



Tasks for the LISE⁺⁺ development assistance group

Facility for Rare Isotope Beams, Michigan State University, East Lansing, MI 48824 USA

2025

MICHIGAN STATE
UNIVERSITY



U.S. DEPARTMENT OF
ENERGY

Office of
Science

Week 1 (01/06/2025)

Daniel

- LISE site statistics : downloading
- Poster printing
- Testing SpecTk in Linux environment
- Using Qt for ARIS SpecTcl

Sasha

- make the 3D dipole for Relative plotting (rectangle projection) - no Angles
- Look at the modified LISE source
- Insert separator 3D-blocks in LISE MC 3D envelope
- OpenGL: simple application

Arjun

- ETACHA profiling
- How many times for bottleneck functions
- Locate bottlenecks
- Suggest solution asymptotic, tabulation, simplification, smart calculation
- Subroutine to calculate the DIGAMMA function of a complex argument using formulas from M. Abramowitz and I. Stegun
- Presentation for bottlenecks and solution
- Find out time profit between parallelized and regular versions

Oleg's note

- No meetings on the next week
- Using Quick in LISE (Linh?)
- Qt on LINUX, SpecTcl
- Migration from github to MSU gitlab?

can you suggest asymptotic for function sum(1/k) where k is from 1 to N

The function $\sum_{k=1}^N \frac{1}{k}$ is the N -th harmonic number, denoted by H_N . An asymptotic approximation for H_N as $N \rightarrow \infty$ is:

$$H_N \sim \ln(N) + \gamma + \frac{1}{2N} - \frac{1}{12N^3} + O\left(\frac{1}{N^5}\right),$$

where:

- $\ln(N)$ is the natural logarithm of N .
- γ is the Euler-Mascheroni constant ($\gamma \approx 0.577$).

For a simpler leading-order asymptotic, you can use:

$$H_N \sim \ln(N) + \gamma.$$

This approximation is sufficient for most applications. The higher-order terms become significant only for small N .

Monday meeting participants

Daniel, Sasha, Arjun

current week tasks

Last week report

- Finished LISE Site Statistics
 - All data from 1/1/24-12/31/24
 - Created download statistics
- Reformatted Poster
- Finished 3rd Poster Draft

- Creation of new 3D slit model for graph.
- Measurements drafted for additional dipole model.
- Start of looking into model placement and scaling in Monte Carlo graph.

- -Installed software to see functions in mac profiler
- -Tweaked code to make compatible
- -Profiled ETACHA4 code:GQUAD function-largest runtime percentage(Due to calling function hy1star)
- -Started researching into efficient ways for parallelization of function.
- -Meetings

Week 2-3 (01/20/2025)

Daniel

- Using Qt for ARIS SpecTcl
- Integrators research
- Travel expenses
- Numerical repices
- Tuesday: students

Sasha

- make the 3D dipole for Relative plotting (rectangle projection) - no Angles
- Look at the modified LISE source
- Prepare questions
- Insert separator 3D-blocks in LISE MC 3D envelope
- OpenGL: simple application

Arjun

- ETACHA profiling
- How many times for bottleneck functions
- Locate bottlenecks
- Suggest solution asymptotic, tabulation, simplification, smart calculation
- Presentation for bottlenecks and solution
- Subroutine to calculate the DIGAMMA function of a complex argument using formulas from M. Abramowitz and I. Stegun
- Find out time profit between parallelized and regular versions

Oleg's note

- Send Monday-Tuesday class schedule
- Using Quick in LISE (Linh?)
- Qt on LINUX, SpecTcl
- Migration from github to MSU gitlab?

current week tasks

- Attended weekly meetings
- Began work on using QT in LINUX
- Prepared for the RIKEN trip
- Presented results of porting LISE for Excel to 64 bit and SpecTk development in the Fragment-Separator experts workshop in RIKEN, Japan

- Final selection of candidates.
- Preparing questions for LISE 3D graph project for teams arrival.
- -----
- 2D projection of dipole model approved and all models finalized.
- Review of candidates.

- -Identified bottleneck lines of code
- -Identified which functions were called most often.
- -Trial and error method to make bottleneck code more efficient. No significant improvement solutions found yet.
- ~~Travel back to campus~~
- -Focused on calculations after clicking the "continue" button in ETACHA cross-sections dialog.
- -Still testing methods to reduce function times.

Last week report

Monday meeting participants

Daniel, Sasha, Arjun



Week 4 (01/27/2025)

Daniel

- Pdf-sorting
- Using Qt for ARIS SpecTcl
- Integrators research
- Travel expenses

Sasha

- make the 3D axes dialog
- Keep axis information for original, and modified.
- Clicking button "Accept" -- redraw the plot without closing the dialog
- Think why your shapes have so different sizes
- OpenGL: simple application

Arjun

- **Presentation for bottlenecks and solutions**
- ETACHA profiling
- How many times for bottleneck functions
- Locate bottlenecks
- Suggest solution asymptotic, tabulation, simplification, smart calculation
- Subroutine to calculate the DIGAMMA function of a complex argument using formulas from M. Abramowitz and I. Stegun

Oleg's note

- Prepare pdf-files to sort
- Prepare 3D-block positions
- Provide info about current Sasha's block
- Using Quick in LISE (Linh?)
- Qt on LINUX, SpecTcl
- Migration from github to MSU gitlab?

Monday meeting participants

Daniel, Sasha, Arjun

current week tasks

Last week report

- Met and Interviewed new undergraduates
- ODE research
- LINUX QT research

- Troubleshooting 3D model rendering issue in QT.
- Models remade with mesh triangulated to solve export issue.
- Meetings

- -Meetings
- -Updated ETACHA with a popup window for the timer of the integration process
- -Currently trying to implement the same timer for Plots
- -Bottleneck points presentation and solution
- -Tested with parallelization on certain bottleneck functions.

