

# Sonnet/Virtuoso Interface Training



**ELECTROMAGNETICS**  
**SPECIALISTS**

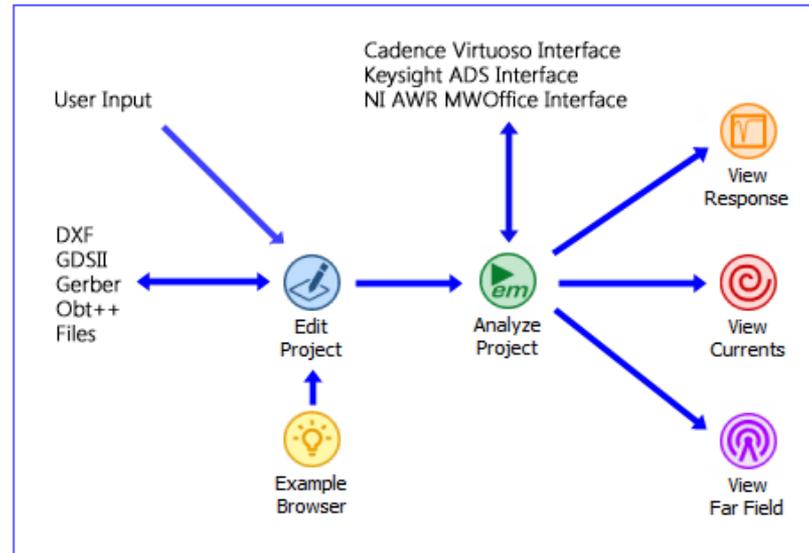
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- Sonnet Interfaces and Overview
- Virtuoso Interface and Capability
- Demo of Cadence Interface

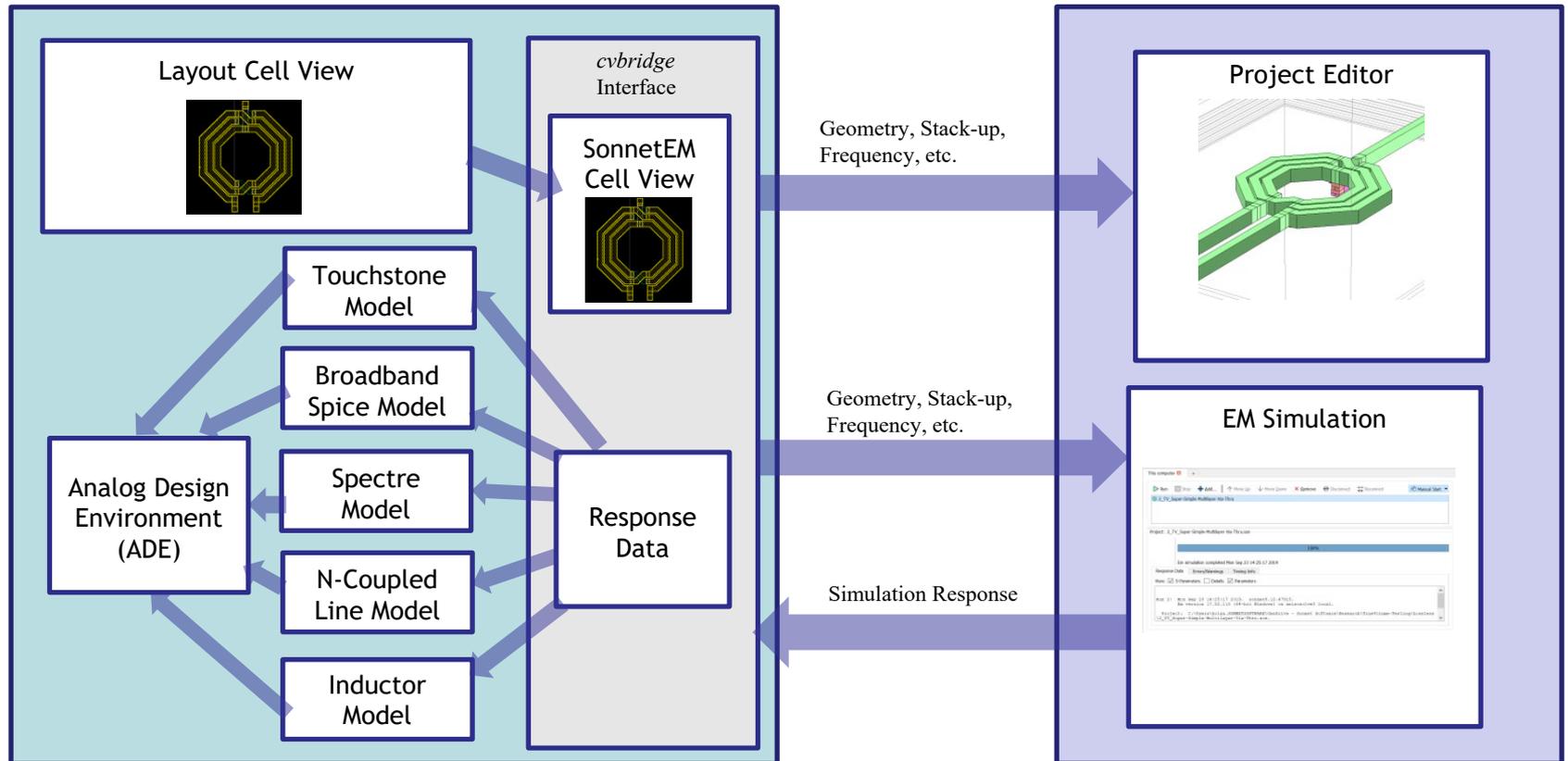


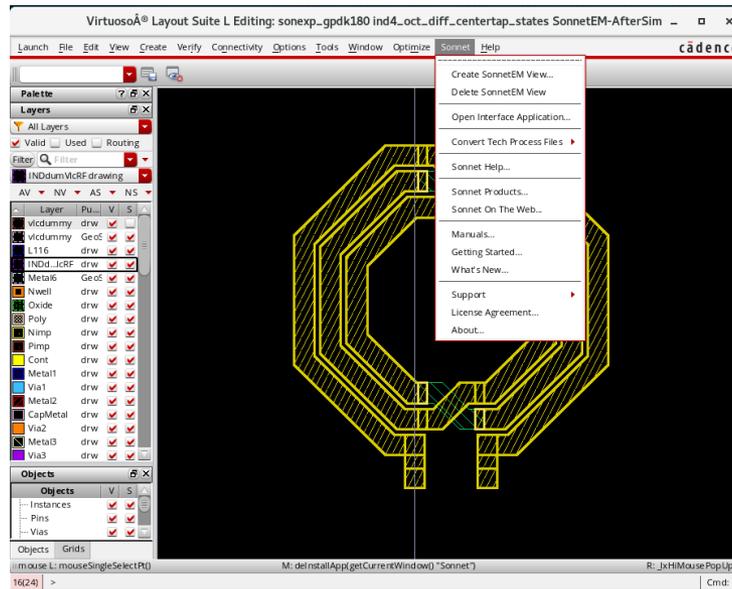
Overview of All Sonnet Interfaces

# Sonnet Interfaces and Overview

- **Cadence:**
  - Connections Program Partner (Since 2002)
  - Complete Virtuoso Suite Integration
- **Keysight:**
  - Third-Party EDA Vendor, with integrated interface to ADS
  - Keysight provides a Sonnet interface for Genesys Suite
  - **New:** Support for Co-simulation in v17.
- **National Instruments/AWR:**
  - EM Software Partner
  - Integration with Microwave Office through the AWR EMSocket
- **Synposys:**
  - Synposys In-Sync Program member
  - Sonnet SPICE extraction is fully compatible with Synposys HSPICE
- **AutoDesk:**
  - AutoCAD Partner
  - DXF format standards and interface
- **MathWorks:**
  - MathWorks Connections Program Member
  - Developed an API for automated operation of Sonnet from MATLAB

