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# New Plotter in MCNP



**Cole Frederick**  
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MCNP User Symposium  
Aug 2024



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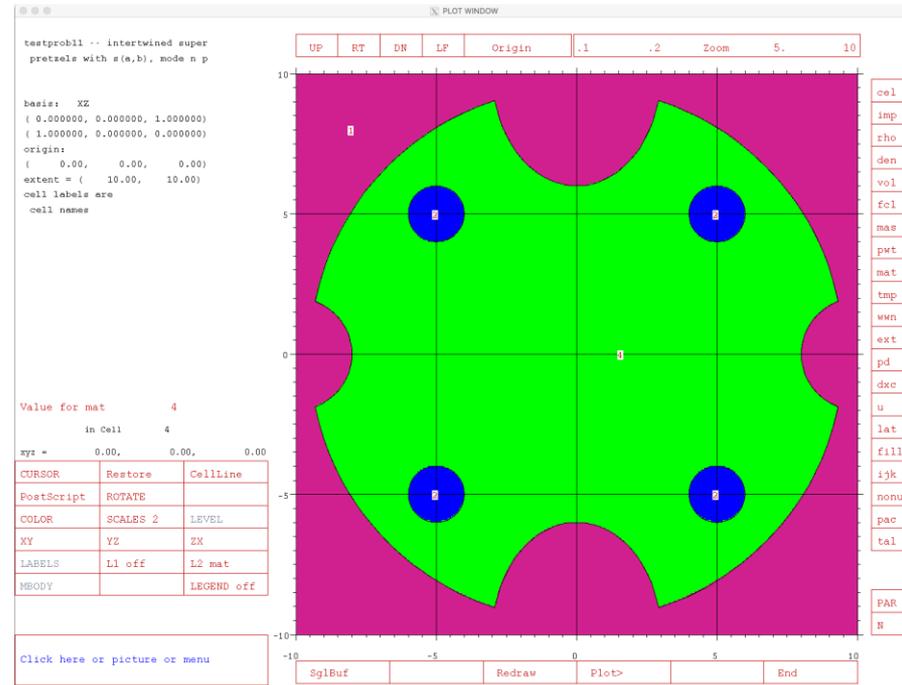
# Why update the plotter?

## Current interface uses a basic layout

- Buttons are modeled directly in MCNP, not using a UI framework
- Interaction with interface doesn't provide a modern look-and-feel

