Information Visualization for Supernova Spectra

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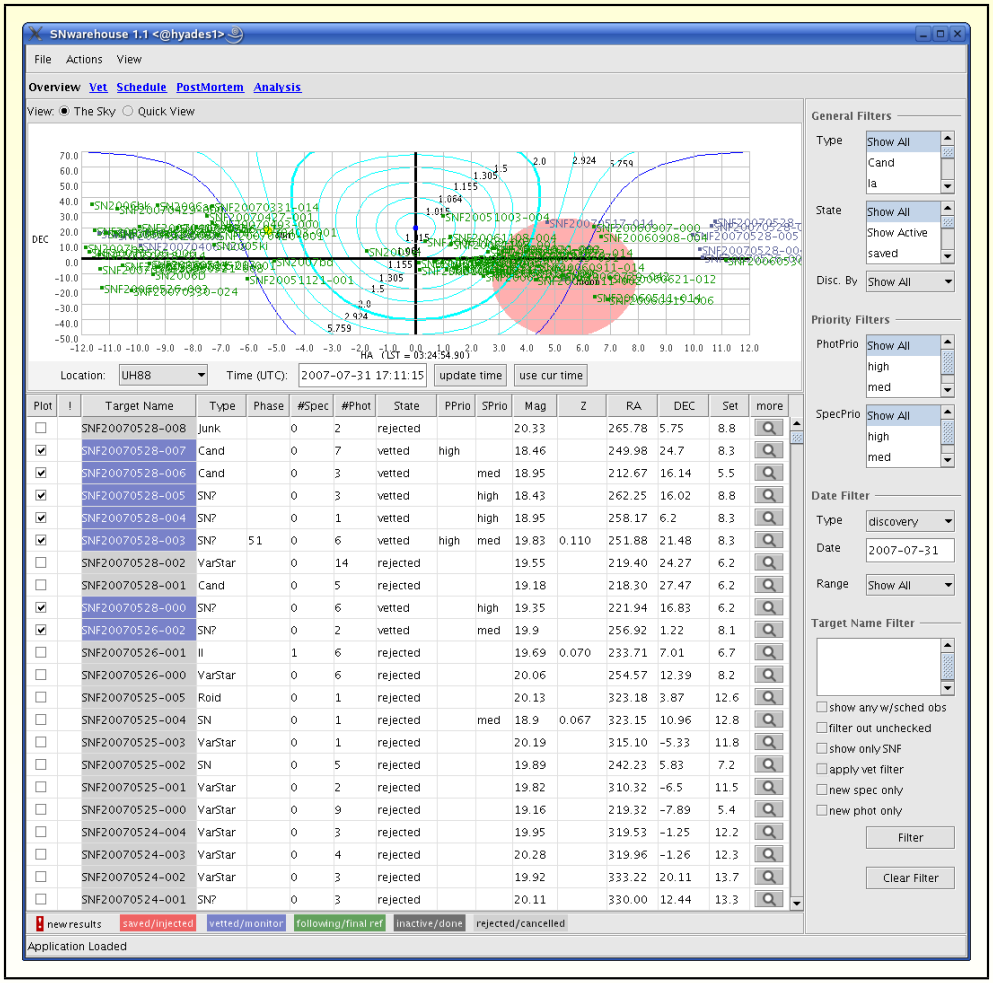
Overview of a Summer Internship

- Setting the frame of the SpectraVis Project
- Scientific and Information Visualization
- A focus + context technique
- Fisheye browser - Demo
- Conclusions

SpectraVis Project - setting the frame

- Dark energy is one of the most important scientific discoveries that explains the expansion of the universe
- It can be understood by studying the type Ia SNe.
- SNFactory - an international astrophysics experiment - is searching for Ia SNe

Supernova Warehouse

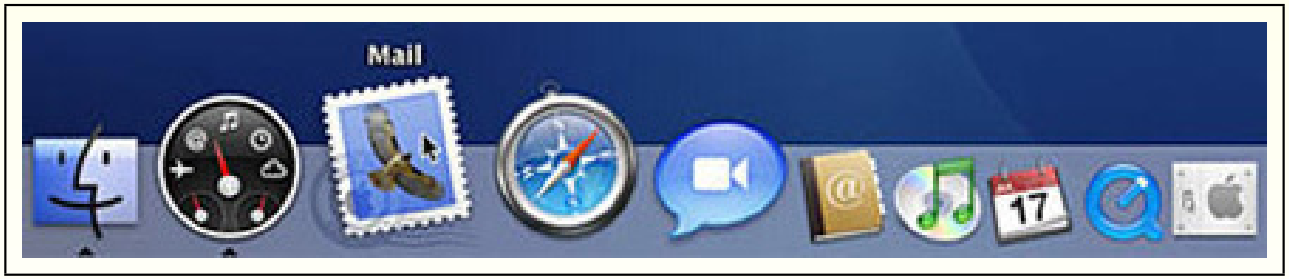


Scientific and Information Visualization

- Scientific Vis. - the study of graphical representation of complex physical phenomena
- Info Vis. - the study of graphical displaying of abstract data => two powerful techniques for large scientific datasets