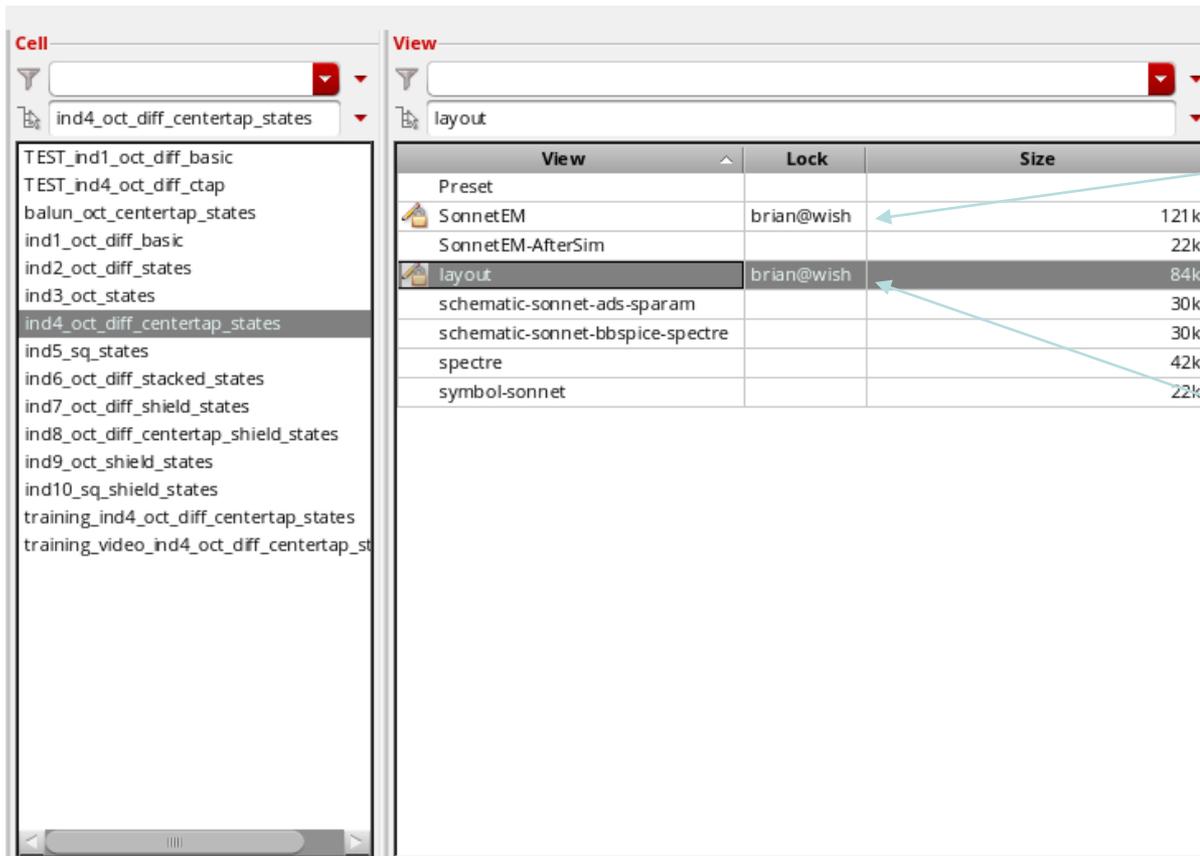
- Supported and cross-platform support on:
  - Windows
  - Red Hat Enterprise Linux
  - SuSe Enterprise Linux
- Multi-Core and multi-CPU support on x86 processors
- Node-Locked, LAN and WAN licensing capability
  - Remote display/Desktop and Remote simulation possible with LAN and WAN licenses
- Cluster computing