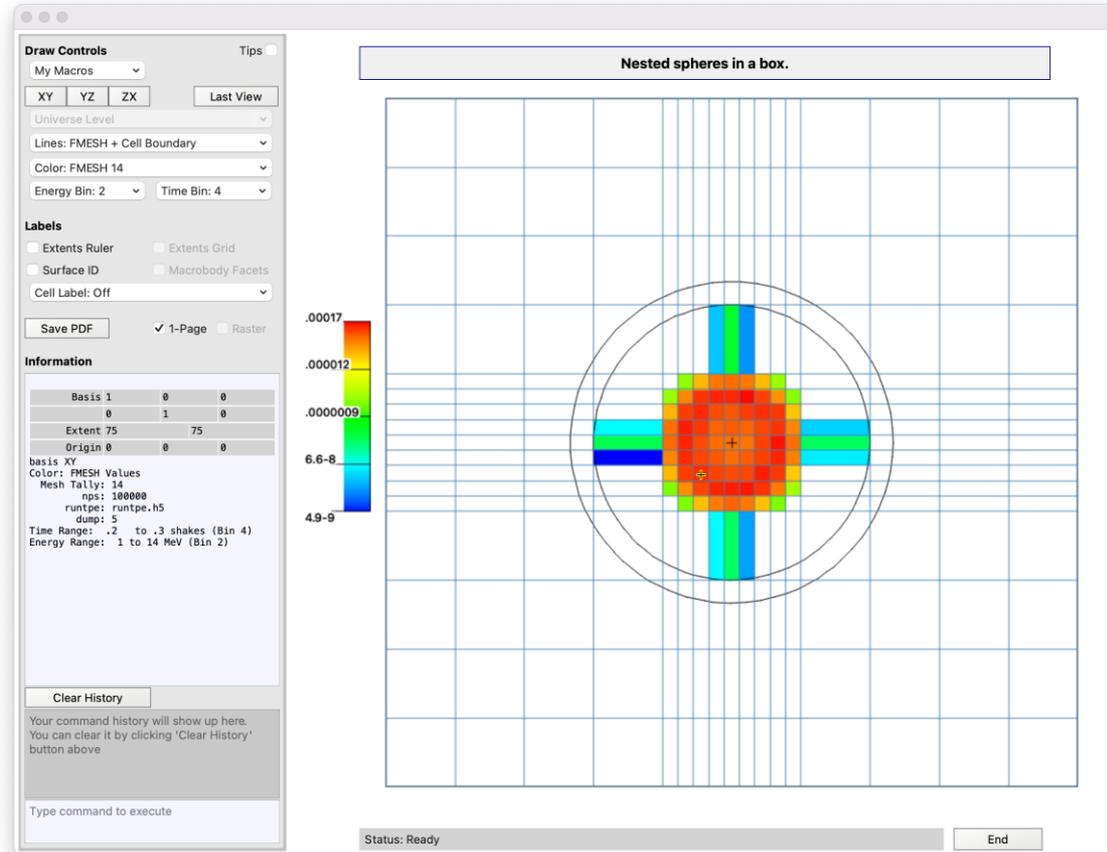
## Performance is less than optimal

- No platform specific optimizations
- Host code runs the main event loop



# Modern Controls

- Reactive buttons, checkboxes
- Menus (drop down or tear away)
- Tool tips on mouse hover
- Mouse controls for pan, rotate, zoom
- Faster rendering



# Features

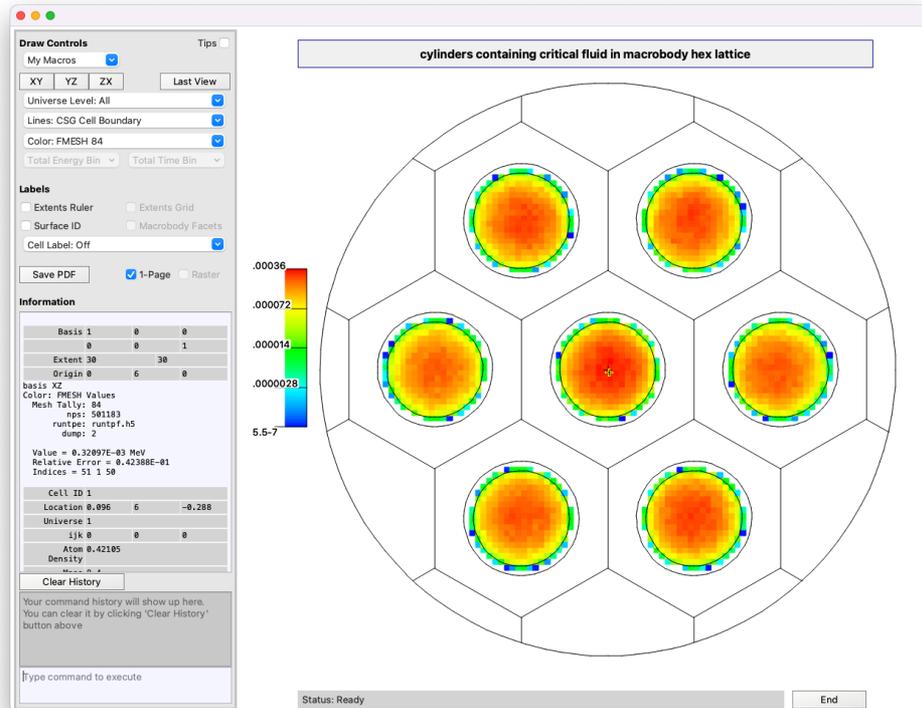
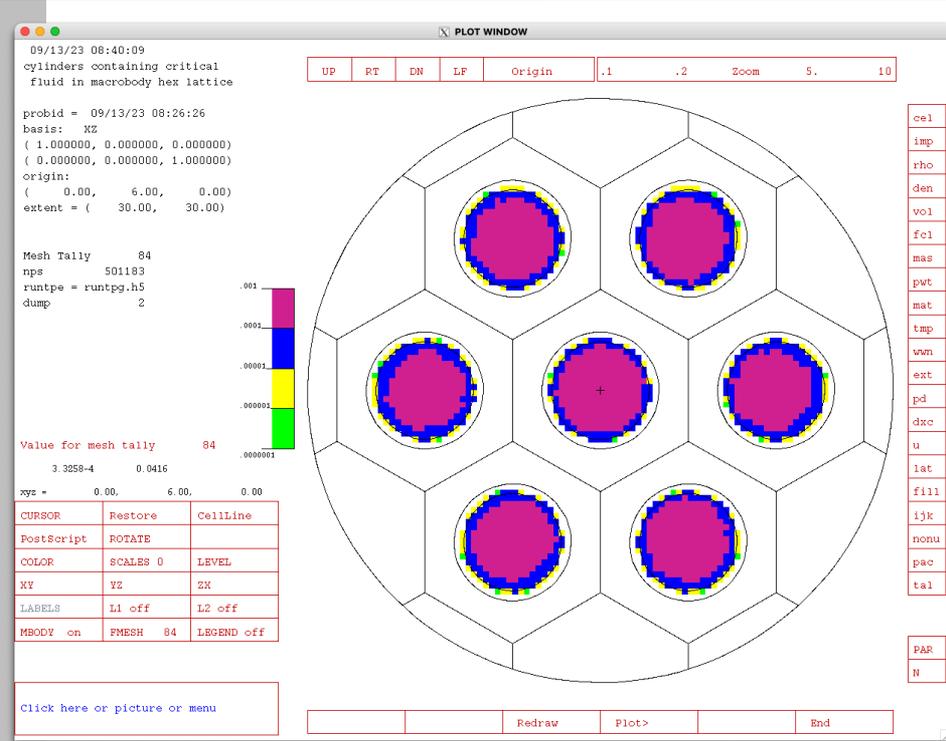
## Retains:

- Text command interface for scripts and power users
- All drawing capabilities offered by previous plotter

## Adds (so far):

- Export directly to PDF
- Cell information at a glance
- Mouse pan/rotate/zoom
- Save/restore views
  - Easily shared with colleagues
- Etc

# Side by Side



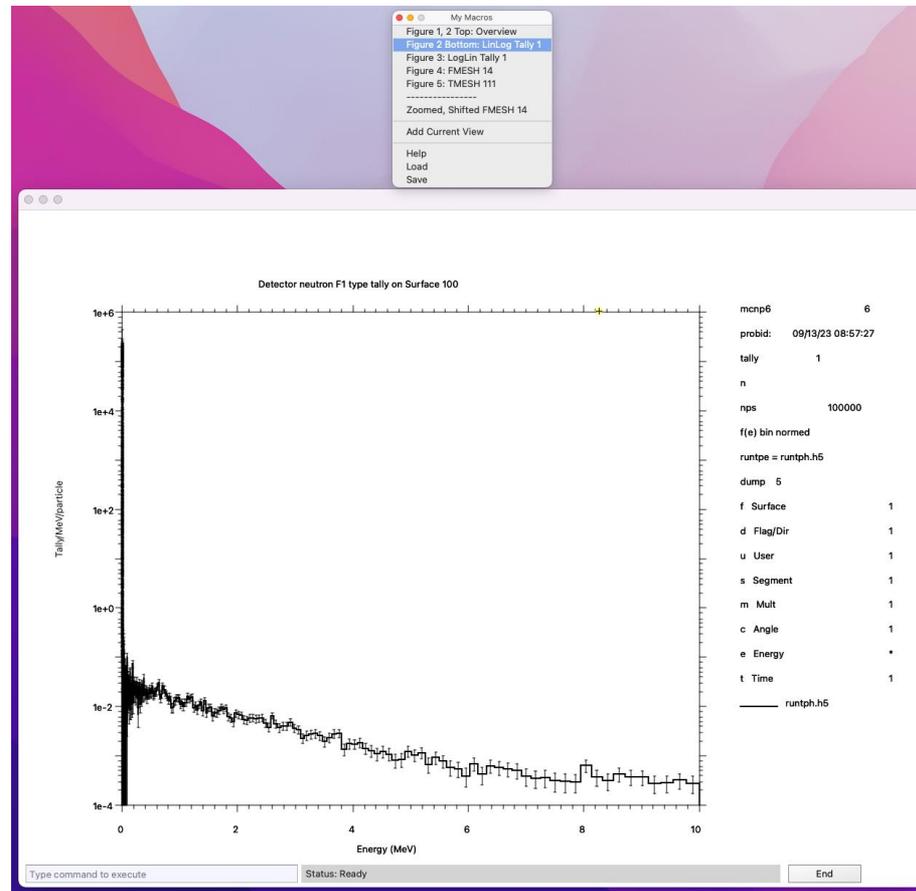
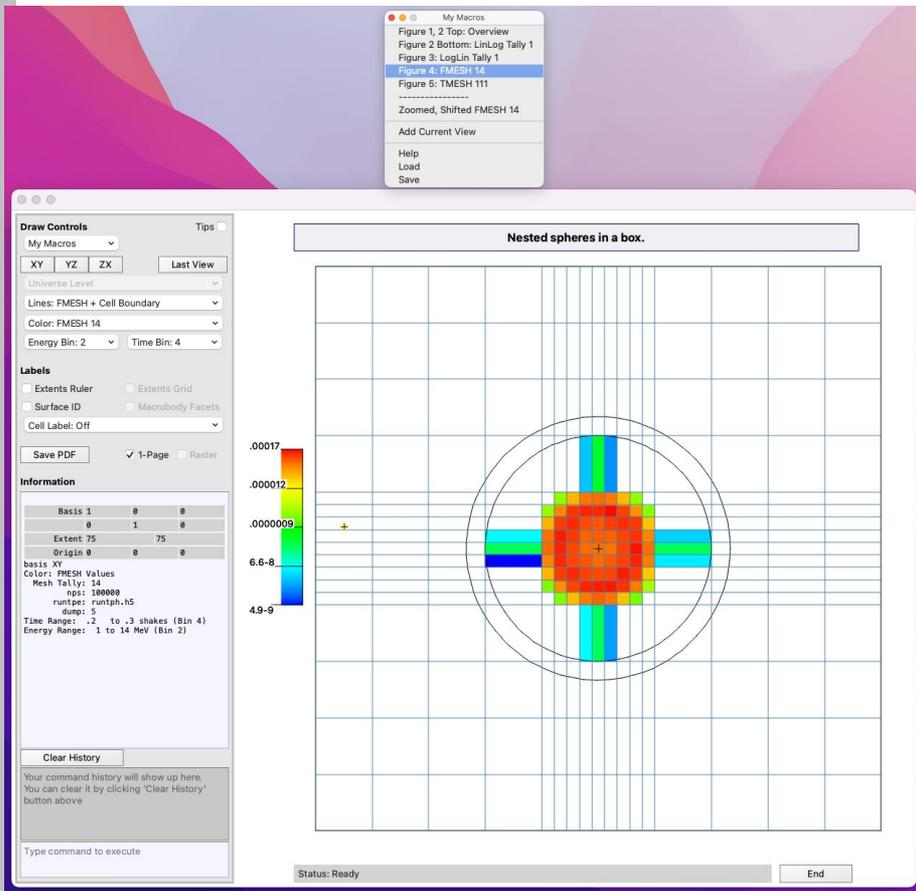
# Control Panel Detail

