



MDSplus WebScope



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What is MDSplus?

MDSplus is a collection of tools and APIs for acquiring and analyzing data. It was developed primarily for fusion experiments as a collaboration between MIT and RFX. Both the acquired data and the settings are stored in a tree data structure and are organized into files by shot number. A shot refers to a single data capture of an experiment.

Tree: cmod

Shot: 1090909010

What is a scope?

A data visualization tool

The word comes from 'oscilloscope'

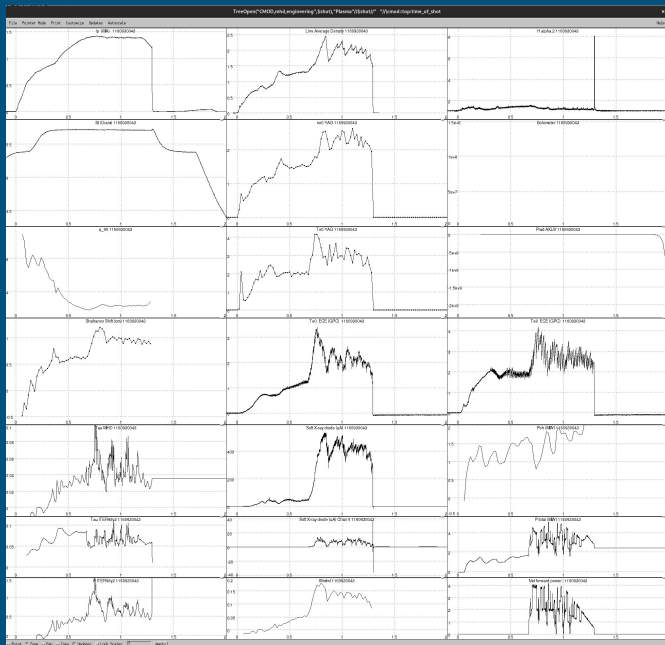
This allows viewing of multiple data signals side by side, zooming and aligning data, and updating the plots when new data is available

We need one because other data visualization tools don't integrate with MDSplus.

Existing MDSplus Scopes

Fun fact: DW refers to DECwindows

dwscope



Pros

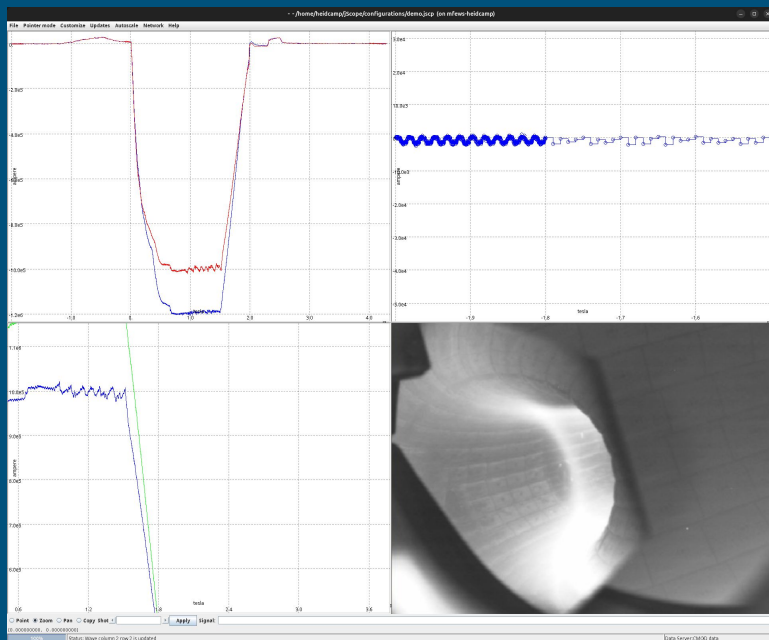
- Fast
- Reliable

Cons

- Difficult to maintain
- Single line plots only
- No colors
- Missing modern creature comforts

Existing MDSplus Scopes

jScope



Pros

- Multi line traces
- Different graph types/options
- Supports video

Cons

- Slow
- Relies on outdated java windowing framework

Motivations

- Limitations of the old scopes
- Greater accessibility for more users with a smaller footprint
- Modernize with web tools
- Inspired by tools like Grafana



Why not just use Grafana?

i.e., Why extend MDSplus instead?