Overview of the Cadence Interface

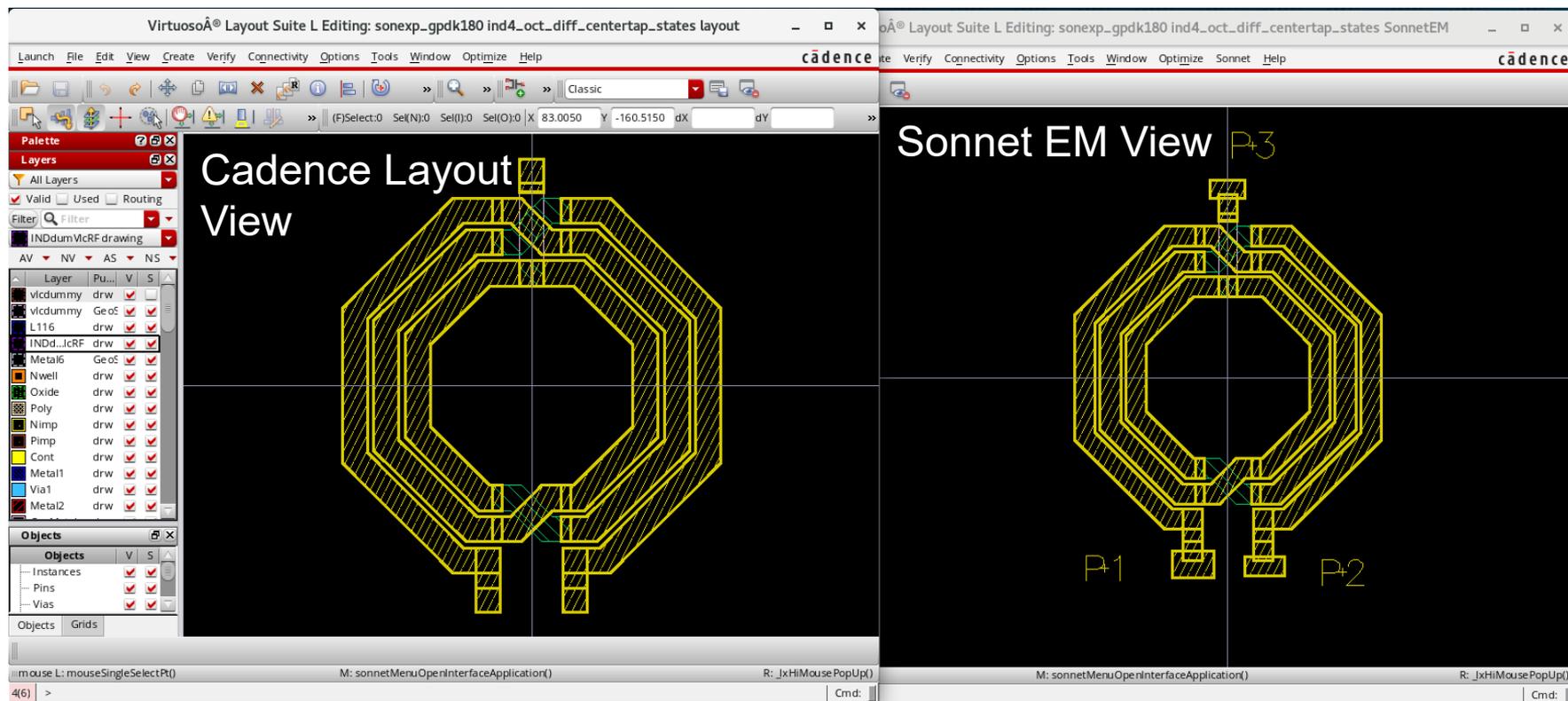
# Virtuoso Interface and Capability



Sonnet EM View

Cadence Layout View

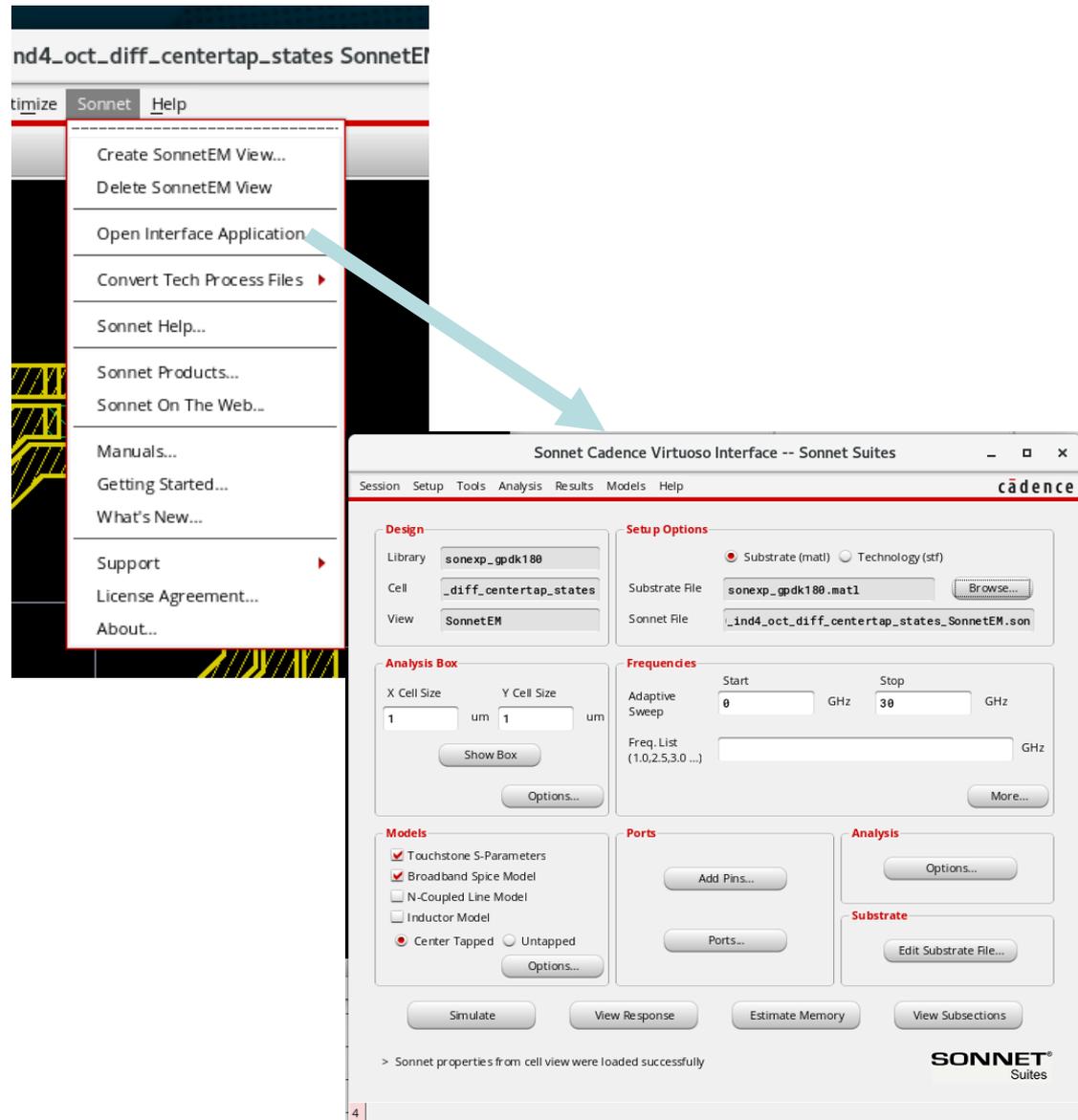
- Sonnet EM Views are generated from, and roughly analogous to Layout Views, however they keep the em-simulation settings.

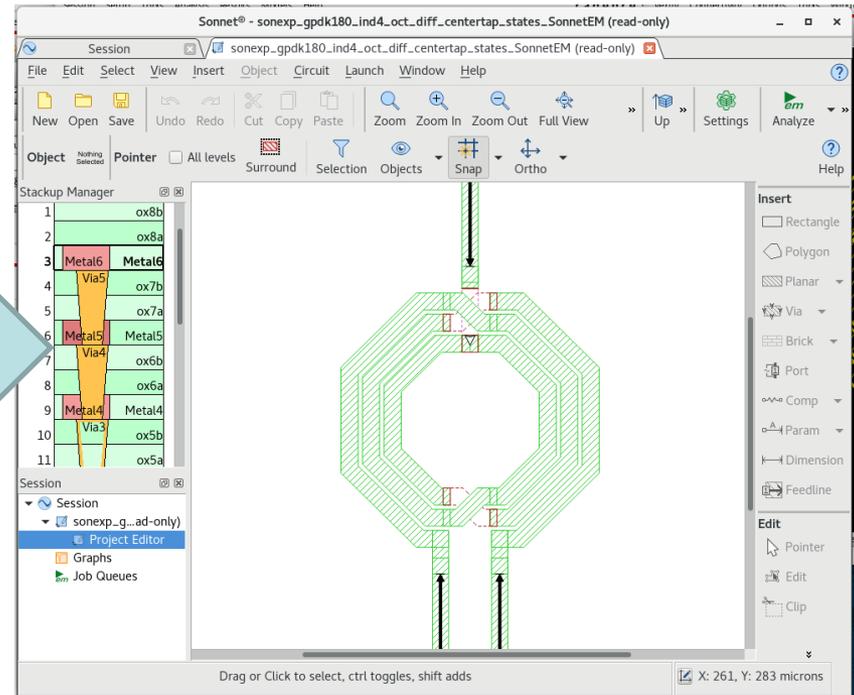
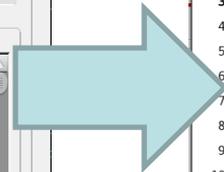
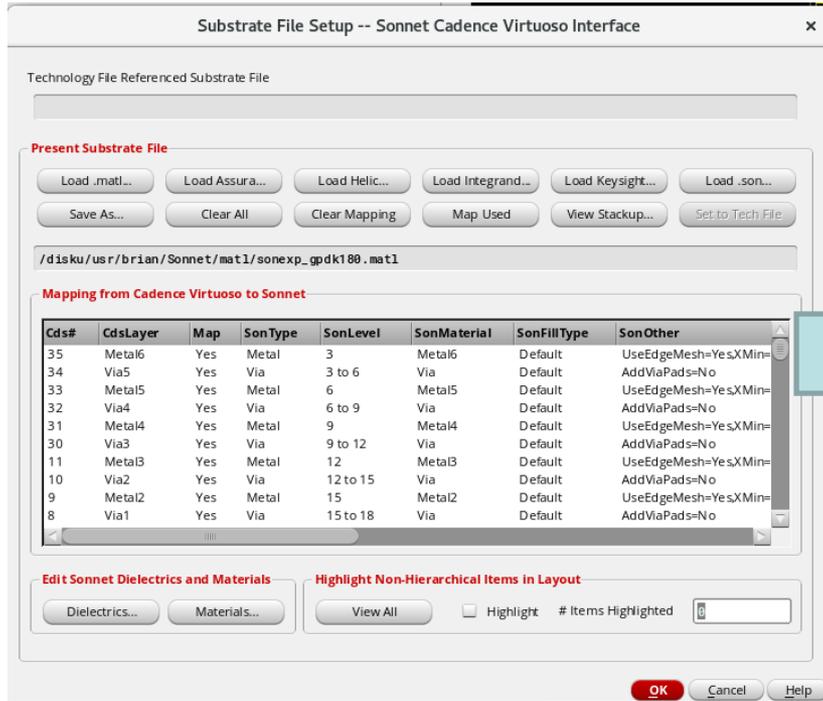