Week 5 (02/03/2025)

Daniel

- Pdf-sorting
- Using Qt for ARIS SpecTcl in LINUX
- Integrators research

Sasha

- 3D operations in Qt: how to make
- Zoom with axis change
- Pan
- Viewpoint location change
- See information in → ChatGPT, google, github, Qt source for OpenGL
- OpenGL: simple application

Arjun

- **Presentation for bottlenecks and solutions**
- ETACHA profiling
- How many times for bottleneck functions
- Locate bottlenecks
- Suggest solution asymptotic, tabulation, simplification, smart calculation
- Subroutine to calculate the DIGAMMA function of a complex argument using formulas from M. Abramowitz and I. Stegun

Oleg's note

- Using Quick in LISE (Linh?)
- Qt on LINUX, SpecTcl
- Migration from github to MSU gitlab?

current week tasks

Last week report

- New SpecTcl LINUX learning (currently trying to resolve issues)
- Renaming, Reading, and Organizing literature

- Meetings
- Start of dialogue and option layout tasks.

- -Made a list of bottlenecks in an Excel sheet, and added it to the folder
- -Profiling to discover more bottleneck points
- -Added timer in popup and icon checkbox for timer.
- -Meetings

Monday meeting participants

Daniel, Sasha, Arjun



Weeks 6-8 (02/24/2025)

Daniel

- Pdf-sorting
- Using Qt for ARIS SpecTcl in LINUX
- SpecTk – “about” move, “hard reset” command, latest version?
- Integrators research

Sasha

- Update 3D ARIS optical blocks for new coordinate system
- Show current axis angle rotation status, later with possibility to enter data

Arjun

- **Presentation for bottlenecks and solutions**
- ETACHA profiling
- How many times for bottleneck functions
- Locate bottlenecks
- Suggest solution asymptotic, tabulation, simplification, smart calculation
- Subroutine to calculate the DIGAMMA function of a complex argument using formulas from M. Abramowitz and I. Stegun

Oleg's note

- Check Daniel's process with papers in lisedev
- Using Quick in LISE (Linh?)
- Qt on LINUX, SpecTcl
- Migration from github to MSU gitlab?

current week tasks

- Worked on resolving an issue with LISE for Excel
- Completed training
- Continued sorting literature (>50%)
-
- Continued sorting literature (about 40% done)
-
- Continued reading articles and sorting them
- Continued work on SpecTcl compiling

Last week report

- Panning classes implementation into 3D Graph.
- New orientations for beamdump models.
- Fixed geometry issues.
- Meetings
- Start of new 3D graph tasks with locations, zooming, and panning..

- -Completely optimized first function
- -Working on optimizing function digam, running into some bugs.
- -Made presentation on optimized version of chypser.
- -Updated excel sheet
- -Meetings
-
- -Finished optimization of first bottleneck, it is no longer a bottleneck point.
- -Currently gathering all data to make inputs in excel and presentation.
- -Presentation for bottleneck optimization.
- -Meetings
-
- -Made bottleneck presentation and updated to github.
- -Timer completed, yet to push to github.
- -Research on optimization methods.
- -Started working on implementing optimization methods.
- -Meetings

Monday meeting participants

Daniel, Sasha, Arjun



Weeks 9 (03/03/2025)

Daniel

- Pdf-sorting
- SpecTk – ellipse gate
- Isomer database
- Using Qt for ARIS SpecTcl in LINUX
- Integrators research

Sasha

- Update 3D ARIS optical blocks for new coordinate system and sizes (only X)
- Show current axis angle rotation status, later with possibility to enter data

Arjun

- **Presentation for bottlenecks and solutions**
- ETACHA profiling
- How many times for bottleneck functions
- Locate bottlenecks
- Suggest solution asymptotic, tabulation, simplification, smart calculation
- Subroutine to calculate the DIGAMMA function of a complex argument using formulas from M. Abramowitz and I. Stegun

Oleg's note

- NO meeting on 03/10
- Using Quick in LISE (Linh?)
- Qt on LINUX, SpecTcl
- Migration from github to MSU gitlab?

current week tasks

Last week report

- Finished SpecTk 1.7.2
 - Added the auto gating
- Continued to sort documents

- Models sent off
- Start of axes rotation in 3D graph.

-
- blocks like material are not included because materials do not need to be changed, they are only applied to the other objects.
 - All the other ones are in there

- -Pushed updates to Github
- -Working on second bottleneck point
- -Meetings

Monday meeting participants

Daniel, Sasha

Weeks 10-12 (03/24/2025)

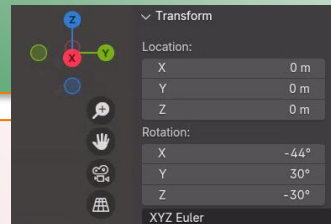
Daniel

- Pdf-renaming
- SpecTk – statistics fonts
- SpecTk - python
- Using Qt for ARIS SpecTcl in LINUX
- Isomer database

- Finished SpecTk 1.7.4
- Added an Ellipse Option to Auto Gate
- Added Covariance and angle Calculations to all 2D ROIs
- Began work on SpecTk 1.7.5
 - Trying to add a timeout to SpecTk to terminate functions after a set amount of inactivity
- Continued Paper Sorting
- ----- 11
- Participated in the e21035 experiment
- Released SpecTk versions 1.7.5-1.7.11
 - 1.7.5 Decreased auto gates speed to less than a second
 - 1.7.6 fixed a covariance calc issue
 - 1.7.7 removed standard deviation from the display
 - 1.7.8 Added an advanced calculation option, and introduced a cap on auto gate run time
 - 1.7.9 Allow auto gate to be done inside an ROI, and fixed an Xamine import issue
 - 1.7.10 Added slope to the advanced calculations
 - 1.7.11 reformatted the advanced calculations window to improve readability
- ----- 12
- Finished Sorting Papers
 - Began Renaming Papers
 - Briefly worked on SpecTk contour hitboxes

Sasha

- Remade 3D ARIS optical blocks for new coordinate system and sizes (only X)
- Show current axis angle rotation status, later with possibility to enter data



- ----- 10
- New versions of 3D graph models with different measurements created
- ----- 11
- -Axis rotation slider, scrub, and input implemented in 3D graph.
- Different methods for creating a Z rolling rotation tested.
- ----- 12
- meetings

