

Allison Scanner App

Now supports multiple ion sources

2023-01-10, Tong Zhang

Revised: 2023-03-16

Locate and Open the App

- See the brief description of the app
- Click to start up the app, please note the pop-up dialogs before the app getting started, it requires user clicking.

The screenshot shows the 'App Launcher' interface. At the top, there are tabs for 'Home' and 'Apps'. Below the tabs, a welcome message reads 'Welcome Tong Zhang!'. A section titled 'Favorites' displays a grid of application cards. The first card, 'Allison Scanner', is highlighted with a green border. It shows a version number '3.6', a star icon, and a description 'Emittance Measurement'. Below the grid, a pop-up window for the 'Allison Scanner' app is open. The pop-up has a green header with the app name and a close button. It contains two sections: 'Actions' on the left and 'Descriptions' on the right. The 'Actions' section lists 'Open', 'Open in Terminal', and 'Remove from Favorites'. The 'Descriptions' section provides a detailed description of the app's function and a warning not to operate the device too often. At the bottom of the pop-up, contact information for Tong Zhang is displayed. The footer of the interface includes the 'Facility for Rare Isotope Beams' logo, the text 'Michigan State University', and the 'App Launcher (v4.3)' version information. The date and time '2023-03-16 14:22:40 EDT' are shown in the bottom right corner.

Home Apps

Welcome Tong Zhang!

Favorites

3.6 Unknown 7.1 3.1 Unknown

Allison Scanner Emittance Measurement

BPM Overview devel

Correlation Visualizer General

Device Viewer Data Viewer

FSEE GUI devel

Allison Scanner Emittance Measurement

Actions:

- Open
- Open in Terminal
- Remove from Favorites

Descriptions:

Operating Allison-scanner device and processing the acquired data to get the beam transverse emittance, as well as Twiss parameters. This application also supports save and load data to perform post-analysis.

Please do not operate the device very often, which might cause hardware mechanical issues.

Contact: Tong Zhang x7421 zhangt@frib.msu.edu

10.5 Unknown Unknown Unknown

Facility for Rare Isotope Beams Michigan State University

App Launcher (v4.3)