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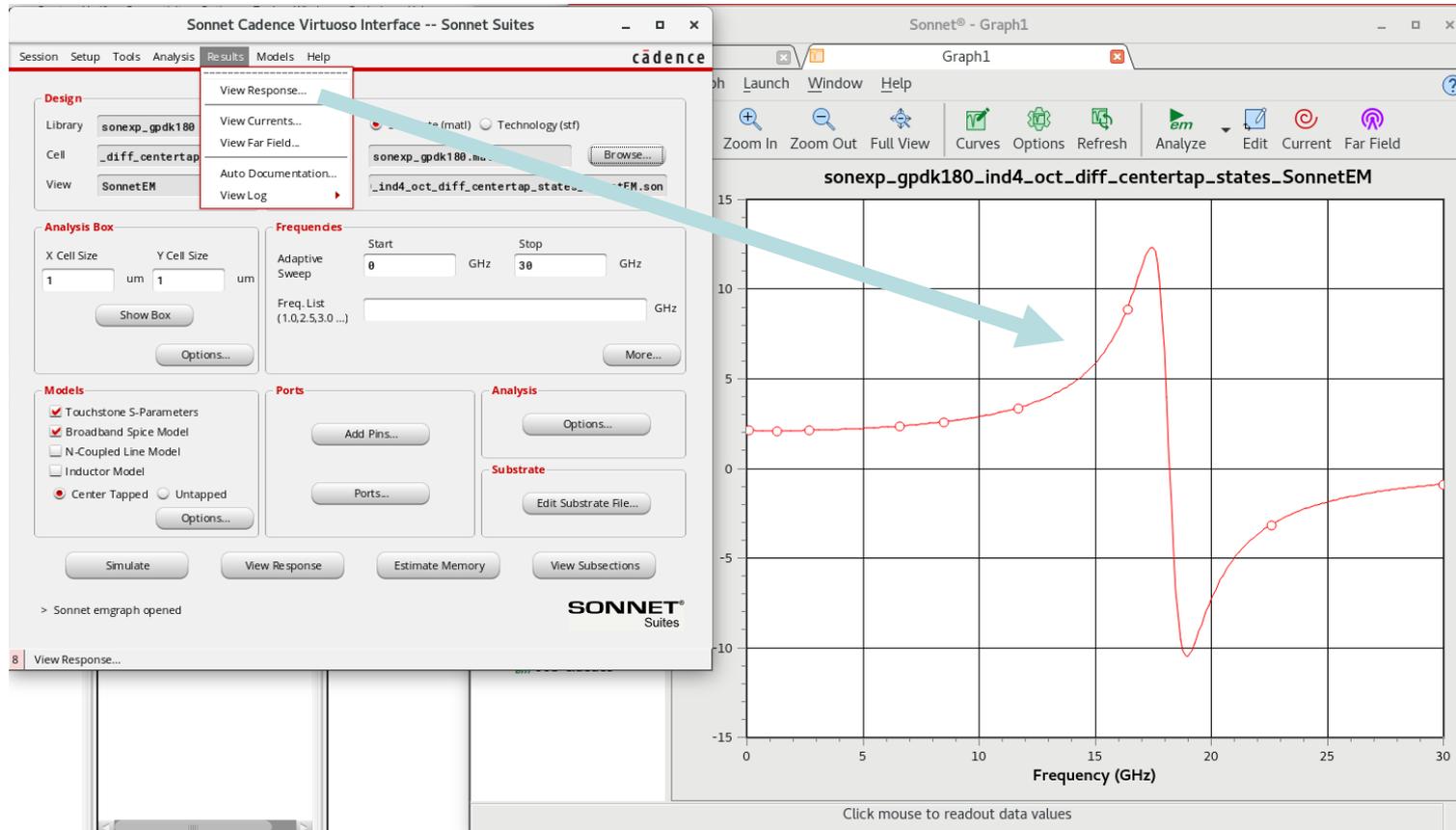
# SONNET® Sonnet Virtuoso Interface Application

- From Sonnet → Open Interface Application...
- The interface window keeps all of the Sonnet EM Analysis settings in a convenient place

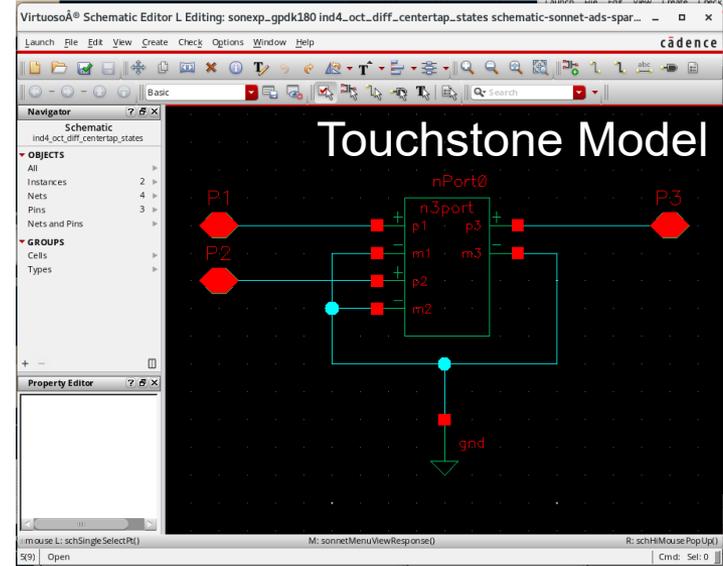
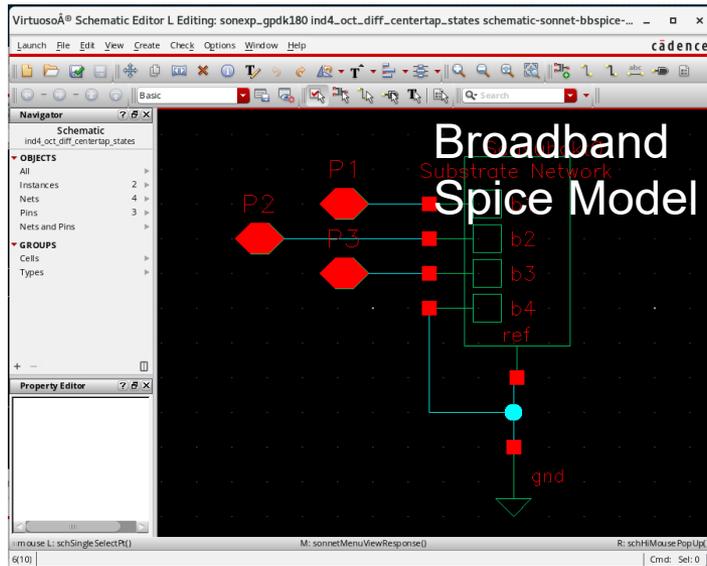




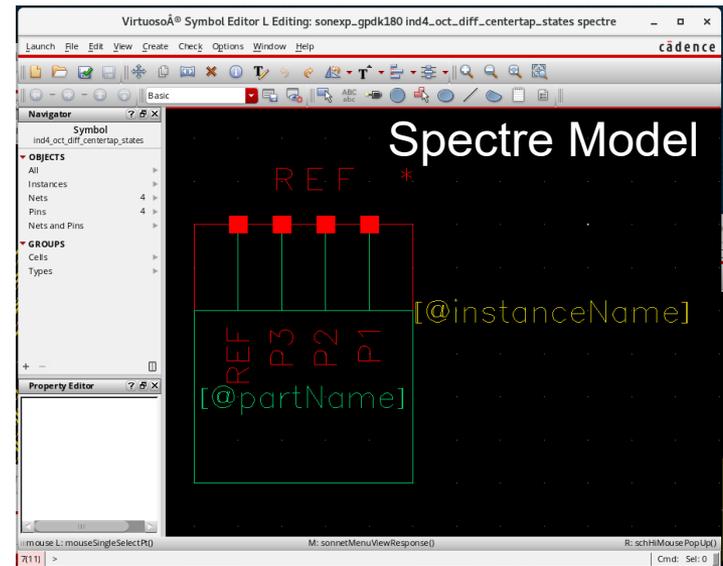
- For supported processes, .MATL and/or .STF files are available to simplify getting data relevant to electromagnetic simulation into Sonnet.



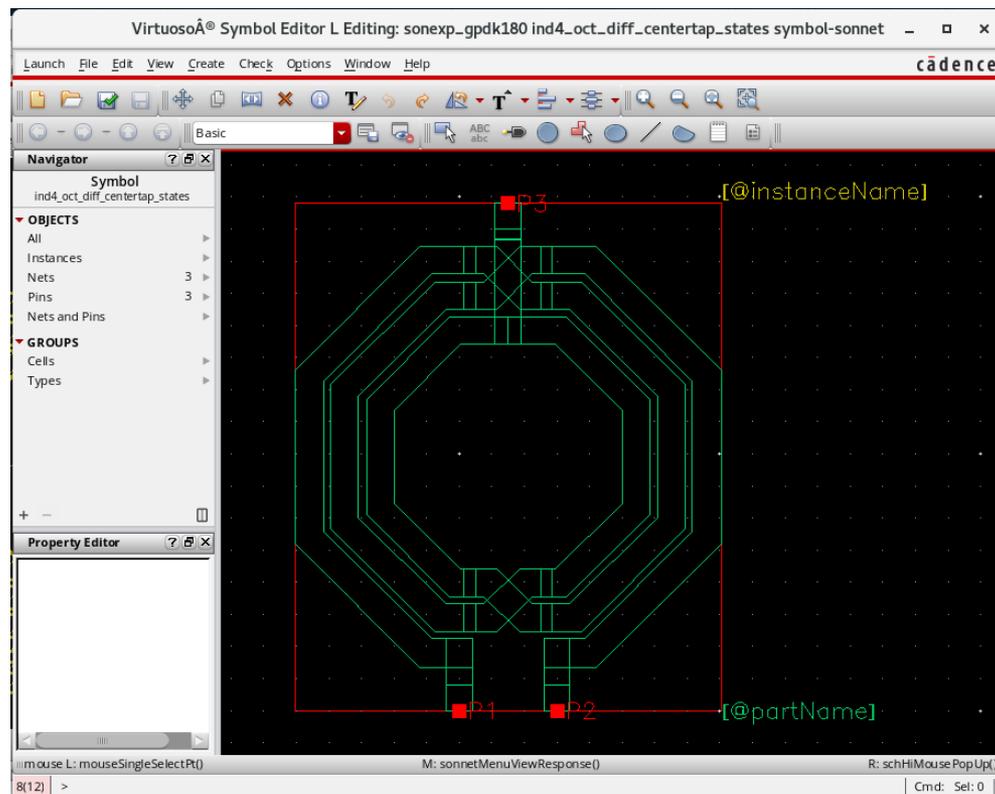
- Simulation Response can be viewed in Sonnet...