Arjun

- Presentation for bottlenecks and solutions for this Thursday meeting
- ETACHA profiling (currently 7 bottlenecks)
- How many times for bottleneck functions
- Locate bottlenecks
- Suggest solution asymptotic, tabulation, simplification, smart calculation
- Subroutine to calculate the DIGAMMA function of a complex argument using formulas from M. Abramowitz and I. Stegun

- ----- 10
- -Completed bottleneck 2 code optimization for function cGamLn
- -Excel and presentation for optimized code
- -Completed optimization for bottleneck 3 for function diser
- -Filled excel sheet for new code
- -Testing and comparing times to check extent of optimization.
- ----- 11
- -Optimization of Bottleneck #4(CalcOlegSum Function)
- -Presentation and mExcel sheet updated for new optimized code
- -Code and files pushed to github.
- -Still trying to find percentage time decrease with previous code optimization.
- ----- 12
- -Finished Bottleneck optimization of e_F4 file(2/3)
- -Working on 3rd Bottleneck
- -Time difference for diser bottleneck found, yet to push

Oleg's note

- Talk to Remco about Daniel's summer, and faculty choice
- Using Quick in LISE (Linh?)
- Qt on LINUX, SpecTcl
- Migration from github to MSU gitlab?

Monday meeting participants

Daniel, Sasha, Arjun

current week tasks

Last week report

Weeks 13 (03/31/2025)

Daniel

current week tasks

- SpecTk – statistics fonts
- Working on SpecTk bugs
- SpecTk – python
- Literature -- tree
- Using Qt for ARIS SpecTcl in LINUX
- Isomer database

Sasha

- Rserach on extraction axes rotation angles
- Show current axis angle rotation status, later with possibility to enter data

Arjun

- **Presentation for bottlenecks and solutions for this Thursday meeting**
- ETACHA profiling (currently 7 bottlenecks)
- How many times for bottleneck functions
- Locate bottlenecks
- Suggest solution asymptotic, tabulation, simplification, smart calculation
- Subroutine to calculate the DIGAMMA function of a complex argument using formulas from M. Abramowitz and I. Stegun

Oleg's note

- Talk to Remco about Daniel's summer, and faculty choice
- Using Quick in LISE (Linh?)
- Qt on LINUX, SpecTcl
- Migration from github to MSU gitlab?

Last week report

- Participated in experiment
- Finished renaming literature files
- Finished work on SpecTk 1.8.0
 - Add Area calculations
- Reformatted the Statistics display again
- Reformatted 1D Display Stats
- Made the Name of Stat display dynamic in length
- Added Name menu to auto gate dialog
- Continued to tinker with contour vertex hitboxes

- Meetings
- Z rotation for 3D graph final research
- 3D models reviewed and approved
- 3D graph rotation sliders synchronized and update with manual rotation

- -Done with bottleneck points in e_F4 file, yet to update excel sheet and presentation.
- -Continue working on next bottleneck points
- -Meetings

Monday meeting participants

Daniel, Sasha



Weeks 14 (04/07/2025)

Daniel

- Isomer database
- SpecTk – Z-lines
- SpecTk 2D fit
- SpecTk – python
- Using Qt for ARIS SpecTcl in LINUX

Sasha

- Modification of right panel (optimize, make groupbox)
- Show current axis angle rotation status, later with possibility to enter data

Arjun

- Presentation for bottlenecks and solutions for this Thursday meeting
- Time consumption
- Parallelization

Hud

- <https://lise.frib.msu.edu/introduction.html>
- "Production of Fast Rare Ion Beams" lectures at the Euroschool on Exotic Beams including examples of how to use the LISE++ code
- Install Qt-framework
- trainings

Oleg's note

- Meetings for Hud
- Books for Arjun : Parallelization
- Books for Hud: Qt C++
- Talk to Remco about Daniel's summer, and faculty choice
- Using Quick in LISE (Linh?)
- Qt on LINUX, SpecTcl
- Migration from github to MSU gitlab?

- Participated in experiment
- Created a file tree for Literature
- Finished SpecTk Version 1.8.1
- Fixed the Clear selected/page issue
- Fixed the Results Font option
- Made improvements to the Statistics display again
- Attempted to add Tab font option
- Began work on updating the isomer database

- Meetings
- Start of reconfiguring 3D graph display

- -All bottleneck points are completed, with updated presentation and excel sheet, and pushed to GitHub.
- -More profiling to check for any remaining significant bottleneck points, none found.

Monday meeting participants

Daniel, Sasha, Arjun, Hud

Weeks 15 (04/14/2025)

Daniel

- Isomer database continue
- Think: SpecTk – Z-lines
- Research: SpecTk 2D fit
- SpecTk – python
- Using Qt for ARIS SpecTcl in LINUX

Sasha

- Optimization of the right panel
- Connect axis angle cell and real values

Arjun

- What is finally optimization value???? Time consumption
- What is profit of optimization?
- Provide dates and time – when we can meet
- Presentation for bottlenecks and solutions for this Thursday meeting
- Parallelization

Hud

- <https://lise.frib.msu.edu/introduction.html>
- "Production of Fast Rare Ion Beams" lectures at the Euroschool on Exotic Beams including examples of how to use the LISE++ code
- Try to solve the task in the last lecture
- Qt-framework : play with C++ widgets C++
- trainings

Oleg's note

- Provide access for Hud to lisedev project
- Budget Account for Hud
- Access for Daniel to ArisDaq
- Books for Hud: Qt C++
- Email, Talk to Remco about Daniel's summer, and faculty choice
- Find date to meet Arjun in person
- Using Quick in LISE (Linh?)
- Qt on LINUX, SpecTcl
- Migration from github to MSU gitlab?

- Obtained new Isomer Database
- Made it display properly in excel by splitting it into 100+ chunks of 500k rows
- SpecTk 1.8.2
- More changes to the statistics display
- Fixed the tab font size
- Addressed the an discussed on Thursday (Need more details)
- Began work on fitting 2D gaussians in SpecTk

- Meetings
- Rough Draft of 3d configuration complete

- -Research on Parallelization(Book, Chatgpt)
- -Meetings

- Completed orientation items and trainings, as well as some recommended downloads.