2023-03-16 14:22:40 EDT

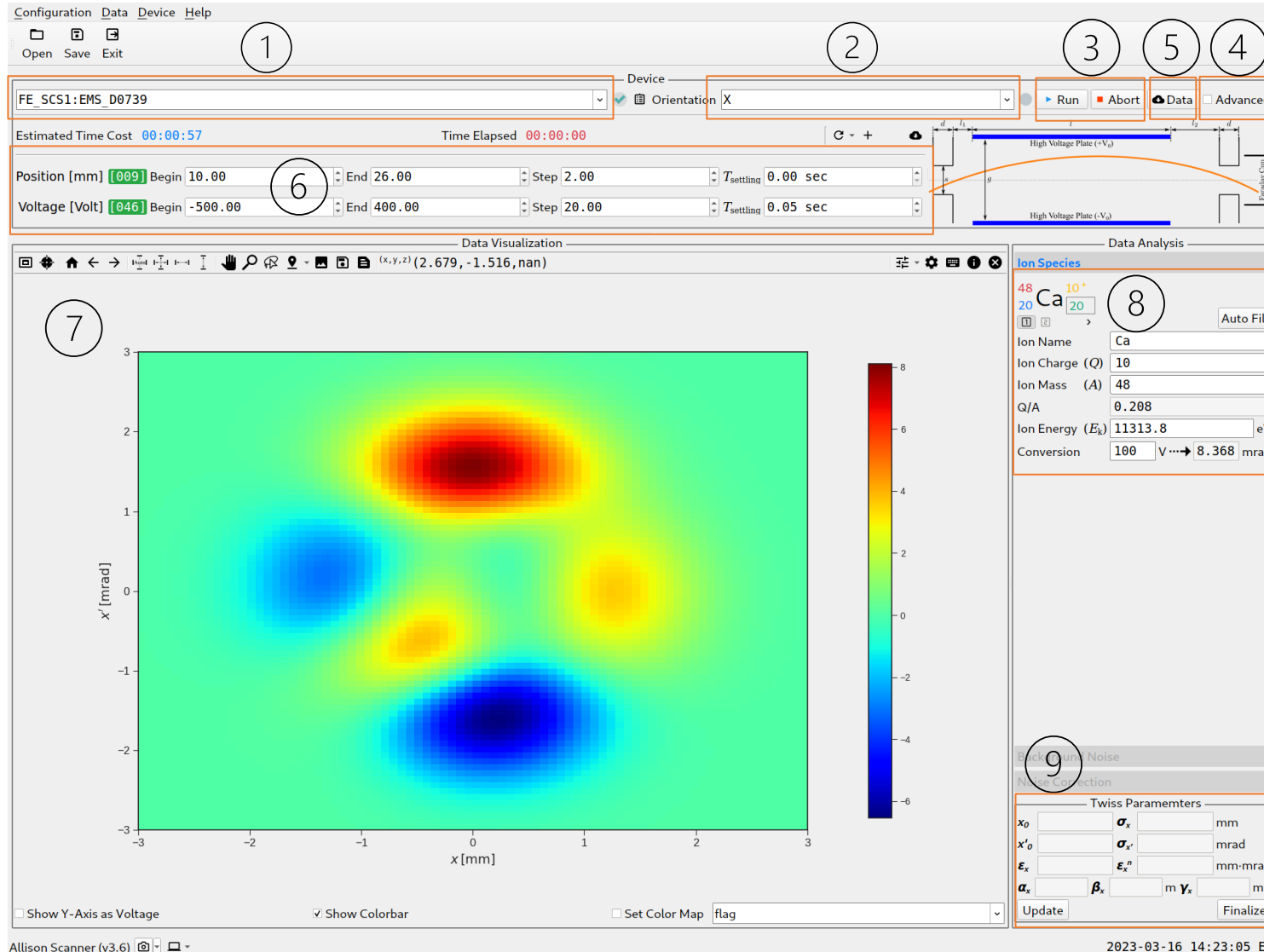
The Main App Interface

1 Select device, two options for two ion source beamline

2 Select X or Y direction for the measurement

6 Set up the scan ranges for voltage and position, make sure the total steps is an integer, if not, the green background area will be shown as red as a warning.

7 The 2D image will be refreshing as the scan procedure is undergoing. The Y-axis shows the converted x' from voltage, see also in 8



3 Start or stop the device scan

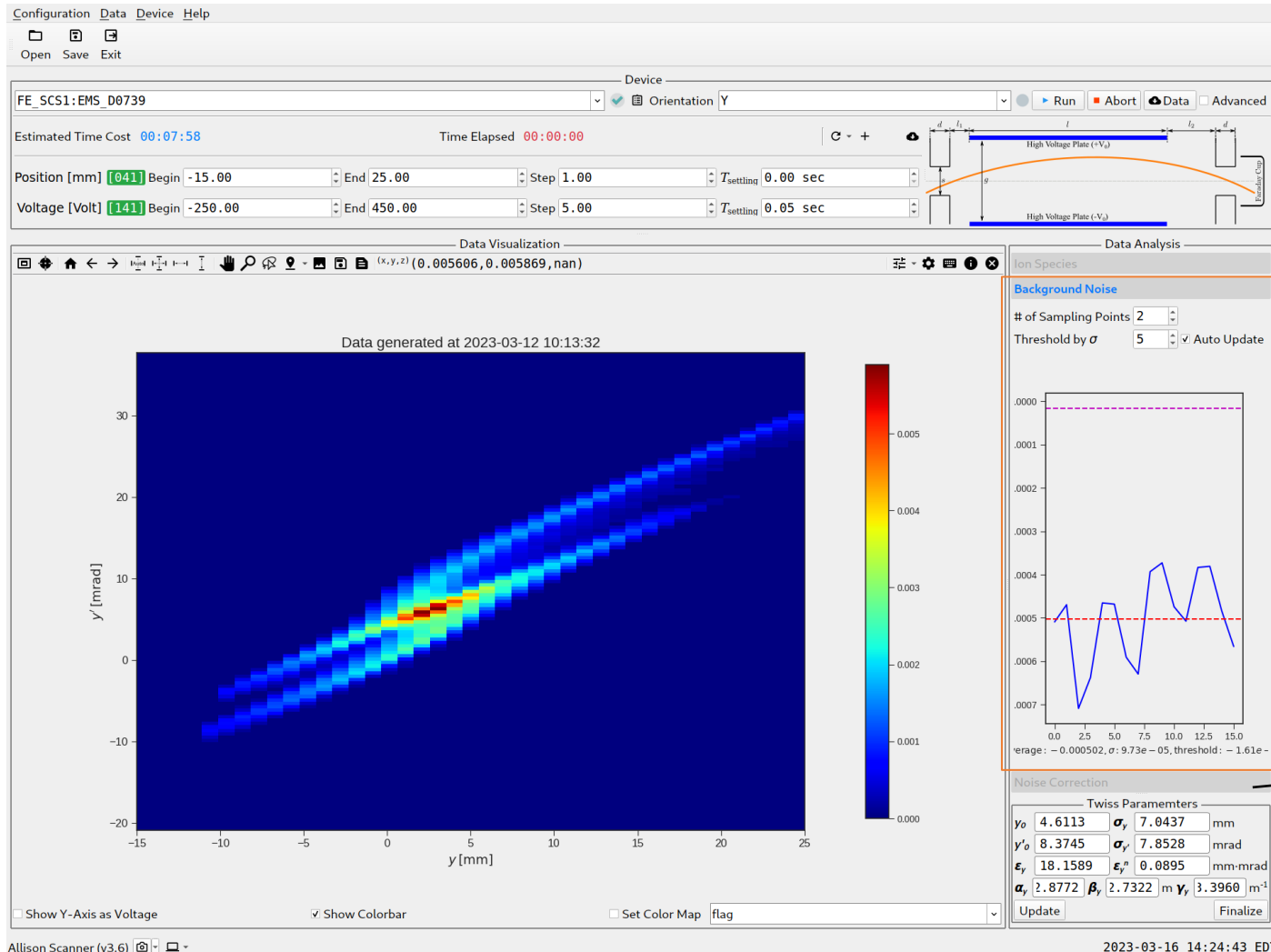
4 See more info of device configs and motor position