- Shot-based data, not just time series data
- Familiarity to existing users
- Ability to import old scope files
- Reduce dependence on external products



WebScope Features

- Fast
- Multi trace panels
- Easily run on modern web browsers
- Modern creature comforts
- Colors
- Import existing scope files
- The goal is feature parity with dwscope and jScope



Technologies Used

- Vanilla Javascript
 - Longevity
 - Minimize dependency injection
 - D3
 - SVG plot generation
 - Interactive (zoom +/-)
 - Websockets
 - Currently a simple python server
 - MDSplus is not stateless (not well suited for REST)
 - Designed around MDSplus' `getMany()` API
 - Only one Tree Open command
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Demo

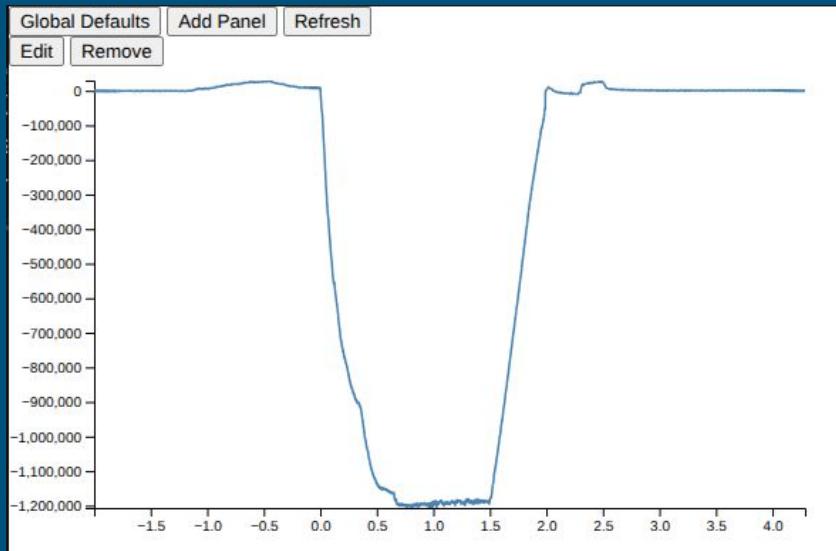


Future improvements

- Styling
 - Configurable Dashboards
 - Exporting scope files
 - Additional graph types
 - Improve UI/UX
 - Incorporate useful features from projects such as piScope and Review+ (from D3D)
 - Dark Mode
 - Stack of Zoom operations
 - And much more!
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Questions?

Demo Backup



Title: ☐

y-min: ☐

y-max: ☐

x-min: ☐

x-max: ☐

+ Trace #1

Y Axis: ☐

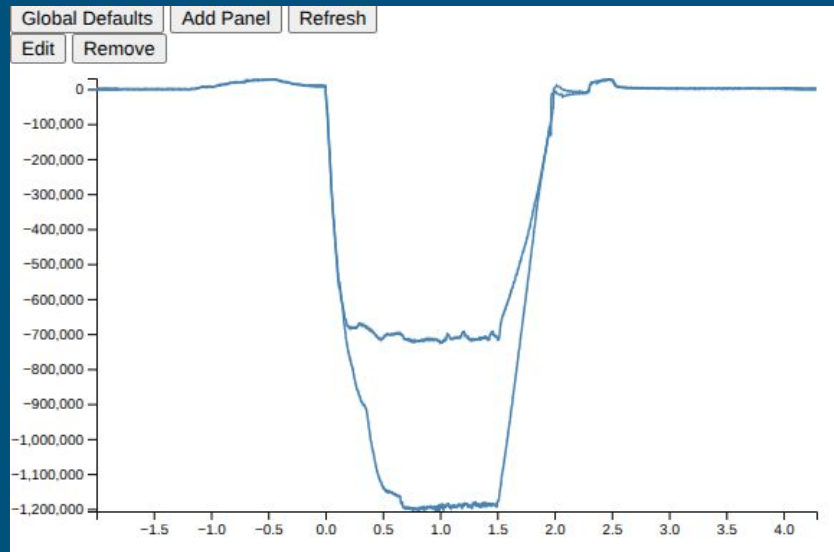
X Axis: ☐

Tree: ☐

Shot: ☐

Default Node: ☐

Save Reset Cancel



Title:

y-min:

y-max:

x-min:

x-max:

+ Trace #1 Trace #2

Y Axis: ☐

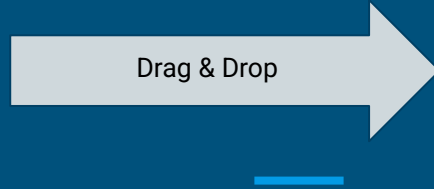
X Axis: ☐

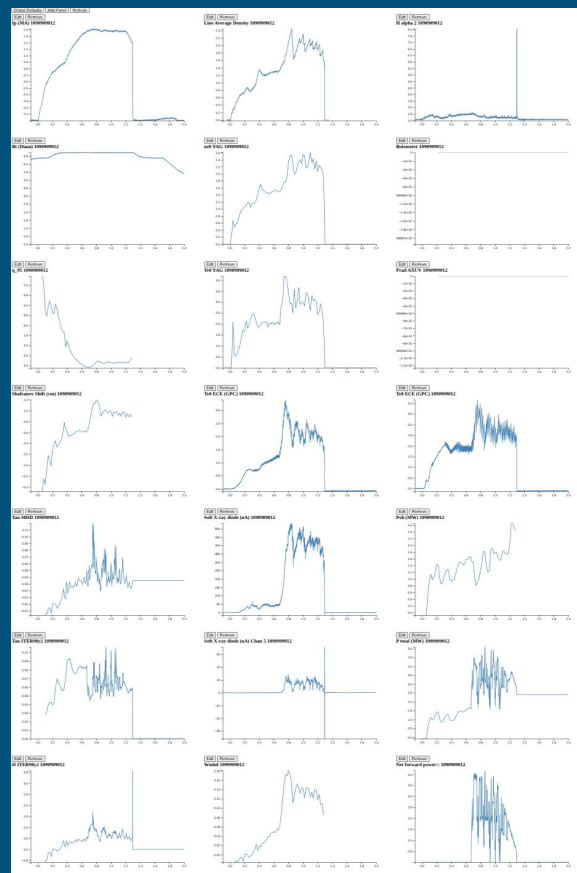
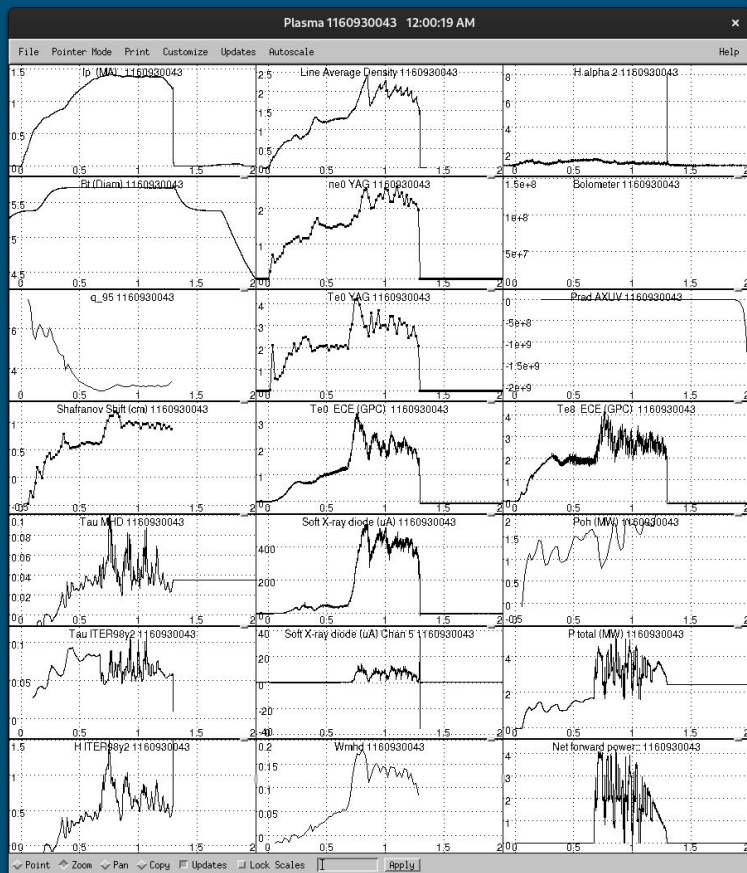
Tree: ☐

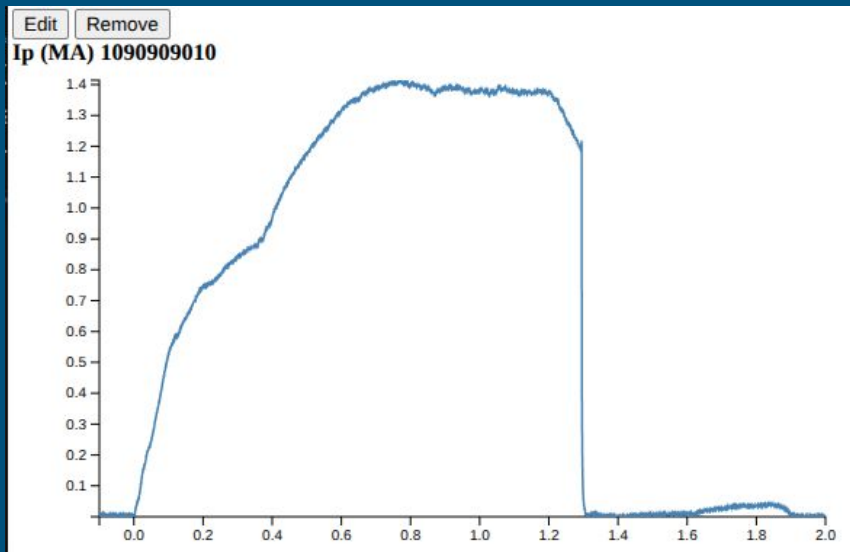
Shot: ☐

Default Node: ☐

Save Reset Cancel







7.5

Title: "Ip (MA) "/"\$shot

y-min:

y-max:

x-min: -0.1 ☒

x-max: 2 ☒

+ Trace #1

Y Axis: ☐

X Axis: ☐

Tree: ☐

Shot: ☒

Default Node: ☐

Save Reset Cancel