Monday meeting participants

Daniel, Sasha, Arjun, Hud

current week tasks

Last week report

Weeks 16 (04/21/2025)

Daniel

- Working on SpecTk 2D fit
- Isomer database continue
- Think: SpecTk – Z-lines
- SpecTk – python
- Using Qt for ARIS SpecTcl in LINUX

Sasha

- Optimization of the right panel
- Connect axis angle cell and real values

Arjun

- Provide dates and time – when we can meet
- Read the Stiffness analysis report for Radiation residue calculator
- Parallelization

Hud

- <https://lise.frib.msu.edu/introduction.html>
- "Production of Fast Rare Ion Beams" lectures at the Euroschool on Exotic Beams including examples of how to use the LISE++ code
- Try to solve the task in the last lecture
- Qt-framework : play with C++ widgets C++
- trainings

Oleg's note

- Access for Daniel to ArisDaq
- Books for Hud: Qt C++
- Email, Talk to Remco about Daniel's summer, and faculty choice
- Find date to meet Arjun in person
- Using Quick in LISE
- Qt on LINUX, SpecTcl

Monday meeting participants

Daniel, Sasha, Arjun, Hud

current week tasks

Last week report

- Finished 1.8.3
- Fixed and Issue with 1D statistics display font settings
- Updated Help
- Continued work on SpecTk 1.8.4
- 2D fit backend has been complete
- Working on the 2D fit frontend

- Meeting
- Review and revision of 3D graph display

- -Found total time profit for ETACHA4 optimized version
- -Made and submitted presentation for results, uploaded on GitHub
- -More research on parallel computing, worked out examples
- -Meeting

- Finished Remote-Work Agreement, got access to lisedev and remote desktop. Euroschool lectures and lecture problem.
- Meetings

Weeks 17 (04/28/2025)

Daniel

- Working on SpecTk 2D fit
- Isomer database continue
- Think: SpecTk – Z-lines
- SpecTk – python
- Using Qt for ARIS SpecTcl in LINUX

Sasha

- Almost DONE! Excellent job!
- Waiting for your report on Thursday

Arjun

- Optimization of Etacha integrator
- Parallelization

Hud

- Learning C++, Qt
- "Production of Fast Rare Ion Beams" lectures at the Euroschool on Exotic Beams including examples of how to use the LISe++ code
- Try to solve the task in the last lecture
- Qt-framework : play with C++ widgets C++

Oleg's note

- Access for Daniel to ArisDaq
- Books for Hud: Qt C++
- Using Quick in LISe
- Qt on LINUX, SpecTcl

- Continued work on 2D fitting
- Added 2D polynomial fitting
 - Adjusted 2D gaussian fitting
 - The UI is now functional
 - Data is being read and printed out
 - Working on displaying the cross section of the fit

- Meetings
- Review on 3D graph scaling
- Options display width and button adjustments

- -Research on parallel computing, practice with code.
- -Meetings

- Meetings, studied QtFramework and worked with LIse++, ORRS trainings

Monday meeting participants

Daniel, Sasha

Weeks 18 (05/05/2025)

Daniel

- Continue research and development on SpecTk
 - Ellipse option (polynomial), area,
 - User lines – menu?
 - documentation
- Isomer database continue (Hudson?)
- Think: SpecTk – Z-lines -- LISE library?
- SpecTk – python
- Using Qt for ARIS SpecTcl in LINUX

Sasha

- COMPLETED! Excellent job!

Arjun

- Optimization of Etacha integrator
- Parallelization

Hudson

- **improving C++, Learning Qt**
- "Production of Fast Rare Ion Beams" lectures at the Euroschool on Exotic Beams including examples of how to use the LISE++ code
- Try to solve the task in the last lecture
- Introduction to isomer database
- Qt-framework : play with C++ widgets C++

Oleg's note

- Access for Daniel to ArisDaq
- Access to LISE software folder
- Books for Hud: Qt C++
- Update new saveset format in LISE
- Using Quick in LISE
- Qt on LINUX, SpecTcl

- Finished SpecTk 1.8.4
- 2D Fitting is complete
- 2D polynomial visualization was unsuccessful
- Updated the SpecTk Documentation 1.7.6-1.8.4
- Began work on the Z lines (Marker) tool
- Able to create markings on graph
- Briefly looked through the TKE Global calibration files

- https://lise.frib.msu.edu/porting/Sasha/Envelope_3D_panel.pdf
- Synchronizing manual rotation and axis quaternion with 3D graph
- Final adjustments to 3D graph optimization task
- Final wrap-ups and presentations for last week of work.

- Thursday meeting
- Reviewed some information on Shane's talk

Monday meeting participants

Daniel, Hudson

Weeks 19 (05/12/2025)

Daniel

- Moving to Linux
- Compile LISE
- Creation lise.dll for Linux
- Qt for Linux (v.6.8)
- Continue research and development on SpecTk
 - Documentation of SpecTk on LISE site
- SpecTk – python
- Using Qt for ARIS SpecTcl in LINUX

Arjun

- Optimization of Etacha integrator
- Check FORTRAN original
- Resolve stiffness issue with automatic gates based
http://lise.frib.msu.edu/9_10/RadiationResidue.pdf
- Parallelization

Hudson

- improving C++, Learning Qt
- "Production of Fast Rare Ion Beams" lectures at the Euroschool on Exotic Beams including examples of how to use the LISE++ code
- Try to solve the task in the last lecture
- Introduction to isomer database
- Qt-framework : play with C++ widgets C++
- Isomer project

Oleg's note

- SpecTk webpage
- Access to LISE software folder
- Books for Hud: Qt C++
- Update new saveset format in LISE
- Using Quick in LISE
- Qt on LINUX, SpecTcl

current week tasks

Last week report

- Finished making changes to the 2D fitting
 - Able to fix parameters
 - Changed layout
- Fixed an indexing issue with ALL calculations in SpecTk
- Finished SpecTk version 1.8.5
 - Marker Tab created
 - Create lines (solid or dashed) in 13 different colors
 - Created an example for Z-line creation (need real data to work with)