The fisheye view - a focus + context technique

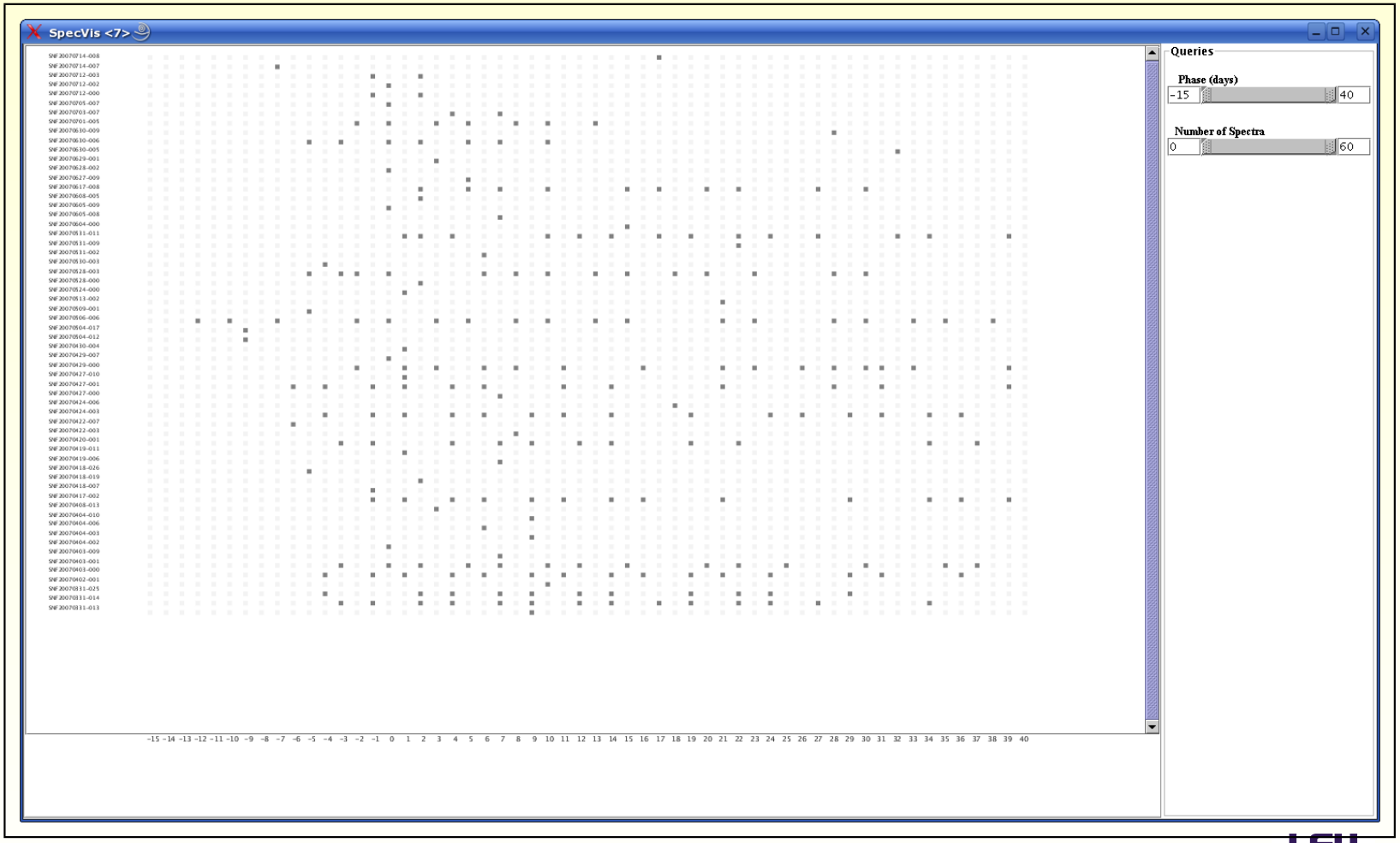
- Challenge: combine the overview and the detail into a single display
- The fisheye technique: "provides detailed views (focus) and overviews (context) without obscuring anything... The focus area (or areas) is magnified to show detail, while preserving the context, all in a single display." (Shneiderman, DTUI, 1998)



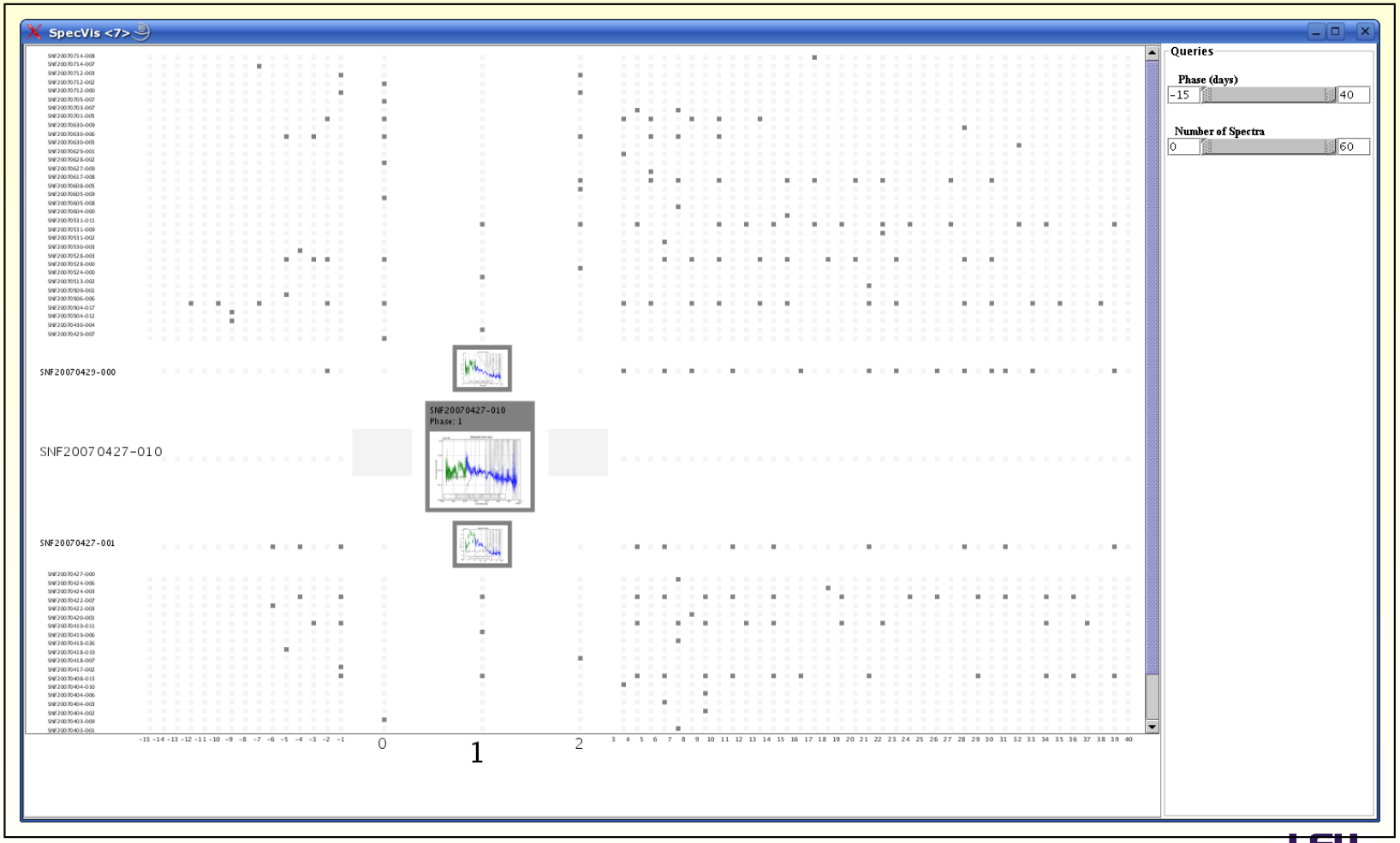
Fisheye browser - Demo

- a grid layout for the time-series concept
- semantic zooming
- highlighting
- filtering