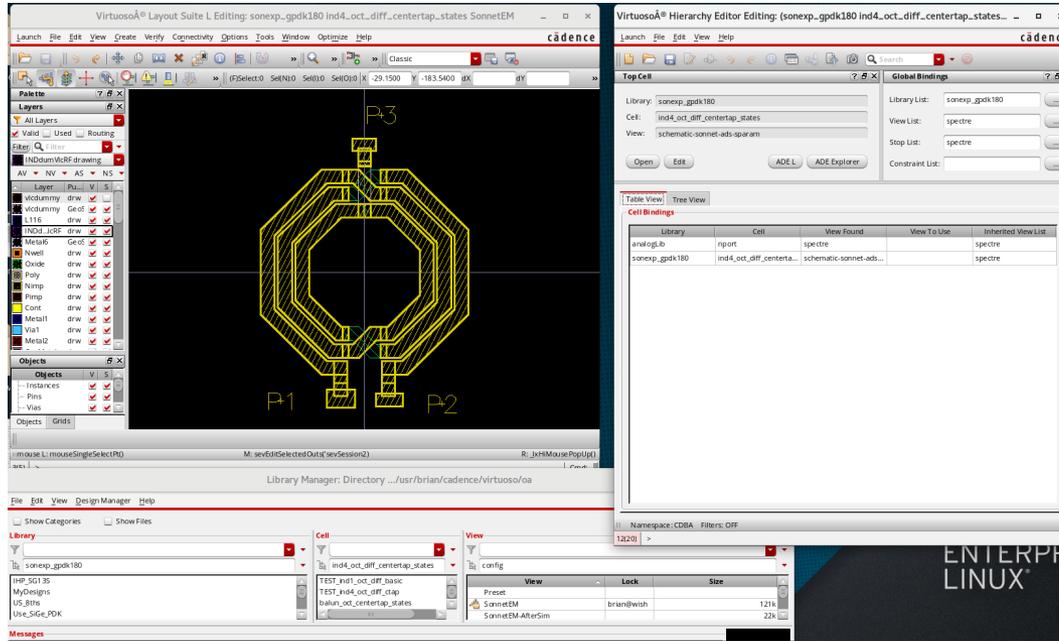


- Or models can be automatically pulled into Cadence.
- (N-Coupled-Line and Inductor Model not shown)



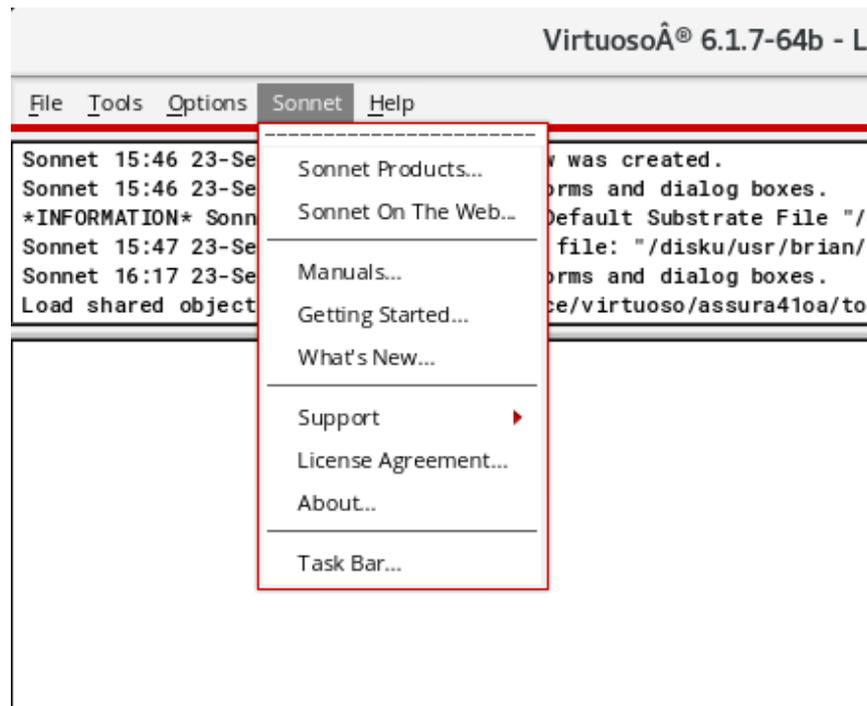
- For simplifying drawings, layout look-alike symbols may be used in many cases in the Virtuoso Analog Design Environment



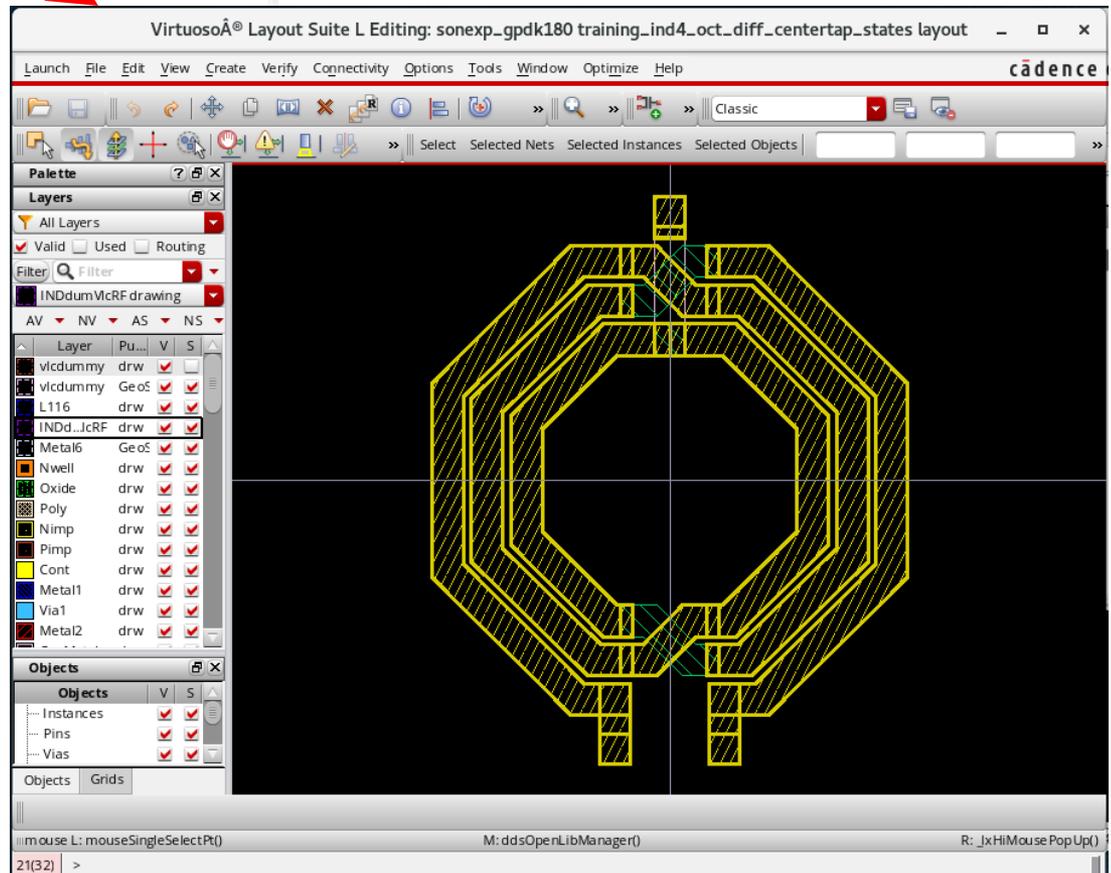
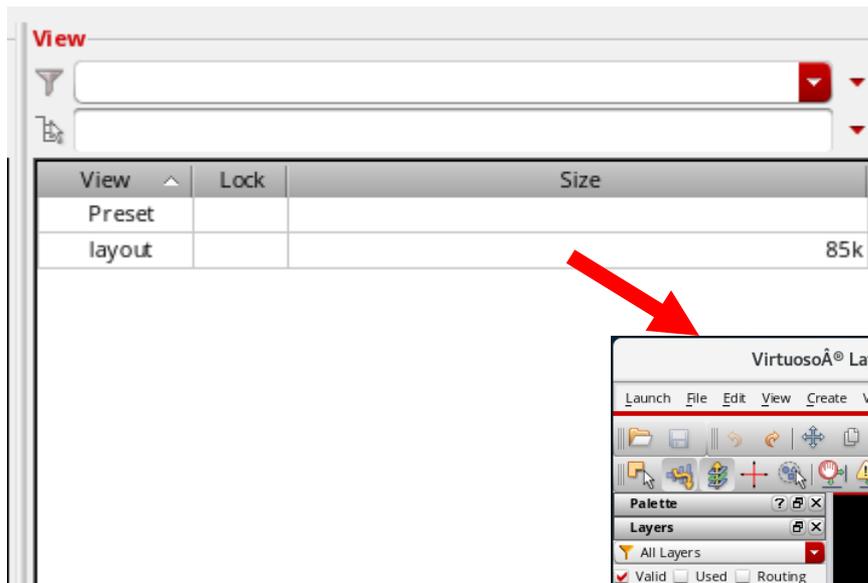