- -More research into parallel computing
- -Started implementation of parallelization of Etacha integrator

- Isomer Project - Learned how to import data from NNDC, working on a flexible code for reading CSV's
- Completed all Enterprise trainings
- Meetings

Monday meeting participants

Daniel, Arjun, Hudson

Weeks 20 (05/19/2025)

Daniel

- “LISE” Euroschool task
- Moving to Linux
- Compile LISE
- Creation lise.dll for Linux
- Qt for Linux (v.6.8)
- Continue research and development on SpecTk
 - Documentation of SpecTk on LISE site
- SpecTk – python
- Using Qt for ARIS SpecTcl in LINUX

Arjun

- “LISE” Euroschool task
- Prepare introduction for backward diff. Gears method
- Optimization of Etacha integrator
- Try to transfer the Integrator FORTRAN original to C. Think about modules as well.
- Resolve stiffness issue with “automatic gates (low and up boundaries)”
http://lise.frib.msu.edu/9_10/RadiationResidue.pdf
- Parallelization

Hudson

- “LISE” Euroschool task
- Working to isomer database – looking for missed lines, parent isomers
- Thinking about the database record structure
- GLOBAL : Isomer project
- >> Qt-framework : play with C++ widgets C++ improving C++, Learning Qt

Oleg's note

- “LISE” Euroschool task
- SpecTk webpage
- Access to LISE software folder
- Books for Hud: Qt C++
- Update new saveset format in LISE
- Using Quick in LISE
- Qt on LINUX, SpecTcl

current week tasks

Last week report

- Attended meetings
- Finished SpecTk 1.8.5
 - Lines now save and load with the config

- -Wrote code for Backward Differentiation solver(Gears Method). Currently trying to tweak it to remove runtime errors.
- -Implemented first outline of parallelization in ODE solver. Yet to test effect of code on sun-time.
- -Meetings

- - Isomer project coding and research
- - CITI Trainings
- - Some nuclear physics studying
- - Finished CSV reader for NNDC adopted levels
- - Meetings

Monday meeting participants

Arjun, Hudson



Weeks 21 (05/27/2025)

Daniel

- “LISE” Euroschool task
- Moving to Linux
- Compile LISE
- Creation lise.dll for Linux
- Qt for Linux (v.6.8)
- Continue research and development on SpecTk
 - Documentation of SpecTk on LISE site
- SpecTk – python
- Using Qt for ARIS SpecTcl in LINUX

Arjun

- “LISE” Euroschool task
- Prepare introduction for backward diff. Gears method
- Optimization of Etacha integrator
- Try to transfer the Integrator FORTRAN original to C. Think about modules as well.
- Resolve stiffness issue with “automatic gates (low and up boundaries)”
http://lise.frib.msu.edu/9_10/RadiationResidue.pdf
- Parallelization

Hudson

- “LISE” Euroschool task
- Working to isomer database – looking for missed lines, parent isomers
- Thinking about the database record structure
- GLOBAL : Isomer project
- >> Qt-framework : play with C++ widgets C++ improving C++, Learning Qt

Oleg's note

- “LISE” Euroschool task
- SpecTk webpage
- Access to LISE software folder
- Books for Hud: Qt C++
- Update new saveset format in LISE
- Using Quick in LISE
- Qt on LINUX, SpecTcl

- -Completed working bdf solver with a variable step size.
- -Currently trying to make it more accurate, induce higher order.
- -Presentation for BDF solver
- -Fortran to C++ outline code
- -Meetings

- - Finished Isomer_DB entry drawing tool to match current sqlite DB
- - Attempted solution for Euroschool task
- - Meetings

Monday meeting participants

Arjun, Hudson

current week tasks

Last week report



Weeks 22-23 (06/09/2025)

Daniel

- “LISE” Euroschool task
- **LISE for Excel (MS Windows)**
- Creation lise.dll for Linux
- Qt for Linux (v.6.8)
- Continue research and development on SpecTk
 - Documentation of SpecTk on LISE site
- **Using Qt for ARIS SpecTcl in LINUX**

- Participated in the e21073 experiment
- Briefly worked on the LISE for Excel issue
- Attempted to replicate the tree spectrum SpecTk bug
- Fixed the DAQ computer python issue
- Made improvements to 2D fitting
- Implemented 2D ellipse fit
- Added additional checks to advanced calculations
- Fixed the jittering issue that was seen when updating
- -----
- Looked over Elaine's cluster file SpecTcl code
- Began to address the LISE for Excel issue

Arjun

- “LISE” Euroschool task
- **Make a presentation for time consumption and quality with different methods**
- Prepare introduction for backward diff. Gears method
- Try to transfer the Integrator FORTRAN original to C. Think about modules as well.
- Parallelization

- -Completed Euler's Integrator, setup with mainwindow
- -Made integrator fast and efficient while maintaining accuracy
- -Continued working on Fortran code integrator, running into logical problems regarding integration method.
- -Implemented parallelization into Euler's integrator.
- -----
- -Fixed and completed Backwards Differentiation solver, setup with UI.
- -Working on making solver faster, higher order, trying to implement parallelization.
- -Ported Fortran integrator to C++, setup with UI. Fixing bugs.
- -Started with Euler's integrator, not much progress yet.