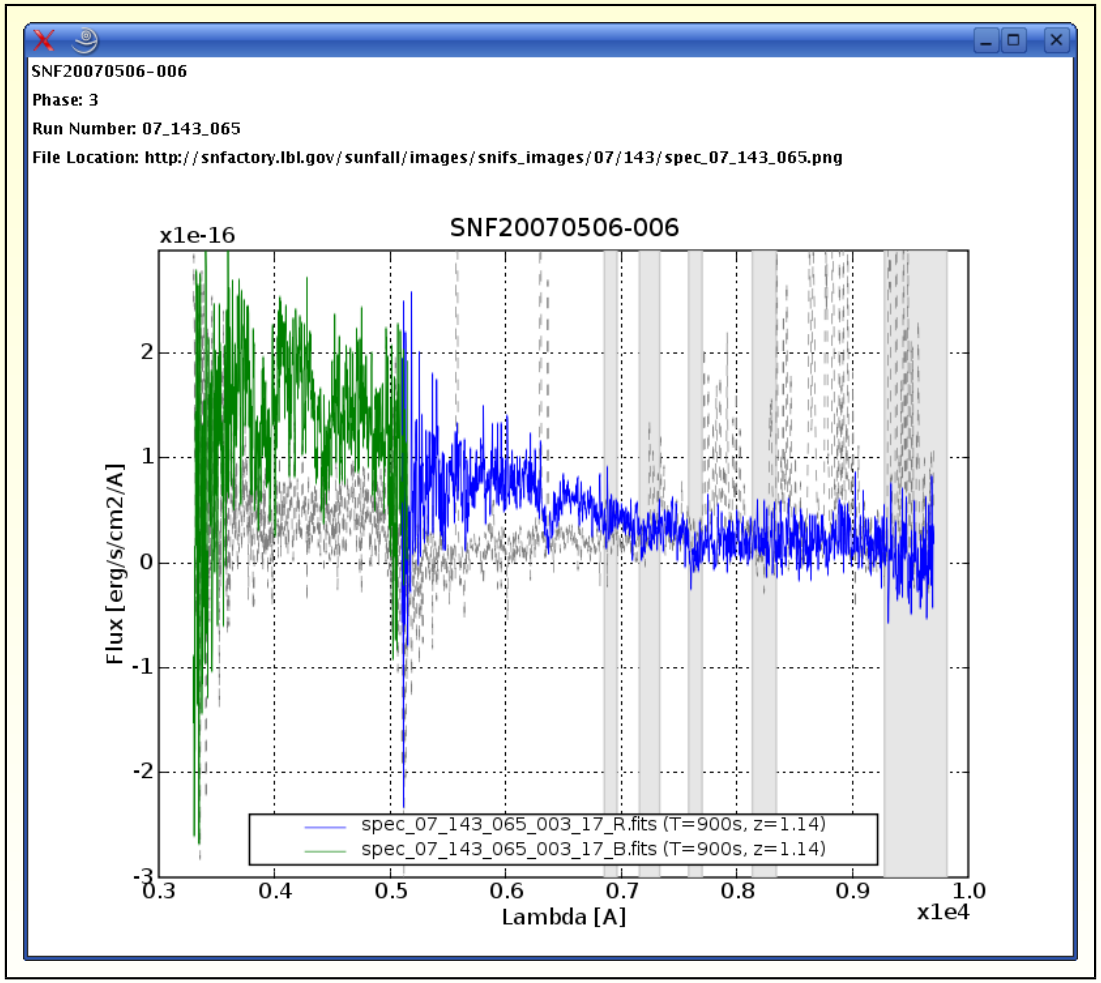
A grid layout



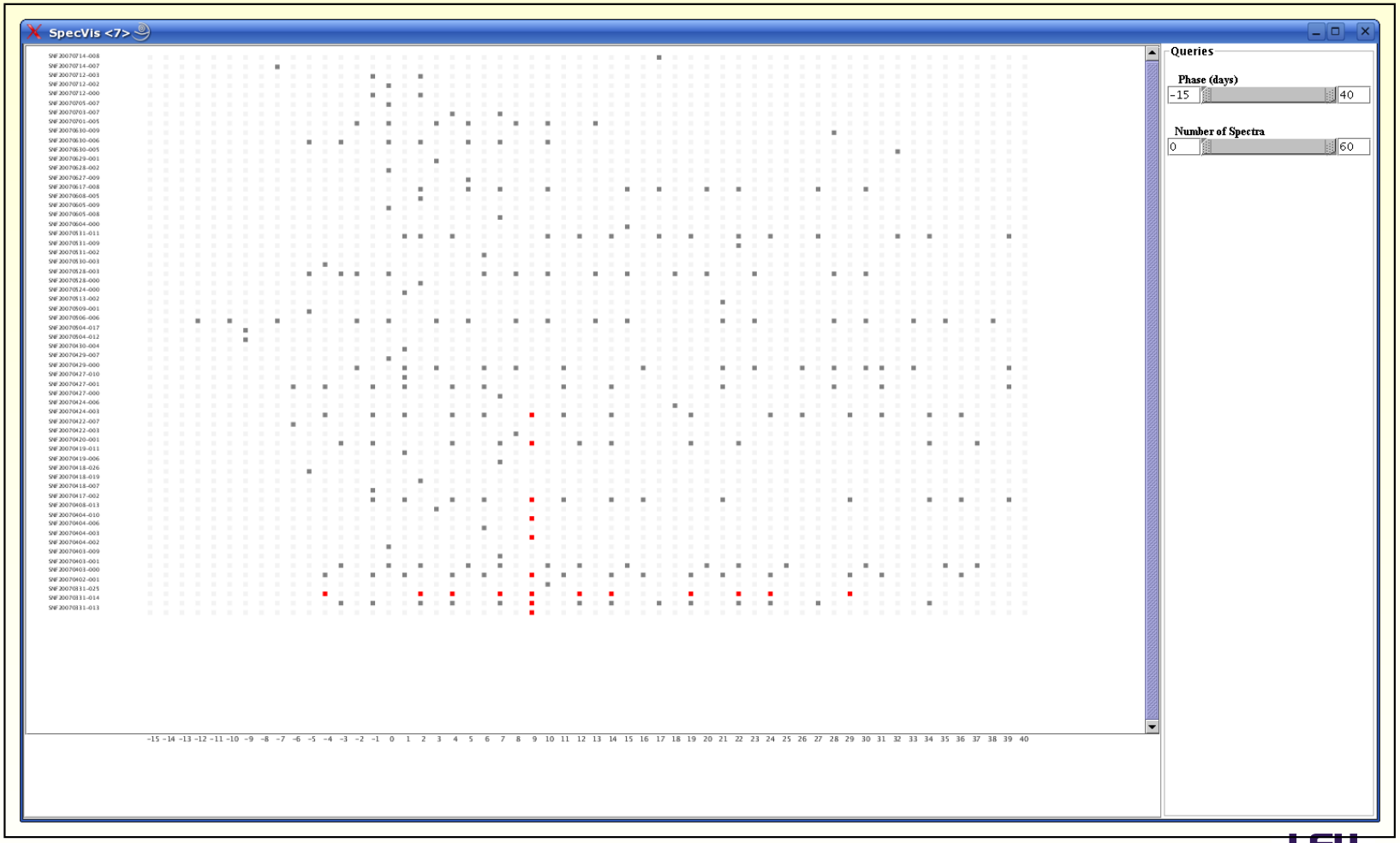
Semantic zooming



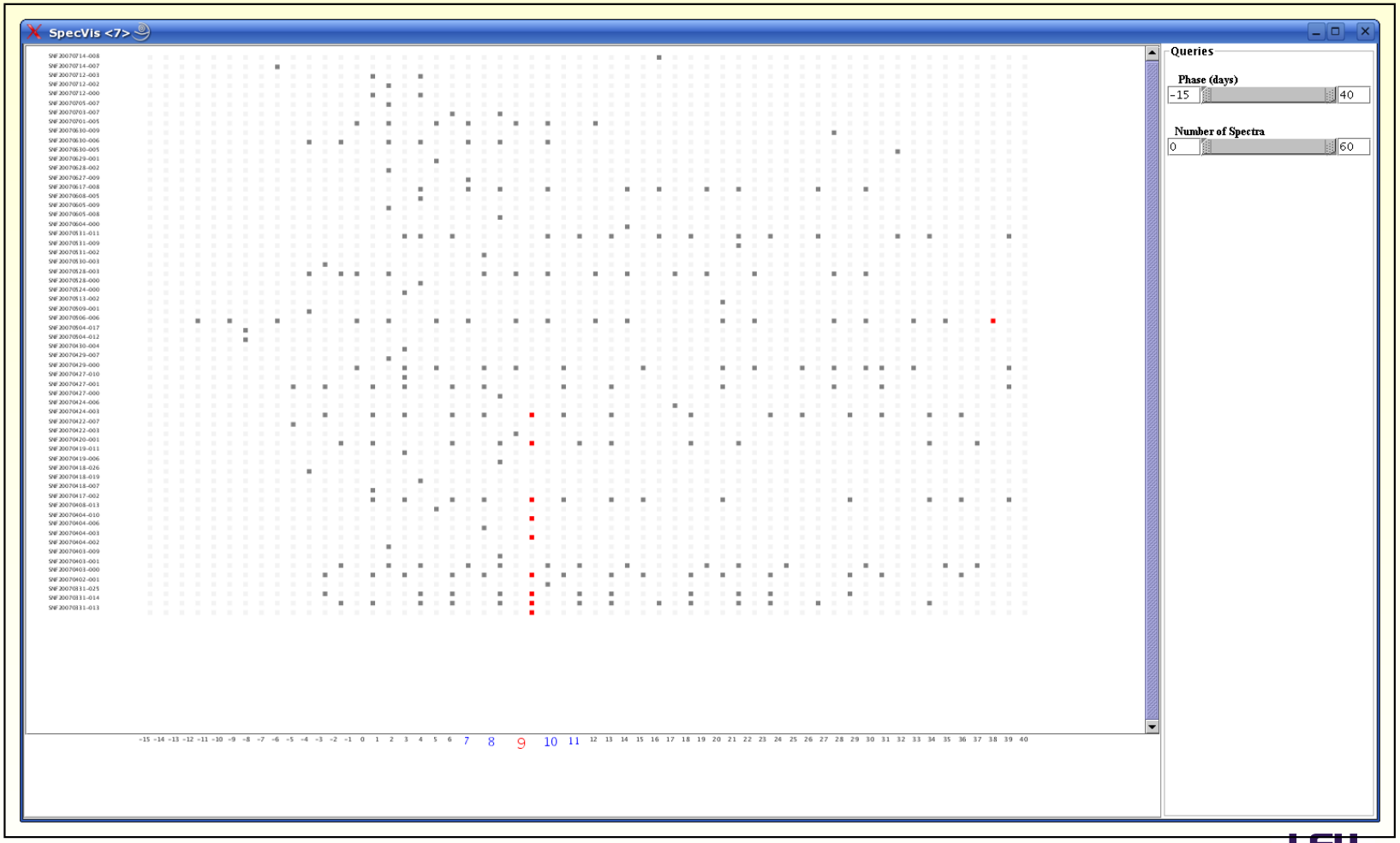