The image shows a software control panel titled "Draw Controls" with various settings and options. Callout boxes provide detailed explanations for several key features:

- My Macros:** A dropdown menu for user-defined view selectors.
- Direct access to z, x, and y views:** Buttons for XY, YZ, and ZX views.
- Universe level menu:** A dropdown menu for selecting levels for repeated structure geometries.
- Color menu:** Controls the filling of cells.
- FMESH tally energy bin selector:** A dropdown menu for selecting energy bins.
- Display ruler relative to extents:** A checkbox to toggle the ruler's position.
- Surface labels:** A checkbox to toggle the drawing of surface labels.
- Cell label menu:** A dropdown menu for selecting cell values.
- Save current view to PDF file:** A "Save PDF" button.
- Show tool tips:** A "Tips" checkbox for hovering over graphics elements.
- Toggle between current and previous view:** A "Last View" button.
- Line menu:** A dropdown menu for determining outlines on the graph.
- FMESH tally time bin selector:** A dropdown menu for selecting time bins.
- Draw grid:** A checkbox for drawing a grid (active with ruler).
- Macrobody facets:** A checkbox to toggle labeling of macrobody surfaces.
- Single page PDF files:** A "1-Page" checkbox to deselect for multiple figures per file.
- Save Raster PDFs:** A "Raster" checkbox for saving PDFs in a different format.

A general note at the bottom states: "All drop-down menus can be 'torn off' with the dotted line at the top."

# Saved Views



# Demo

# Updates

- **Now working uniformly across hardware platforms, compilers, and operating systems**
- **Works with both Qt 5 and 6**
- **Better window scaling across OSs**
- **Bug fixes and small improvements, eg**
  - **Menu item (FMESH+Cell) status consistency with app state**
  - **Enabled CONTOUR**

# Looking forward

- **Distributed with 6.3.0 as optional**
- **In 6.4 and all future version, the new plotter is the only plotter**

## **Integrated directly with MCNP, not a sidecar project**

- Used by the development team

## **Planned next steps**

- Multiple windows (showing multiple views into the same geometry)
- 3D rendering (ray tracing) directly reflecting the physics engine
- Interactive/live editing of the geometry

# Questions?

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