# Demo of Cadence Interface

- The interface installs with Sonnet
- Cadence can be setup to load the interface when launched
- If loaded, this should appear:

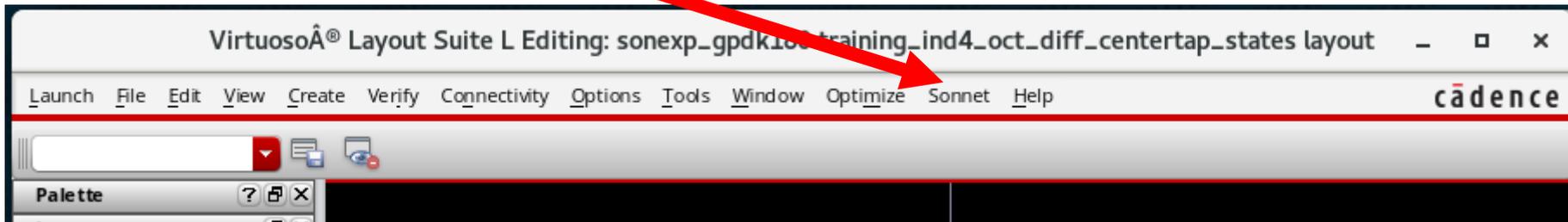
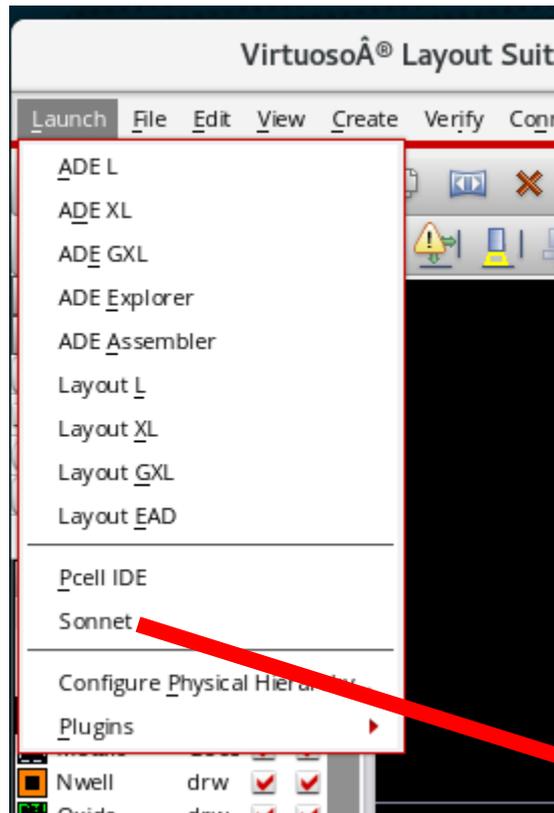


# SONNET® Open the Sample Layout from the Library

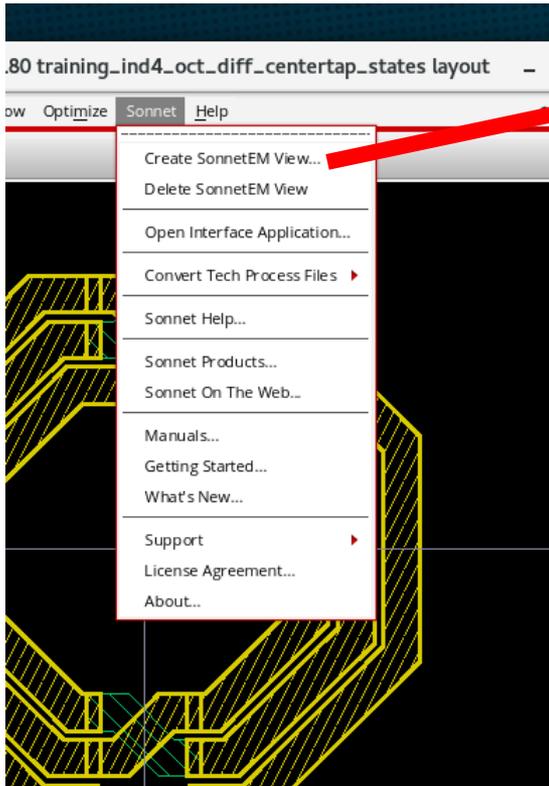


# Launch Sonnet Interface

- The interface needs to be launched from the window you would like to use it in.
- The Sonnet pull-down appears once complete.



# Create EMView



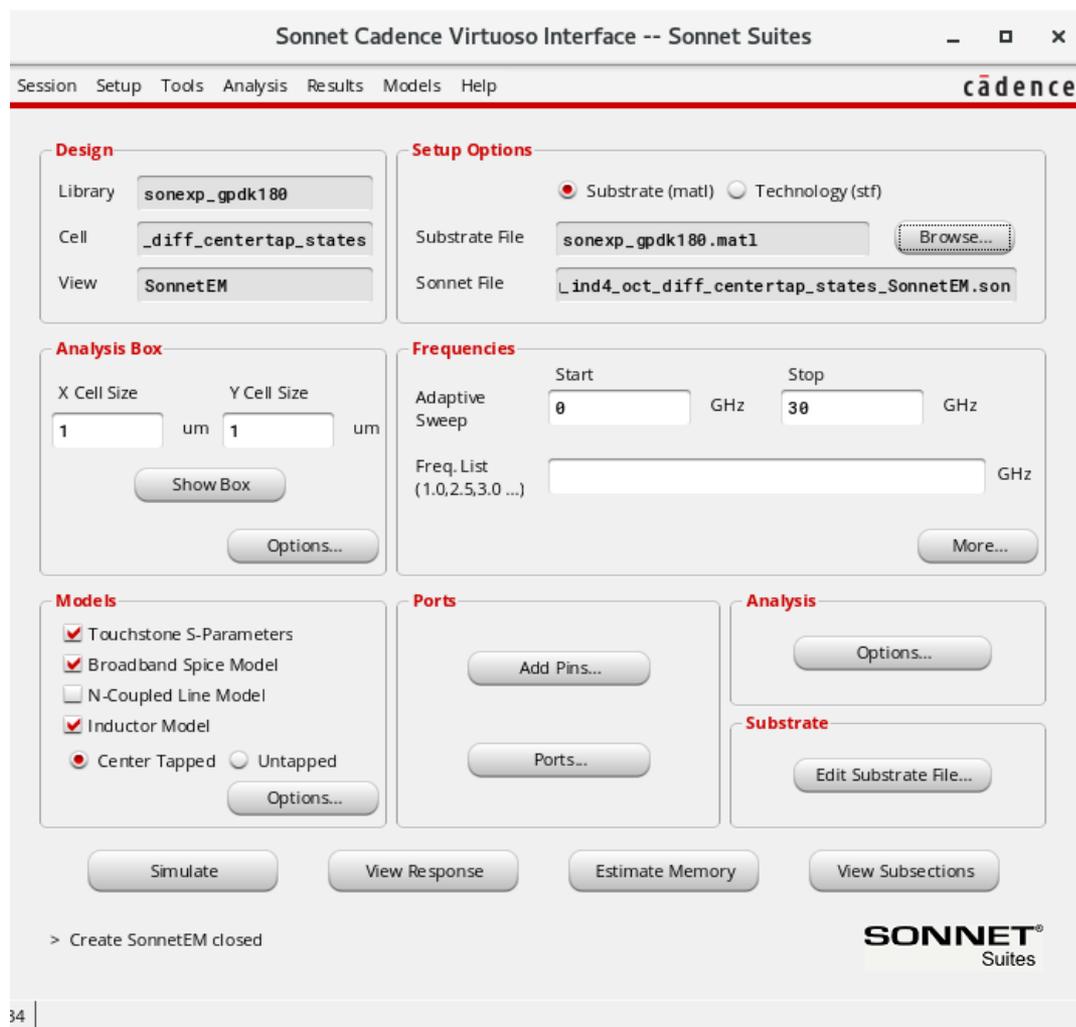
- Launch the wizard to create and emview

