

# AuroraX and aurorax-asilib: a user-friendly auroral all-sky imager analysis framework

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## Key Points:

- AuroraX is a seamless online interface to visualize the aurora
- aurorax-asilib is a Python package for the detailed analysis of auroral all-sky imager data
- Together, these tools lower the barriers to entry for scientists who want to study the aurora

## Abstract

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## Plain Language Summary

### 1 Introduction

#### OUTLINE

- Brief history of ASIs and ASI arrays. Talk about why THEMIS ASI exists. Discuss CANOPUS?
- With these ASI arrays, the volume of data is immense.
- Why this software? Aurora ASI data formats very greatly, each with their own caveats. Our goal is to remove the need for scientists needing to write duplicate code to use these popular missions. As a result, this will enable scientists to dive right into the science and not need to know the details of data management (downloading and loading data, as well as applying routine data processing steps)

### 2 Design Philosophy

#### OUTLINE

- The primary design philosophy is to offer a relatively small set of functionality that is useful for most researchers studying the aurora. We strived to strike a balance between a complex and a user-friendly tool.
- Online keogram and conjunction interface accessible anywhere with internet connection.
- Comprehensive ASI data analysis functionality on a PC.

### 3 AuroraX

#### OUTLINE

- What is it?
- A highly optimized conjunction search
- On-demand keograms
- Virtual Observatory

### 4 aurorax-asilib

#### OUTLINE

- What is it?
- Plug-in based architecture
- Handles the downloading and loading of ASI images. Ultimately, ASI image files consists of time stamps and images, so the load data is equally as simple.
- Similarly with skymap calibration files.
- If a file is already downloaded, you do not need an internet connection to work with the data.
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#### 4.1 Download and load ASI image and skymap data

#### 4.2 Plotting single images

#### 4.3 Creating ASI movies

#### 4.4 ASI analysis tools

#### 4.5 An example: a satellite-ASI conjunction

### 5 Quality Assurance

#### OUTLINE

- asilib on GitHub. unit and integration tests run automatically before every release.
- THEMIS and REGO data formats are set and won't change.

### 6 Conclusion

#### Acknowledgments

We are thankful for the engineers and scientists who made AuroraX, THEMIS ASI, and REGO ASI projects possible. M. Shumko and B. Gallardo-Lacourt acknowledge the support provided by the NASA Postdoctoral Program at the NASA's Goddard Space Flight Center, administered by Universities Space Research Association under contract with NASA. The THEMIS and REGO ASI data is available from <https://data.phys.ucalgary.ca/>.