Semantic zooming at another level



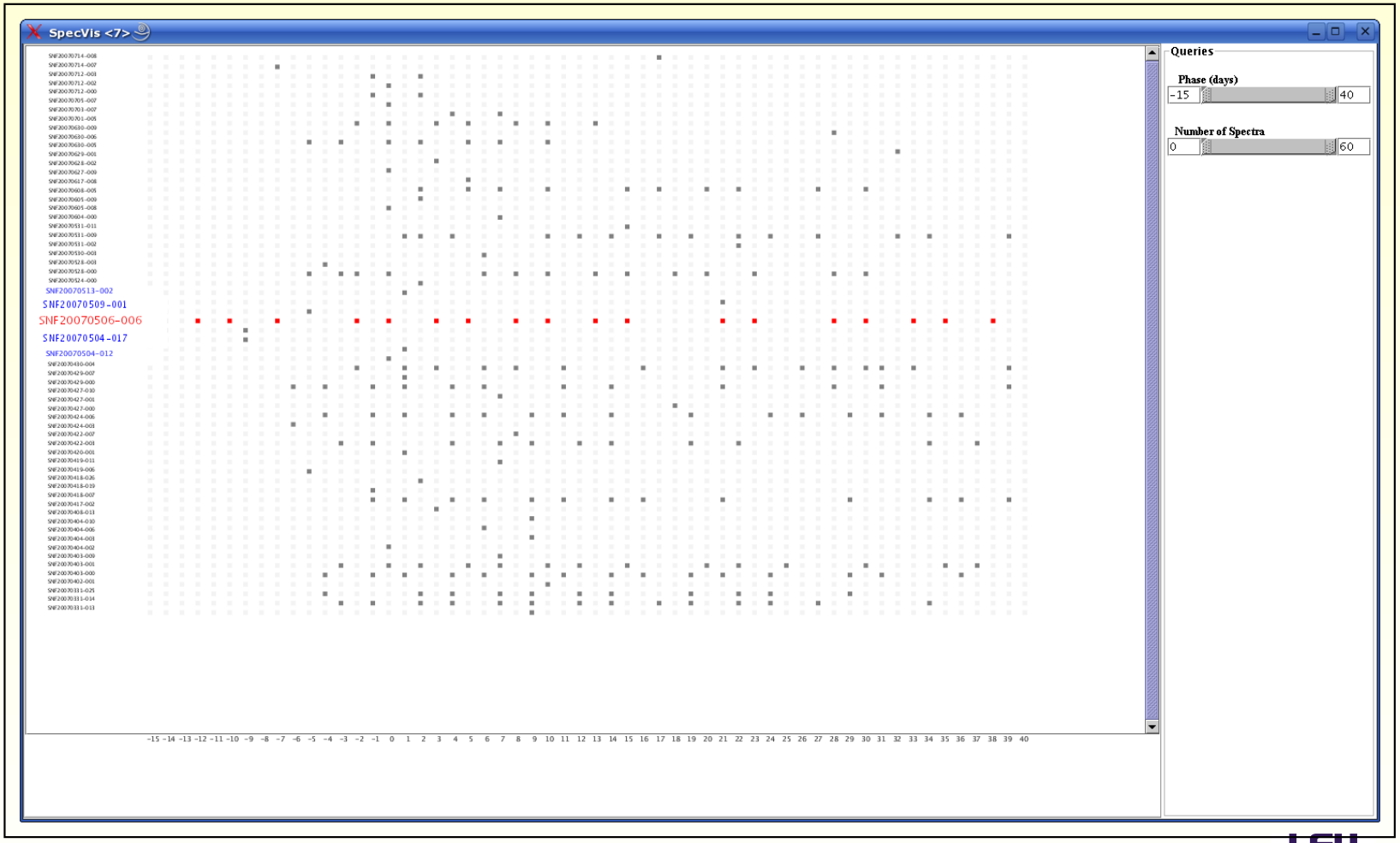
Highlighting



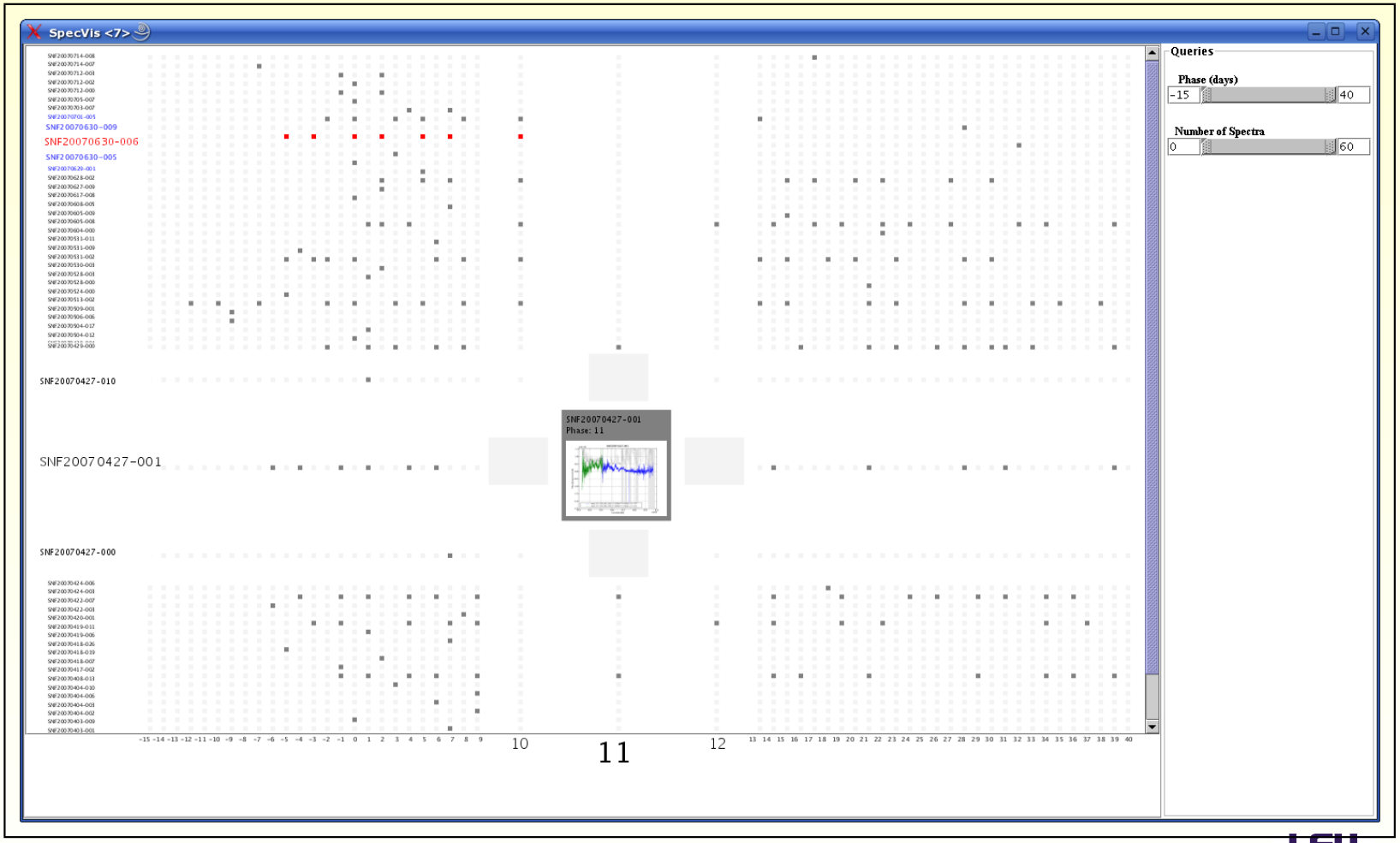
Highlighting