Hudson

- “LISE” Euroschool task
- **SpecTk – python : create a widget for adaption of NNDC data**
- Working to isomer database – looking for missed lines, parent isomers
- Thinking about the database record structure
- GLOBAL : Isomer project
- >> Qt-framework : play with C++ widgets C++ improving C++, Learning Qt

- EUSchool task RF Separator Comparison
- - Looking into band transition tracking with NNDC CSVs
- - LISE++ code investigation (Qt features in program)
- - Module for entering data into isomer database
- - Meetings
- -----
- - Watched lecture by Alexandra Gade
- - Studied Wien filter, RF separator, and Compensating dipole
- - Looked into potential QtFramework APIs for Isomer database project
- - Meeting

Oleg's note

- “LISE” Euroschool task
- SpecTk webpage
- Access to LISE software folder
- Books for Hud: Qt C++
- Update new saveset format in LISE
- Using Quick in LISE
- Qt on LINUX, SpecTcl

Monday meeting participants

Daniel, Arjun, Hudson

current week tasks

Last week report

Weeks 24 (06/17/2025)

Daniel

- “LISE” Euroschool task
- **LISE for Excel (MS Windows)**
- Creation lise.dll for Linux
- Qt for Linux (v.6.8)
- Continue research and development on SpecTk
 - Documentation of SpecTk on LISE site
- **Using Qt for ARIS SpecTcl in LINUX**

Arjun

- “LISE” Euroschool task
- **Make a presentation for time consumption and quality with different methods**
- Prepare introduction for backward diff. Gears method
- Try to transfer the Integrator FORTRAN original to C. Think about modules as well.
- Parallelization

Hudson

- “LISE” Euroschool task
- **SpecTk – python : create a widget for adaption of NNDC data**
- Working to isomer database – looking for missed lines, parent isomers
- Thinking about the database record structure
- GLOBAL : Isomer project
- >> Qt-framework : play with C++ widgets C++ improving C++, Learning Qt

Oleg's note

- “LISE” Euroschool task
- SpecTk webpage
- Access to LISE software folder
- Books for Hud: Qt C++
- Update new saveset format in LISE
- Using Quick in LISE
- Qt on LINUX, SpecTcl

current week tasks

Last week report

- Did the LISE tutorial task
- Found and Implemented a temporary fix to LISE for Excel (There is a more permanent fix)
- Possibly fixed the SpecTk LINUX ROI bug (Haven't tested on LINUX yet)
- Created and lightly tested a LISE .so library (LINUX version of dll)
- Began implementing it with LibreOffice (LINUX Excel)

- -Implemented and pushed final code for Eulers integrator onto GitHub.
- -Presentation for the integrator
- -Applying parallelization to Euler's method
- -Working on Gauss-Kronrod ODE Method
- -Meetings

- - Gained access to LISE++ Github
- - EUSchool task attempted again
- - Qt for python studying and configuration.
- - Research for IsomerAPI
- - Meetings

Monday meeting participants

Daniel, Arjun, Hudson



Weeks 25 (06/24/2025)

Daniel

- Isomer database
- Superimpose – clarify, documentation, example, erase
- Mentoring fresh undergrads
- Thinking about the database record structure
- Creation lise.library for Linux -- example, documentation --- collaborate with Holly : Z,A,Brho id → Calculate Range in SpecTcl
- Update your assistant page
- Qt for Linux (v.6.8)
- dE-ToF pending, think
- Continue research and development on SpecTk
 - Documentation of SpecTk on LISE site
- Using Qt for ARIS SpecTcl in LINUX

Arjun

- **UPDATE the presentation for time consumption and quality with different methods**
- Prepare introduction for backward diff. Gears method
- Try to transfer the Integrator FORTRAN original to C. Think about modules as well.
- Parallelization

Hudson

- Create Decay scheme based on current LISE SQL file in PyApp
- Research on “github” program -- compile, structure, examples, results -- presentation?
- Working to isomer database – looking for missed lines, parent isomers
- Thinking about the database record structure
- GLOBAL : Isomer project
- >> Qt-framework : play with C++ widgets C++ improving C++, Learning Qt

Oleg's note

- “LISE” Euroschool task
- SpecTk webpage
- Access to LISE software folder
- Books for Hud: Qt C++
- Update new saveset format in LISE
- Using Quick in LISE
- Qt on LINUX, SpecTcl

- Worked on the SpecTk Superpose function
- Continued working the the LISE .so file. Works in python and Qt, but unable to get it to work in liberOffice.
- Began to work on the Z-lines SpecTk task
- Briefly looked over the LISE website files

- -LISE EuroSchool Task
- -Research into Fortran solver porting
- -Meetings

- - Studying and configuring Qt For Python
- - Developing IsomerAPI project in Python
- -- Creating UI and custom widget for table viewer
- - Meetings

Monday meeting participants

Daniel, Hudson

Weeks 26 (06/30/2025)

Daniel

- Summarize your work in the assistant page, add Arjun and Hudson presentations
- SpecTk: Superimpose – clarify, documentation, example, erase
- SpecTk webpage update
- Isomer database, Thinking about the database record structure
- SpecTcl: Creation lise.library for Linux -- example, documentation --- collaborate with Holly : Z,A,Brho id → Calculate Range in SpecTcl
- Qt for Linux (v.6.8), for ARIS
- **pending** dE-ToF, think

- Created the superimpose documentation and undo buttons
- Created and tested full examples for the LISE Linux Library with Slides and a currently private github
- Continued working on resolving the SpecTk Linux contour bug
- Created a page for SpecTk on the LISE site
- Began work on SpecTcl LISE library integration
- Continued working on the Z-lines tool

Arjun

- UPDATE the presentations: send the list to Daniel
- Parallelization; find example with ChatGPT, GitHub – parallelization with effective results
- -insert original ODE solver : Research into Fortran porting; Try to transfer the Integrator FORTRAN original to C. Think about modules as well.
- Prepare introduction for backward diff. Gears method

- -just started: Parallel computing on F4 and e_SecMean
- -EuroSchool Task
- -insert ODE solver : Research into Fortran porting
- -Meetings

Hudson

- UPDATE the presentations: send the list to Daniel
- Continue to work on the Decay scheme based on current LISE SQL file in PyApp
- Research on “github” program -- compile, structure, examples, results -- presentation?
- Working to isomer database – looking for missed lines, parent isomers
- Thinking about the database record structure
- GLOBAL : Isomer project
- >> Qt-framework : play with C++ widgets C++ improving C++, Learning Qt

- - Isomer API tool development
- - Finished: Filtering tools, table viewer connection, summary utility,
- - Researching and implementing level scheme drawing tools on current database view
- - Meetings

Oleg's note

- “LISE” Euroschool task
- Update the Assistant page
- Update new saveset format in LISE
- Using Quick in LISE
- Qt on LINUX, SpecTcl