The screenshot displays the Sonnet Cadence Virtuoso Interface. The main window shows a layout diagram with a central octagonal structure and surrounding traces, highlighted in yellow. The interface includes several panels:

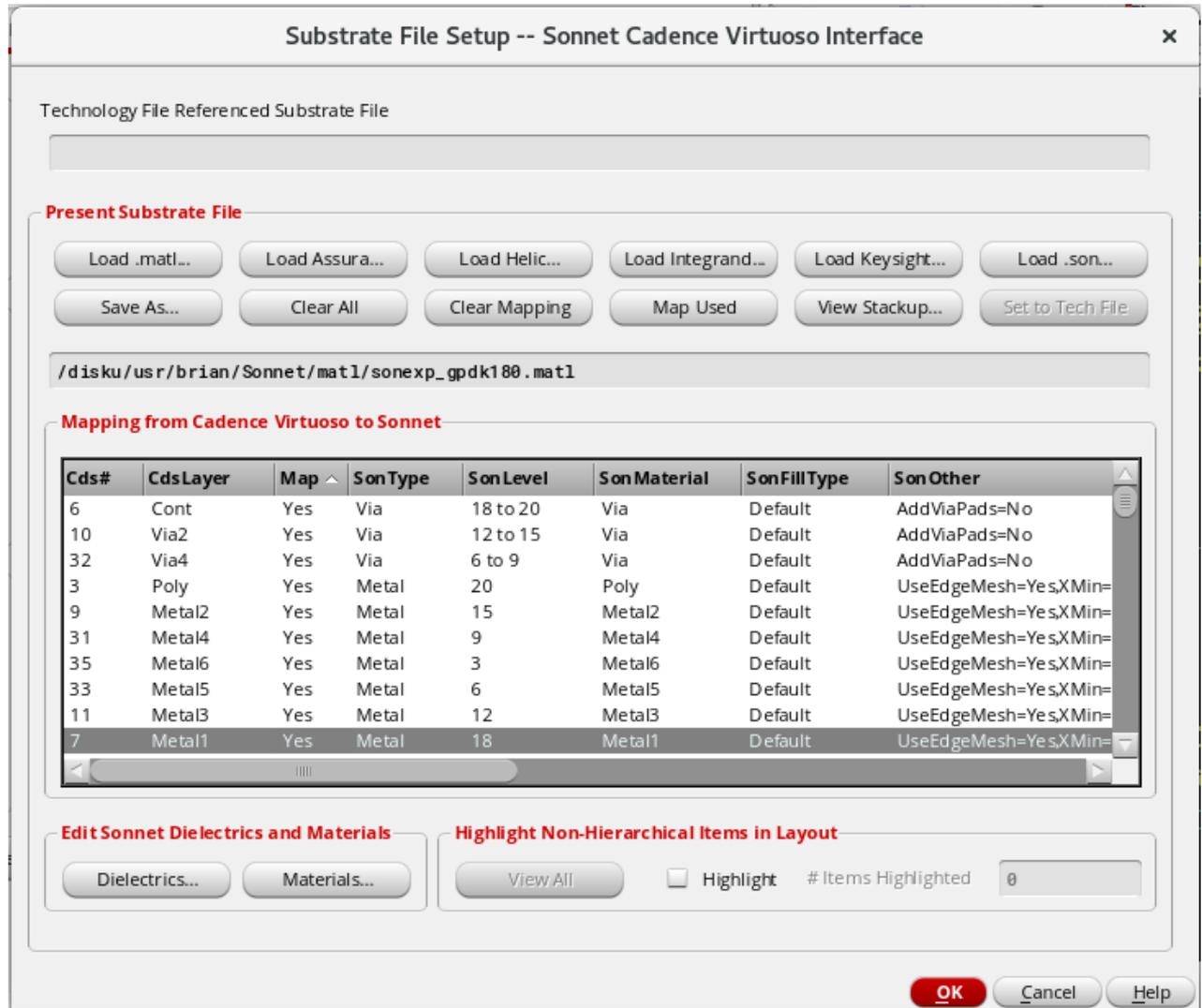
- Design Panel:** Library: sonexp\_gpd180, Cell: \_diff\_centertap\_states, View: SonnetEM.
- Setup Options Panel:** Substrate (matl) selected, Substrate File: sonexp\_gpd180.mat1, Sonnet File: ind4\_oct\_diff\_centertap\_states\_SonnetEM.son.
- Frequencies Panel:** Start: 0 GHz, Stop: 30 GHz, Adaptive Sweep checked, Freq. List: (1.0,2.5,3.0 ...).
- Analysis Panel:** Analysis checked, Substrate Edit Substrate File... button.
- Models Panel:** Touchstone S-Parameters, Broadband Spice Model, Inductor Model, Center Tapped selected.
- Ports Panel:** Add Pins... and Ports... buttons.
- Simulation Buttons:** Simulate, View Response, Estimate Memory, View Subsections.

The bottom status bar shows the file path: Lib: sonexp\_gpd180. A warning message is visible at the bottom right: "Warning: The directory: /disku/app/cadence/libraries/oa/\$(CADENV\_HOME)/caddata/PRQUBIC4XFMPTP/lib/QUBIC4X does not exist but was defined in libFile '/disku/app/cadence/libraries/oa/cds.lib' for Lib 'QUBIC4X'."