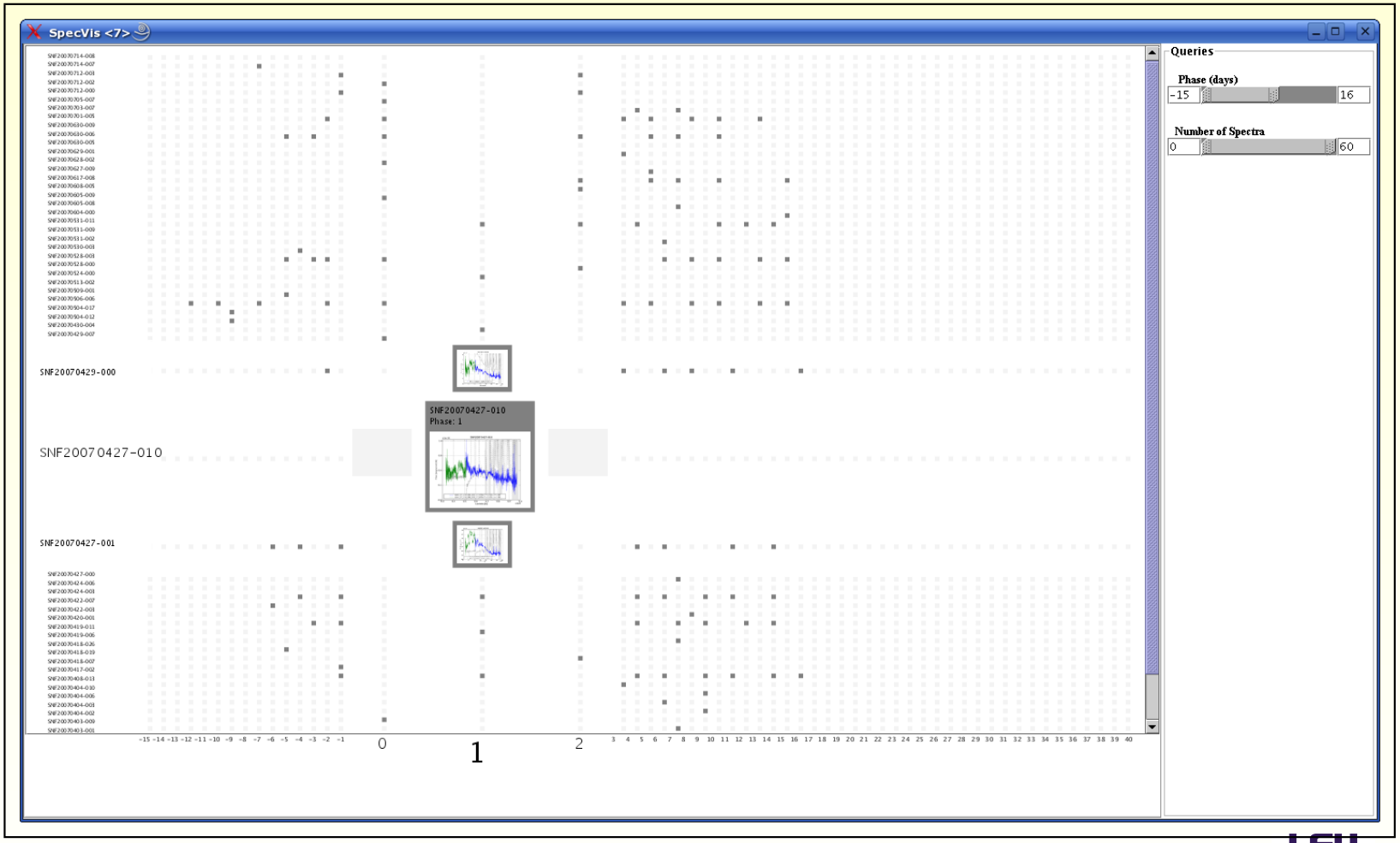
Highlighting



Highlighting



Filtering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Phase (days)
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