5 Pull the data that generated from last scan, and do the analysis

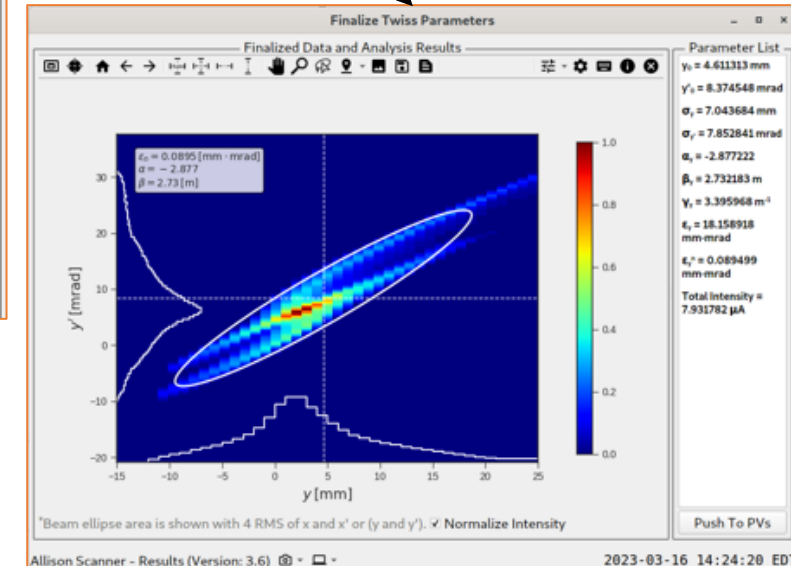
8 The ion source species info, plus the high voltage, will be auto-updated based on the active ion source

9 The Twiss parameters as the final analyzed results, push Finalize will have a more detailed pop-up windows with more information

