

What does it take to make SciQLop?

Unleashing the power of Space Physics data

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With the SClentific Qt application for Learning from Observations of Plasmas (SciQLop), analyzing space physics data is made easier. The project aims to solve the technical challenges involved in retrieving and interpreting data from remote servers, which can be daunting for students or newcomers. Even analyzing data from a single instrument on a given mission can raise some technical difficulties such as finding where to get them, how to get them and sometimes how to read them. These challenges can compound when building complex machine learning pipelines involving multiple instruments and even multiple spacecraft missions. The SciQLop project removes these technical difficulties while maintaining high performance, allowing scientists to focus on their data analysis.



Seamless Access to Space Physics Data with Speasy

- Many space physics datasets use a common format (CDF) following the ISTP standard. This allows scientists to use the same code to access measurements from various spacecraft and instruments.
- Unified Access: Speasy acts as a single access point for numerous online archives, making data retrieval efficient and streamlined.
- Fast and Efficient: Speasy leverages PyCDF++, the fastest available Python implementation for reading CDF files, ensuring smooth data processing.
- Multi-Layered Caching: Speasy's caching system further optimizes performance by storing frequently accessed data, minimizing redundant downloads.

Unlock SciQLop's Power with Jupyter Notebooks

Jupyter Notebooks provide an interactive environment to unleash SciQLop's full potential:

- Effortless Code Integration: Interact with SciQLop's API directly from your code.
- Advanced Customization: Fine-tune your plots beyond GUI limitations and tailor SciQLop to your specific needs.
- Custom "Virtual Products": Define functions to create and plot alongside existing data products. This allows you to easily calculate physical quantities not directly available, like plasma beta from magnetic field and pressure data.



Effortless Catalog Management with TS-Cat

SciQLop streamlines your work with time-series data by seamlessly integrating with TS-Cat, our dedicated Python library.

• Organize Events: TS-Cat simplifies the creation, editing, and browsing of catalogs containing your identified events within time-series data.

 Streamlined Workflow: This integration eliminates the need for complex, external tools, making your SciQLop experience smooth and efficient.

SciQLopPlots: Efficient and Customizable Visualization

Millions of data points can slow down traditional plotting tools. SciQLopPlots tackles this by using a custom Python wrapper around QCustomPlot. This allows for:

- Adaptive Sampling: Intelligently reduces the number of data points displayed, preserving key features while drastically improving performance.
- High Customization: QCustomPlot offers a wide variety of plot types and extensive customization
 options to create clear and informative visualizations tailored to your needs.