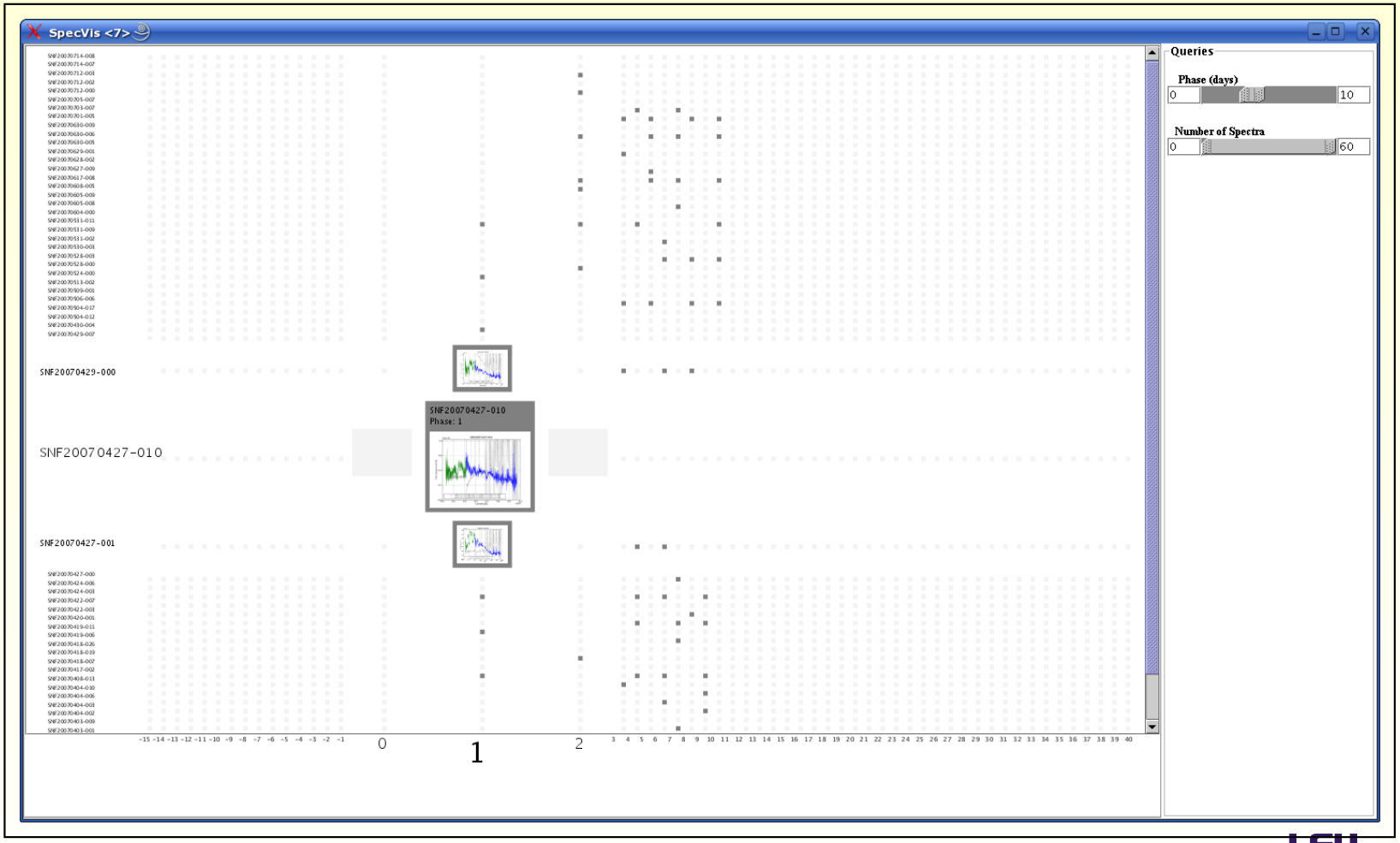
16
Number of Spectra
0
60
SNF20070429-000
SNF20070427-010
Phase: 1
SNF20070427-010
SNF20070427-001
0
1
2

