculation block	Production (pps)	Top isotope	Mechanism	Top rate (pps)	Slit treatments
#1	Combined	LightParticle_PS_monSlit_to_DB3	PS_Mom_slit	CD2_BTS06	5.384e+00	7Li	T1	2.529e+00	PS_FP_slit=P1; DB2_slit=P1
#2	Combined	LightParticle_PS_monSlit_to_DB3	PS_Mom_slit	CD2_BTS06	2.537e+03	2H	T2	2.439e+03	PS_FP_slit=P2; DB2_slit=P1
#3	Combined	LightParticle_PS_monSlit_to_DB3	PS_Mom_slit	CD2_BTS06	0.000e+00				PS_FP_slit=P1; DB2_slit=P2
#4	Combined	LightParticle_PS_monSlit_to_DB3	PS_Mom_slit	CD2_BTS06	4.334e+03	2H	T3	2.240e+03	PS_FP_slit=P2; DB2_slit=P2
#5	Combined	LightParticle_PS_FP_slit_to_DB3	PS_FP_slit	CD2_BTS06	1.057e+01	7Li	T1	2.529e+00	DB2_slit=P1
#6	Combined	LightParticle_PS_FP_slit_to_DB3	PS_FP_slit	CD2_BTS06	0.000e+00				DB2_slit=P2
#7	1	LightParticle_DB2_slit_to_DB3	DB2_slit	CD2_BTS06	5.384e+00	7Li	T1	2.529e+00	
#8	2	LightParticle_DB2_slit_to_DB3	DB2_slit	CD2_BTS06	0.000e+00				

Blank summary: The file / Data/reaction_rate/ps_monSlit_and_slit_summary

Light Particle batch summary: LightParticle DB5 only batch

Calculation	Phase	INI	Slits block	Calculation block	Production (pps)	Top isotope	Mechanism	Top rate (pps)	Slit treatments
#9	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	0.000e+00				PS_FP_slit=P1; DB2_slit=P1; DB3_slit=P1; DB4_slit=P1
#10	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	0.000e+00				PS_FP_slit=P2; DB2_slit=P2; DB3_slit=P2; DB4_slit=P1
#11	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	0.000e+00				PS_FP_slit=P1; DB2_slit=P2; DB3_slit=P1; DB4_slit=P1
#12	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	6.115e+00	2H	T2	6.115e+00	PS_FP_slit=P2; DB2_slit=P2; DB3_slit=P2; DB4_slit=P1
#13	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	0.000e+00				PS_FP_slit=P1; DB2_slit=P1; DB3_slit=P2; DB4_slit=P2
#14	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	0.000e+00				PS_FP_slit=P2; DB2_slit=P1; DB3_slit=P2; DB4_slit=P1
#15	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	0.000e+00				PS_FP_slit=P1; DB2_slit=P2; DB3_slit=P2; DB4_slit=P1
#16	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	3.749e+01	3H	T2	3.587e+01	PS_FP_slit=P2; DB2_slit=P2; DB3_slit=P2; DB4_slit=P1
#17	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	0.000e+00				PS_FP_slit=P1; DB2_slit=P1; DB3_slit=P1; DB4_slit=P2
#18	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	0.000e+00				PS_FP_slit=P2; DB2_slit=P2; DB3_slit=P2; DB4_slit=P2
#19	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	0.000e+00				PS_FP_slit=P1; DB2_slit=P2; DB3_slit=P1; DB4_slit=P2
#20	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	5.132e+03	2H	T2	2.067e+03	PS_FP_slit=P2; DB2_slit=P2; DB3_slit=P1; DB4_slit=P2
#21	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	1.781e-01	4He	T1	1.781e-01	PS_FP_slit=P1; DB2_slit=P1; DB3_slit=P2; DB4_slit=P2
#22	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	6.086e+02	2H	T2	5.986e+02	PS_FP_slit=P2; DB2_slit=P2; DB3_slit=P2; DB4_slit=P2
#23	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	0.000e+00				PS_FP_slit=P1; DB2_slit=P2; DB3_slit=P2; DB4_slit=P2
#24	Combined	LightParticle_PS_monSlit_to_DB5	PS_Mom_slit	CD4_BTS08	5.472e+03	2H	T2	5.480e+03	PS_FP_slit=P2; DB2_slit=P2; DB3_slit=P2; DB4_slit=P2
#25	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS08	0.000e+00				DB2_slit=P1; DB3_slit=P1; DB4_slit=P1
#26	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS08	0.000e+00				DB2_slit=P2; DB3_slit=P2; DB4_slit=P1
#27	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS08	0.000e+00				DB2_slit=P1; DB3_slit=P2; DB4_slit=P1
#28	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS08	0.000e+00				DB2_slit=P2; DB3_slit=P2; DB4_slit=P1
#29	Combined	LightParticle_PS_FP_slit_to_DB5	PS_FP_slit	CD4_BTS08	0.000e+00				DB2_slit=P1; DB3_slit=P1; DB4_slit=P2

61Ca @ DB3

61Ca @ DB5

Power Deposition

Rate analysis by reactions				
#	Block	All frags	ProjFrag	SecTarg1
1	Target	1.79e+12	1.79e+12	0
2	Stripper	1.79e+12	1.79e+12	0
3	a0_PTS	4.39e+11	4.39e+11	0
4	rotate_PS	4.39e+11	4.39e+11	0
5	a0_D1ex	4.39e+11	4.39e+11	0
6	BTS01c_D10	4.39e+11	4.39e+11	0
7	Beam_Dump	3.13e+10	3.13e+10	0
8	Frag_Catch	3.13e+10	3.13e+10	0
9	BTS01d	3.13e+10	3.13e+10	0
10	a0_WDG	3.13e+10	3.13e+10	0
11	PS_Mom_s	1.12e+08	1.12e+08	0
12	PS_wdg	1.12e+08	1.12e+08	0
13	BTS02	1.12e+08	1.12e+08	7.39e+03
14	BTS03	1.12e+08	1.12e+08	7.39e+03
15	correction	1.12e+08	1.12e+08	7.39e+03
16	PS_FP_slit	1.53e+01	1.42e-02	1.53e+01
17	unrotate_P	1.53e+01	1.42e-02	1.53e+01
18	CD1_BTS05	1.34e+01	1.42e-02	1.34e+01
19	DB2_slits	1.34e+01	1.42e-02	1.34e+01
20	DB2wdg	1.32e+01	1.38e-02	1.32e+01
21	CD2_BTS06	1.27e+01	1.35e-02	1.26e+01
22	DB3_PPAC	1.27e+01	1.35e-02	1.26e+01
23	DB3_slit	6.58e-03	6.26e-03	0
24	DB3_PPAC1	6.58e-03	6.26e-03	0
25	DB3_wdg	6.58e-03	6.26e-03	0
26	DB3_TID	6.44e-03	6.13e-03	0
27	CD3_BTS07	6.23e-03	5.93e-03	0
28	DB4_slit	5.78e-03	5.78e-03	0
29	DB4_PPAC	5.78e-03	5.78e-03	0
30	CD4_BTS08	5.78e-03	5.78e-03	0
31	DB5_PPAC	5.77e-03	5.77e-03	0
32	DB5_slit	5.69e-03	5.69e-03	0
33	DB5_TID	5.57e-03	5.57e-03	0
34	dummy	5.57e-03	5.57e-03	0
35	DB5_PIN	5.53e-03	5.53e-03	0

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Figure 4. Original slide 4. DB3 and DB5 batch results and reaction-rate analysis for the 61Ca setting with a 2 mm DB2 wedge. Source [4].