Analyze Example



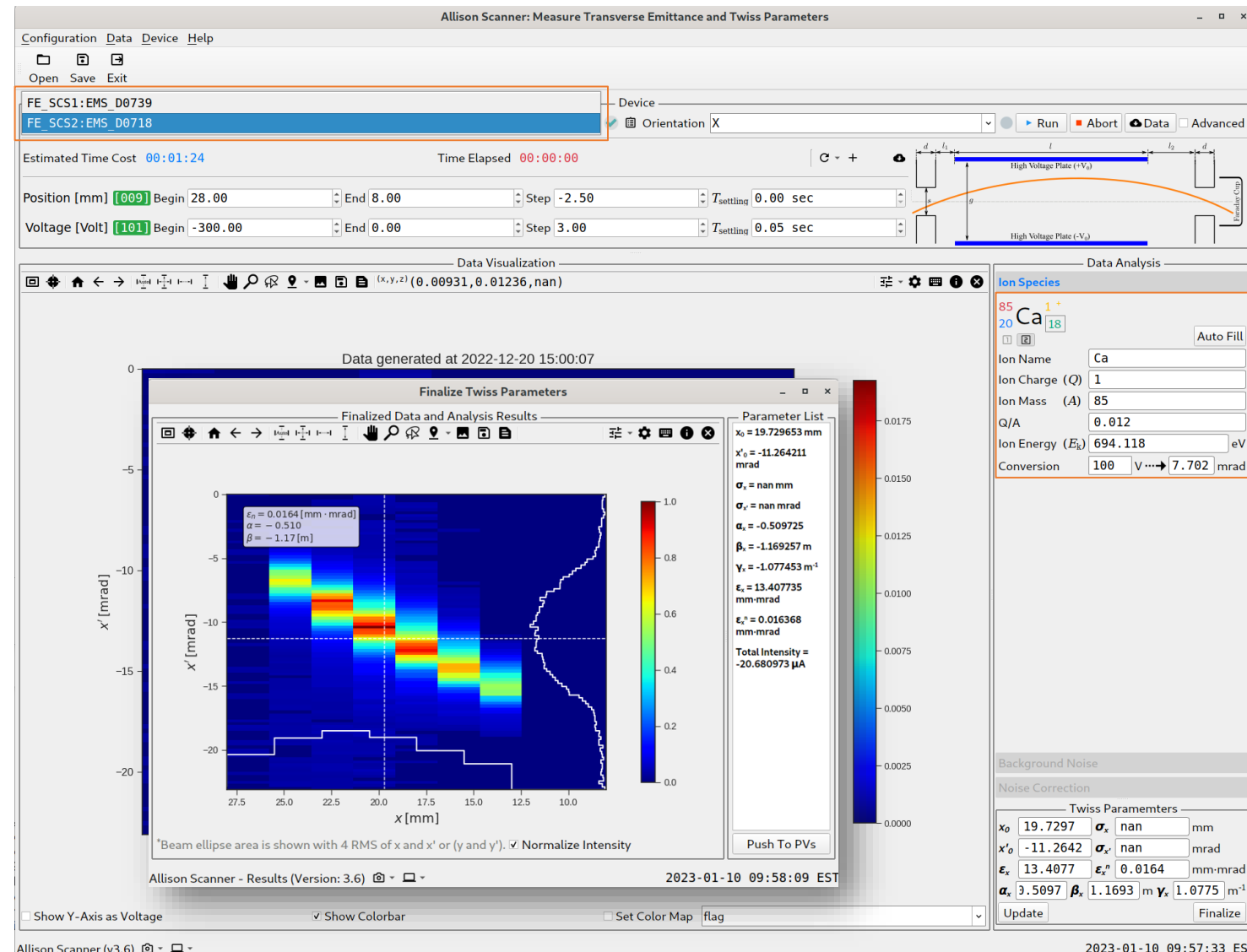
- Two tabs in the “Data Analysis” section could be used to adjust the analysis routine
- The background noise reduction
- And the overall noise correction
- Adjust the numbers to see how the image and results change
- Push the Finalize button to get the detailed report



About the data

- Data is supported to save and load into the app
- There will be a question dialog before exiting the app about saving the data into a file
- The data format is enhanced to accommodate the new device in the high-power source beamline, but is back-compatible with the previous data

Multiple Ion Source Support



- App version: 3.6
 - Showing on App Launcher or Help → About of this app
- Support a new Allison Scanner device (EMS): FE_SCS2:EMS_D0718 in the High Power Ion Source Beamline
- Choose the EMS device from the dropdown menu, will adapt the UI components:
 - Ion Species: element name, Q, A, Q/A, energy, and voltage to divergence interpretation...
 - You may also see the new ion species info widget on Settings Manager and other apps that use it, which will be used to add multiple ion source support.
 - [optional] Click [1] or [2] will switch ion source, [1]: Artemis, [2]: new source

Embedded Ion Source Info in the Saved Data

```
1133 },
1134 "Beam Source": {
1135   "_id": "ISRC2",
1136   "Ion Name": "Ca",
1137   "Q": 1,
1138   "A": 85,
1139   "Ek": {
1140     "value": 694.118,
1141     "unit": "eV"
1142   }
1143 },
```

- A new key is added to the format of saved data, “_id”, under “Beam Source”, to indicate which ion source is working with, ‘ISRC2’ is for the new high power ion source, and ‘ISRC1’ is for Artemis.
- For the data files that saved with previous versions, no such key exists, they all refer to ‘ISRC1’.

New PVs for the Analyzed Results

- Field value PV: “FE_SCS2:EMS_D0718:{field}_RD”
- Field:
 - XCEN (centroid of x), XPCEN, (centroid of x')
 - XALPHA (alpha of x), XBETA (beta of x), XGAMMA (gamma of x), XEMIT (geometric emittance of x), XNEMIT (normalized emittance of x)
 - XINTEN (total intensity)
 - Replace all 'X' with 'Y' for Y plane.
- Menu: Data → Auto Push Results to PVs, by default it is checked.

Device geometry info

- Check the “Advanced” checkbox to see more information regarding the device hardware geometry configurations.