Filtering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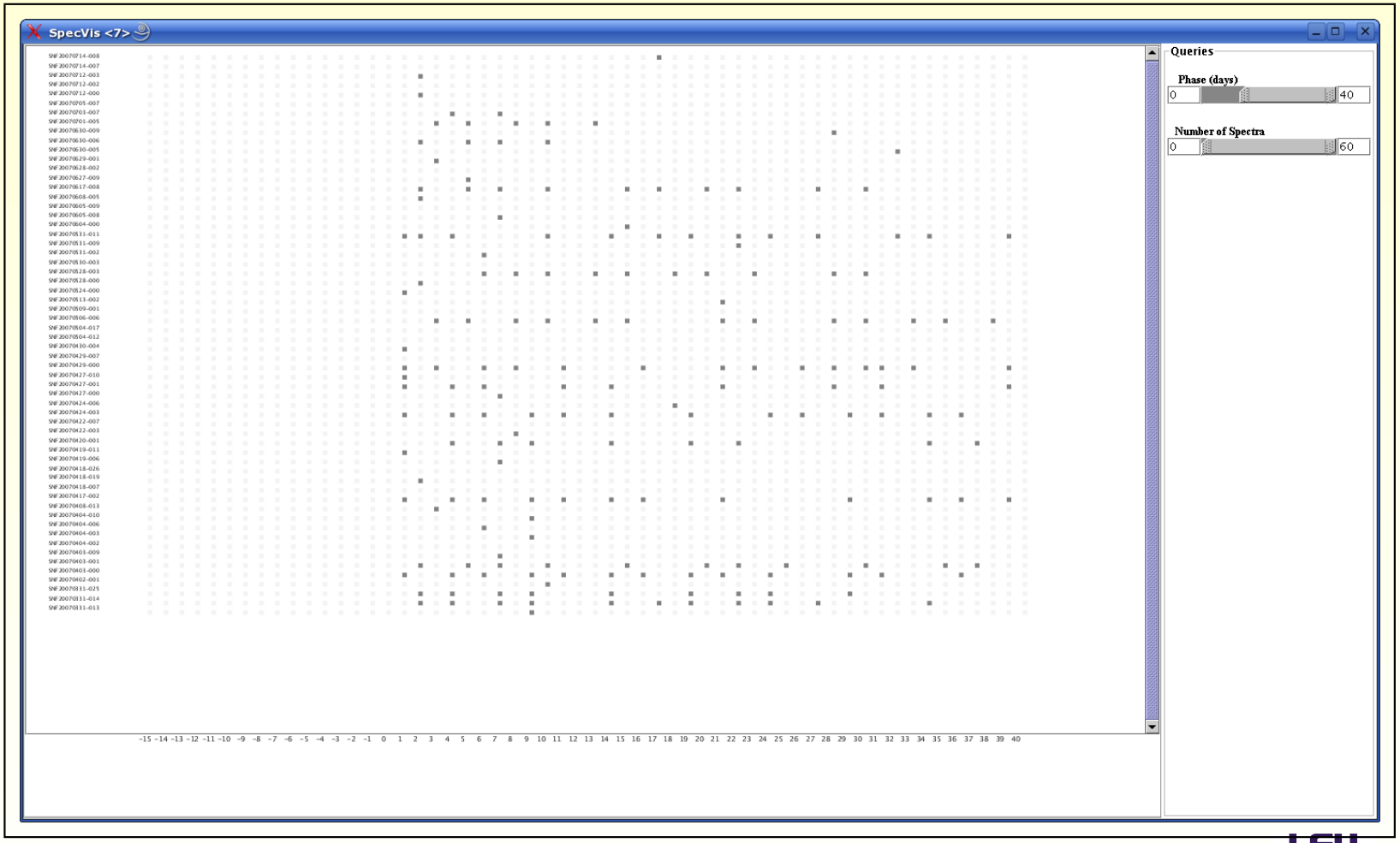
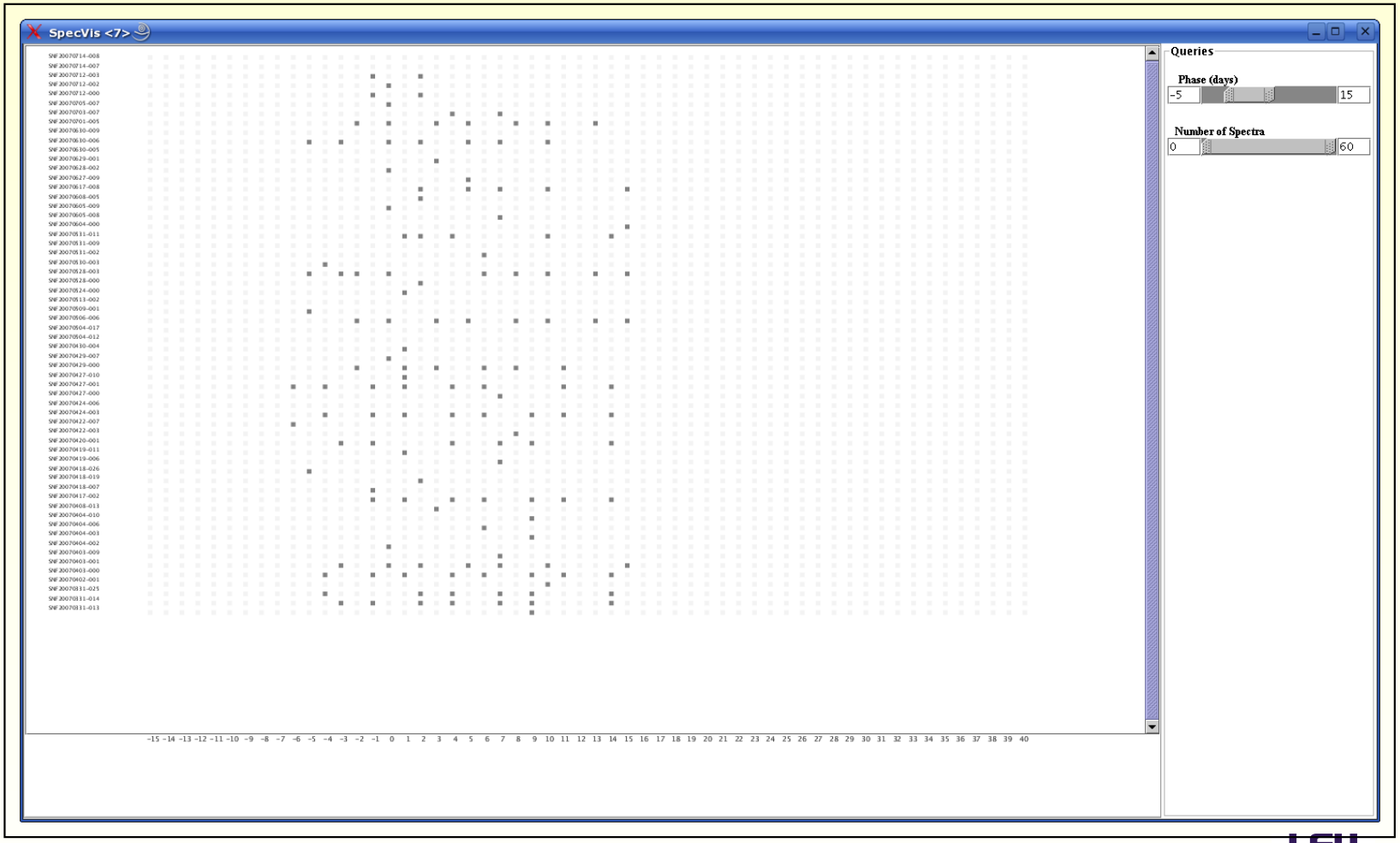
Filtering