Monday meeting participants

Daniel, Arjun, Hudson

current week tasks

Last week report

Weeks 27 (07/07/2025)

Daniel

- **Abstract – today**
- SpecTcl: Creation lise.library for Linux -- example, documentation --- collaborate with Holly : Z,A,Brho id → Calculate Range in SpecTcl
- Debugging steps for Trange beta - > E manual Z and A values for Trange
- Qt for Linux (v.6.8), for ARIS
- Isomer database, Thinking about the database record structure
- **pending** dE-ToF, think

Arjun

- Parallelization; find example with ChatGPT, GitHub – parallelization with effective results
- -insert original ODE solver : Research into Fortran porting; Try to transfer the Integrator FORTRAN original to C. Think about modules as well.
- Prepare introduction for backward diff. Gears method -- let's start the next modnay

Hudson

- UPDATE the presentations: send the list to Daniel
- Experimental CS from in-flight fission RIKEN experiemnts
- Continue to work on the Decay scheme based on current LISE SQL file in PyApp
- Working to isomer database – looking for missed lines, parent isomers
- Thinking about the database record structure
- GLOBAL : Isomer project
- >> Qt-framework : play with C++ widgets C++ improving C++, Learning Qt

Oleg's note

- SpecTk: Superimpose – clarify, documentation, example, erase
- SpecTk webpage update
- Update the Assistant page
- Update new saveset format in LISE
- Using Quick in LISE
- Qt on LINUX, SpecTcl

- Updated the LISE assistance and SpecTk pages
- Continued working on integrating the LISE library in SpecTcl
- Reformatted and compiled the library in Qt 5.15.2 (GLIBC_2.28 compatibility)
- Continued working on a fix for SpecTk's contour issue

- -Worked on parallelization-Examples and implementation
- -Presentation on parallel computing.
- -Ported INTG into C++.
- -Researched into EQDiff porting and techniques used for the integrator.
- -Meetings

- - Isomer API tool development
- - Finished: Filtering tools, table viewer connection, summary utility,
- - Researching and implementing level scheme drawing tools on current database view
- - Meetings

Monday meeting participants

Daniel, Arjun, Hudson

current week tasks

Last week report

Weeks 28 (07/14/2025)

Daniel

- SpecTcl: Creation use library for Linux -- example, **documentation** --- collaborate with Holly
- Complete 2d-fit documentation
- Prepare the list of modifications for ARIS SpecTcl as Zt and so on including source text (Trange function)
- Latest SpecTk version for ArisDAQ
- Table with drag-drop features (continue Linh project)
- For QtPy make it compatible (QtPy is old Qt?) may be push Jordano for new compiler
- Qt for Linux (v.6.8), for ARIS
- Working on LISE dark mode
- Isomer database, Thinking about the database record structure
- **pending** dE-ToF, think

Arjun

- Benchmark between FORTAN original and current C++ versions for thick targets -- speed and stiffness
- Try to find original FORTRAN source authors and so on (Los Alamos)
- Parallelization; -- keep going find example with ChatGPT, GitHub -- parallelization with effective results
- Try to transfer the Integrator FORTRAN original to C. Think about modules as well.
- Prepare introduction for backward diff. Gears method -- let's start the next Monday : comparison with other technique -- pros and cons, what purpose -- stiffness problem?

Hudson

- Experimental CS from in-flight fission RIKEN experiments : 5 column Excel file, where last column is data source
- Prepare example from/for MATHEMATICA -- input information for levels ?
- Continue to work on the Decay scheme based on current LISE SQL file in PyApp
- Working to isomer database -- looking for missed lines, parent isomers
- Thinking about the database record structure -- two databases ? One parent short only isomer levels, second just daughter levels
- GLOBAL : Isomer project
- >> Qt-framework : play with C++ widgets C++ improving C++, Learning Qt

Oleg's note

- Update new saveset format in LISE
- Using Quick in LISE
- Qt on LINUX, SpecTcl

- Wrote and Submit an Abstract for the 2025 DNP
- SpecTcl LISE lib integration is mostly finished
 - Updated Busterdaq
 - Updated Functions
 - Added Zt to PID.tcl calibration
- Continued working on porting new QtPy
- Updated LISE assistance page
- Updated SpecTk Page (Added Tutorial Page)
- Created the SpecTk 2D fit presentation

- -Found ode solver original code and implementation for both C++ and Fortran versions.
- -Research into parallelization for integration and cross-section.
- -Meeting

- - CS Fission data ported from RIKEN papers to .cs files
- - Mathematica Level Scheme investigation
- - Currently working in closed environment
- - Research on Mathematica in Qt/Python
- - Also multiple language compiling in Qt.
- - Meetings

Monday meeting participants

Daniel, Arjun, Hudson

current week tasks

Last week report



Weeks 29 (07/21/2025)

Daniel

- SpecTcl: Creation use library for Linux -- example, **documentation** --- collaborate with Holly
- Complete 2d-fit documentation
- Prepare the list of modifications for ARIS SpecTcl as Zt and so on including source text (Trange function)
- Latest SpecTk version for ArisDAQ
- Table with drag-drop features (continue Linh project)
- For QtPy make it compatible (QtPy is old Qt?) may be push Jordano for new compiler
- Qt for Linux (v.6.8), for ARIS
- Working on LISE dark mode
- Isomer database, Thinking about the database record structure
- **pending** dE-ToF, think

Arjun

- Benchmark between FORTAN original and current C++ versions for thick targets -- speed and stiffness
- Try to find original FORTRAN source authors and so on (Los Alamos)
- Parallelization; -- keep going find example with ChatGPT, GitHub -- parallelization with effective results
- Try to transfer the Integrator FORTRAN original to C. Think about modules as well.
- Prepare introduction for backward diff. Gears method -- let's start the next Monday : comparison with other technique -- pros and cons, what purpose -- stiffness problem?