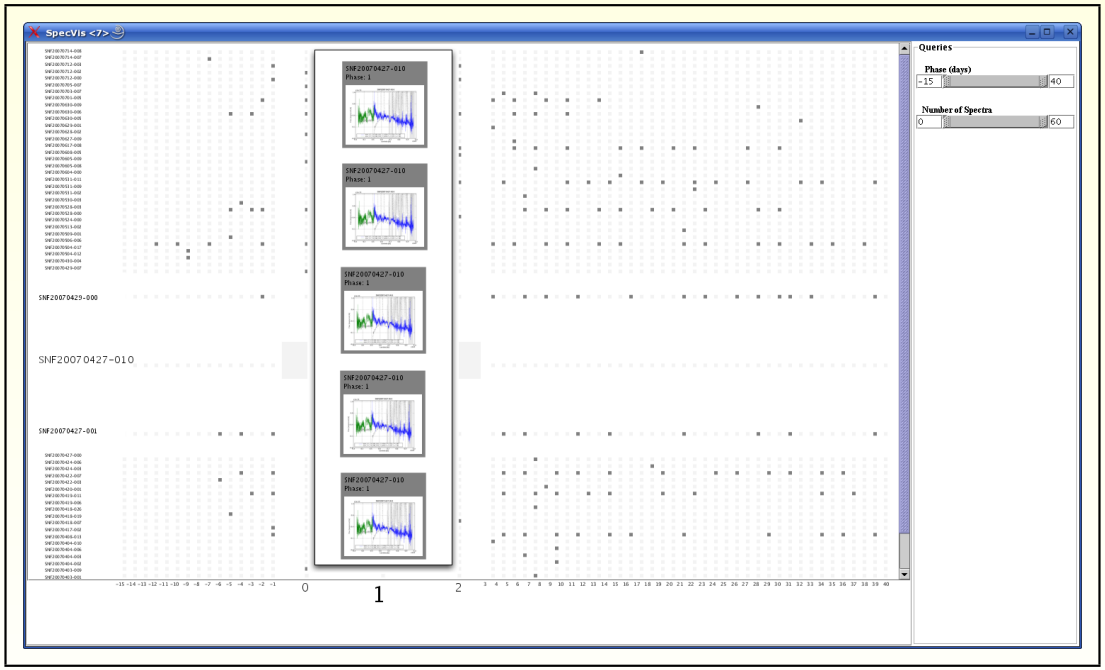


Filtering



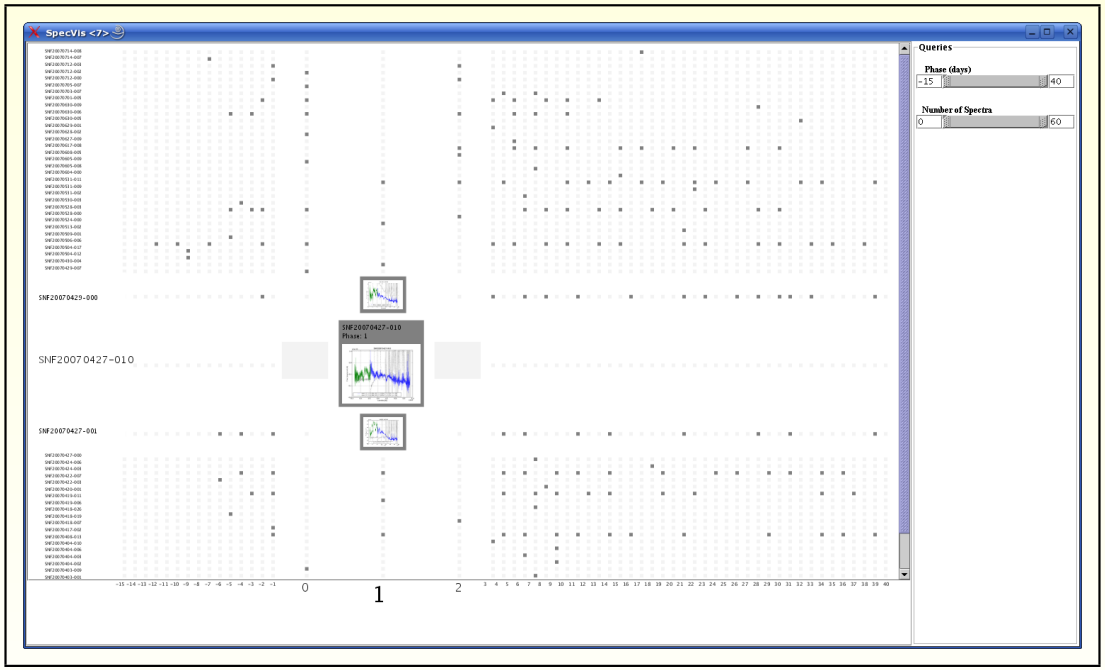
User-feedback and future work

- filtering the targets based on their features
- color coding the points
- displaying all spectra at a given phase



Conclusions

- we created a visual interface for browsing and exploring spectral data
- we implemented an useful info vis technique for large data sets



Acknowledgments

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- Dr. Karl Runge
- Vis group
- SNFactory scientists
- LBNL
- CCT

References

Piccolo website: www.cs.umd.edu/hcil/jazz/

Other examples on the web: the Piccolo fisheye calendar or the Piccolo fisheye menu

Thank you!