Hudson

- Experimental CS from in-flight fission RIKEN experiments : 5 column Excel file, where last column is data source
- Prepare example from/for MATHEMATICA -- input information for levels ?
- Continue to work on the Decay scheme based on current LISE SQL file in PyApp
- Working to isomer database -- looking for missed lines, parent isomers
- Thinking about the database record structure -- two databases ? One parent short only isomer levels, second just daughter levels
- GLOBAL : Isomer project
- >> Qt-framework : play with C++ widgets C++ improving C++, Learning Qt

Oleg's note

- Update new saveset format in LISE
- Using Quick in LISE
- Qt on LINUX, SpecTcl

- Finished the SpecTcl and LISE library integration and wrote documentation
- Created a list of all modifications to the source of SpecTcl
- Continued working on LISE library and QtPy visualizer compatibility
- Updated the 2D fit documentation
- Made Two updates to SpecTk both improving 2D Fitting
- Began work on LISE Drag and Drop

- -Research into original source code for EQDIF.
- -Porting of source code part by part to C++.
- -So far, ported most of the main logic and complex code(Step driver, stiffness detection and adaptive order)
- -Tested parallelization for integration and cross-section via n+1 prediction.
- -Meetings

- - Porting RIKEN data and searching for missing Z=40-50 information
- - Mathematica LevelScheme development
- - Working LevelScheme in closed environment with SQL connection
- - Researching incorporation of Mathematica in IsomerAPI.
- - Meeting Monday

Monday meeting participants

Daniel, Arjun, Hudson

current week tasks

Last week report



Weeks 30 (07/28/2025)

Daniel

- Table with drag-drop features – multiple selection for moving and erasing
- Working on LISE dark mode
- Isomer database, Thinking about the database record structure
- SpecTcl: Creation lise.library for Linux -- Range vs. Z-q , Z vs. Z-Q, e21073 runs, GlobalCalibration table for detectors
- For QtPy make it compatible (QtPy is old Qt?) may be push Jordano for new compiler
- Qt for Linux (v.6.8), for ARIS
- **pending** dE-ToF, think

Arjun

- Keep going – prepare a new table
- Update f_type.h for user modifications, including date and version number
- Post to GitHub
- Benchmark between FORTRAN original and current C++ versions for thick targets -- speed and stiffness
- Try to find original FORTRAN source authors and so on (Los Alamos)
- Parallelization; -- keep going find example with ChatGPT, GitHub – parallelization with effective results
- Try to transfer the Integrator FORTRAN original to C. Think about modules as well.

Hudson

- Experimental CS from in-flight fission RIKEN experiments -- stat errors.
- Prepare example from/for MATHEMATICA -- input information for levels ?
- Move to C++ Qt : the Decay scheme based on current LISE SQL file in PyApp
- Working to isomer database – looking for missed lines, parent isomers
- Global trend : Isomer project
- >> Qt-framework : play with C++ widgets C++ improving C++, Learning Qt

Oleg's note

- Check Daniel drag-drop
- Update new saveset format in LISE
- Think about isomer databases structure, Do we need links?
- Thinking about the database record structure – two databases ? One parent short only isomer levels, second just daughter levels
- Using Quick in LISE
- Qt on LINUX, SpecTcl

- Finished LISE Drag and Drop
- Released SpecTk Updates 1.8.11 and 1.8.12
- Began work on LISE dark mode changes
- Performed an analyses of the SpecTcl range data

- -Ported subroutines SDPSC, SDNTP, SDZRO completely and complete BDF code
- -Partially ported subroutine SDSTP or SDNTL
- -Imported LSODA code and hooked it up to Etacha.
- -Working on making it faster for stiff solutions.

- - Work on CS Fission project and statistical errors with data
- - Reading CS papers and identifying present/readily available error vs. what is needed
- - Read Feldman paper on statistical uncertainty methods
- - Currently working on incorporating for error in excel table.
- - Research on Mathematica implementation in Qt Python
- - Monday meeting

Monday meeting participants

Daniel, Arjun, Hudson

current week tasks

Last week report



Weeks 31 (08/04/2025)

Daniel

- Working on LISE dark mode (merge with github)
- Create LISE-isomer project in github
- **Isomer database, Thinking about the database record structure**
- SpecTcl: Creation lise.library for Linux -- Range vs. Z-q, Z vs. Z-Q, e21073 runs, GlobalCalibration table for detectors
- Let's think about global ID keeping in file. Adaptation of old versions, merging (append)
- For QtPy make it compatible (QtPy is old Qt?) may be push Jordano for new compiler
- Qt for Linux (v.6.8), for ARIS
- pending dE-ToF, think

Arjun

- Keep going – prepare a new table
- Update f_type.h for user modifications, including date and version number
- Push to GitHub
- Benchmark between FORTAN original and current C++ versions for thick targets -- speed and stiffness
- Try to find original FORTRAN source authors and so on (Los Alamos)
- Parallelization; -- keep going find example with ChatGPT, GitHub – parallelization with effective results
- Try to transfer the Integrator FORTRAN original to C. Think about modules as well.

Hudson

- Experimental CS from in-flight fission RIKEN experiments -- check empty region references. Update table
- **Global trend : Isomer project**
- Move to C++ Qt : the Decay scheme based on current LISE SQL file in PyApp
- Prepare example from/for MATHEMATICA -- input information for levels ? -- O. will ask Alexandra

Oleg's note

- Check Hudson's table
- Check gamma database for MATHEMATICA from Alexandra
- Update new saveset format in LISE
- Think about isomer databases structure, Do we need links?
- Thinking about the database record structure – two databases ? One parent short only isomer levels, second just daughter levels
- Using Quick in LISE
- Qt on LINUX, SpecTcl

Monday meeting participants

Daniel, Hudson

current week tasks

Last week report

- Finished most dark mode changes
- Finished improving LISE Drag and Drop:
- Multiple Selection
- Unique IDs
- Improved Scrolling

- Pushed changes to GitHub
- Added updates to e_f_type.h
- Continued to work on reducing time for stiff solver
- Monday meeting

- RIKEN data porting: Total error estimates (systematic with Feldman or relative statistical), problem areas identified
- looking for additional missing data and transmission error values
- Drew new database structure with SQL
- Data from initial DB, looked into linking
- C++ Port for IsomerAPI ~70% completed
- DB connection, SQL querying, filters, UI update
- Meetings