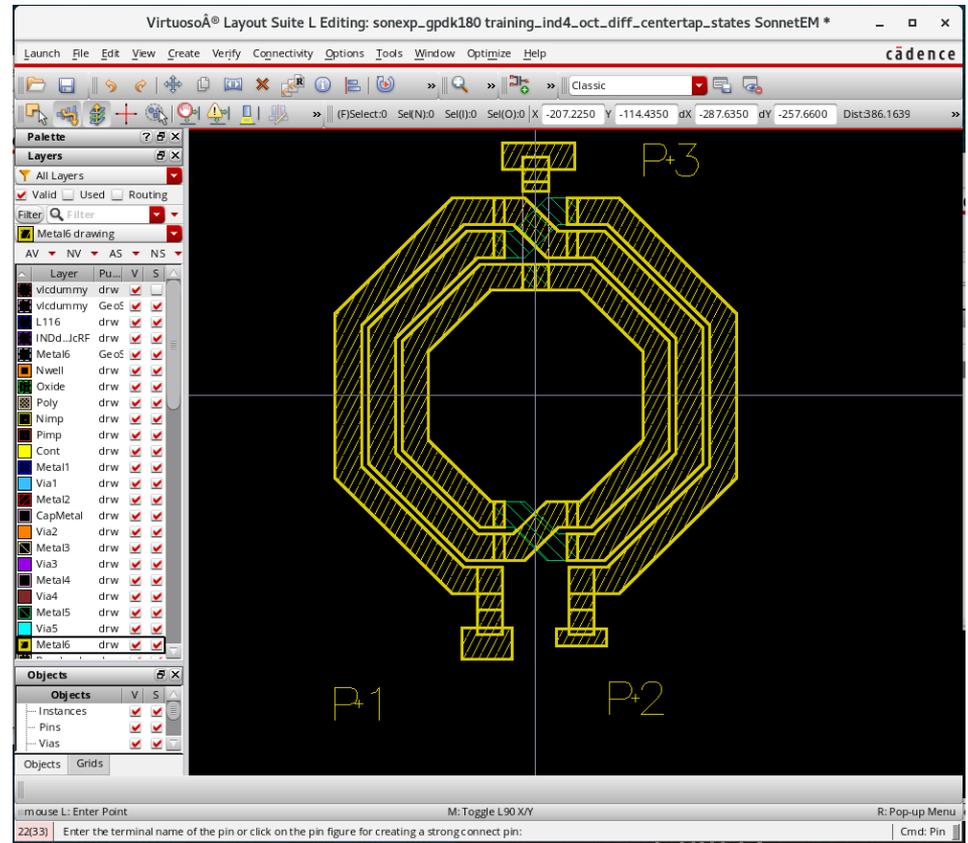
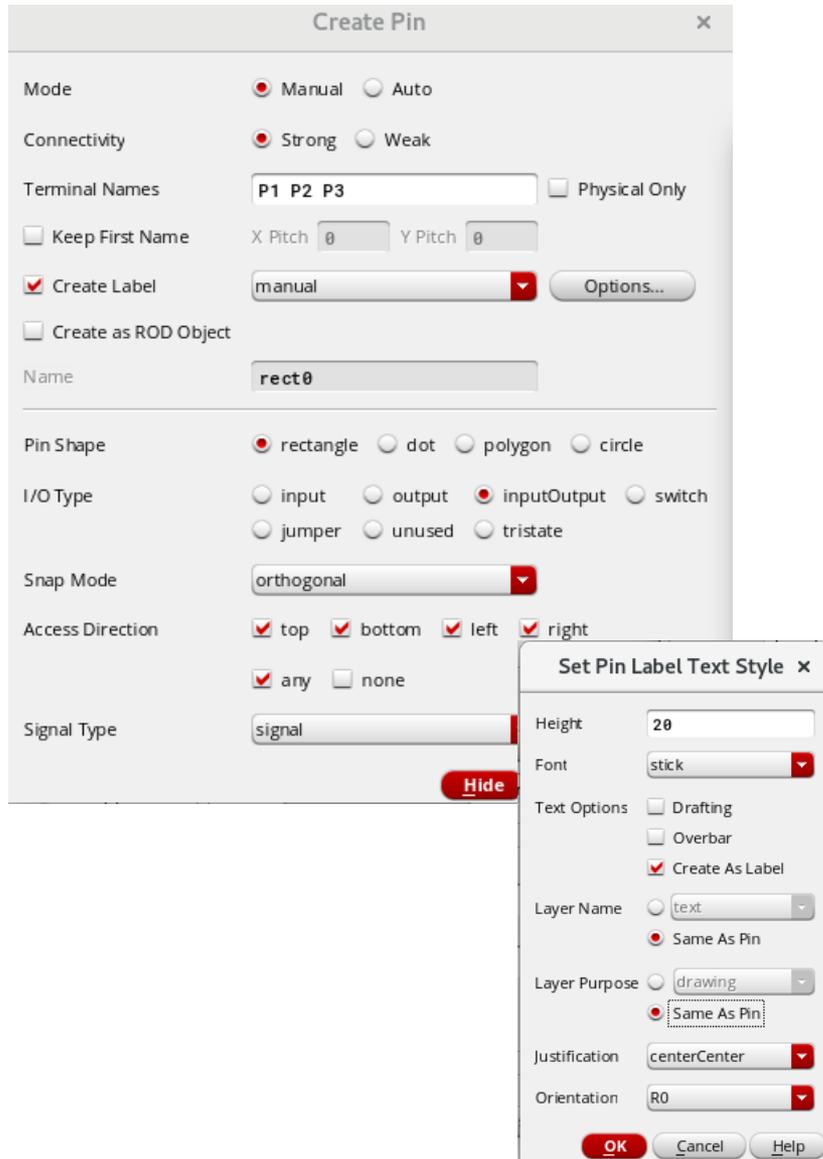
- Sonnet controls are accessible in cadence through the interface application
- We will use it to add ports and substrate files to the circuit



- GPDk180 is a generic PDK useful for examples
- It is loaded and the layers are mapped

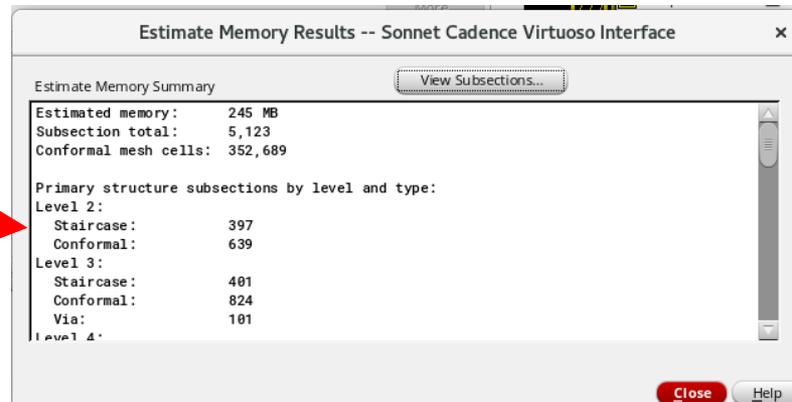
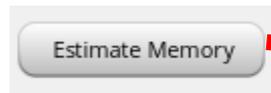
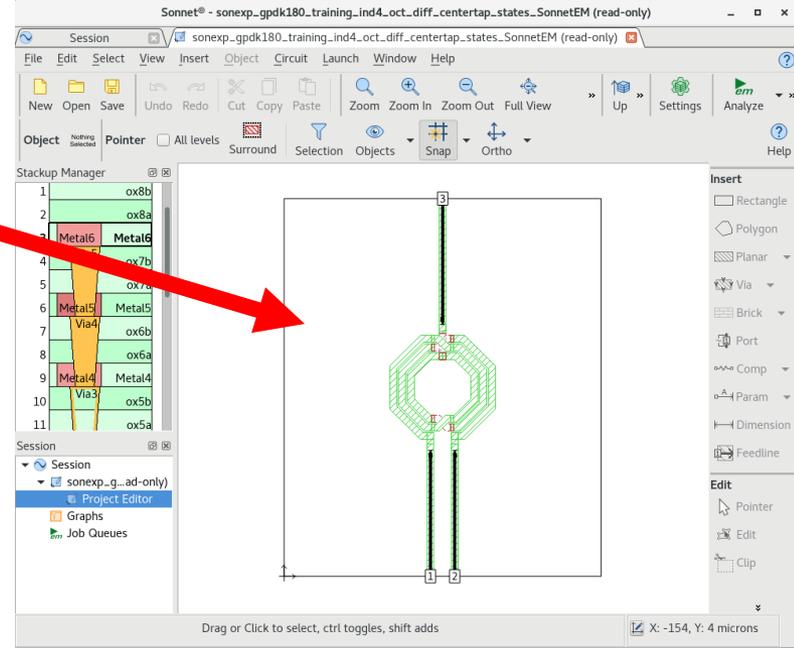
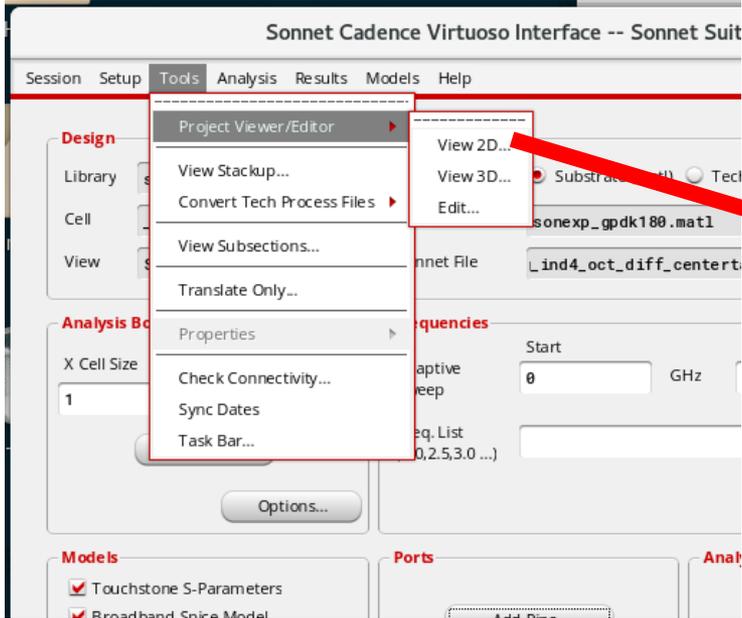


# Add Pins

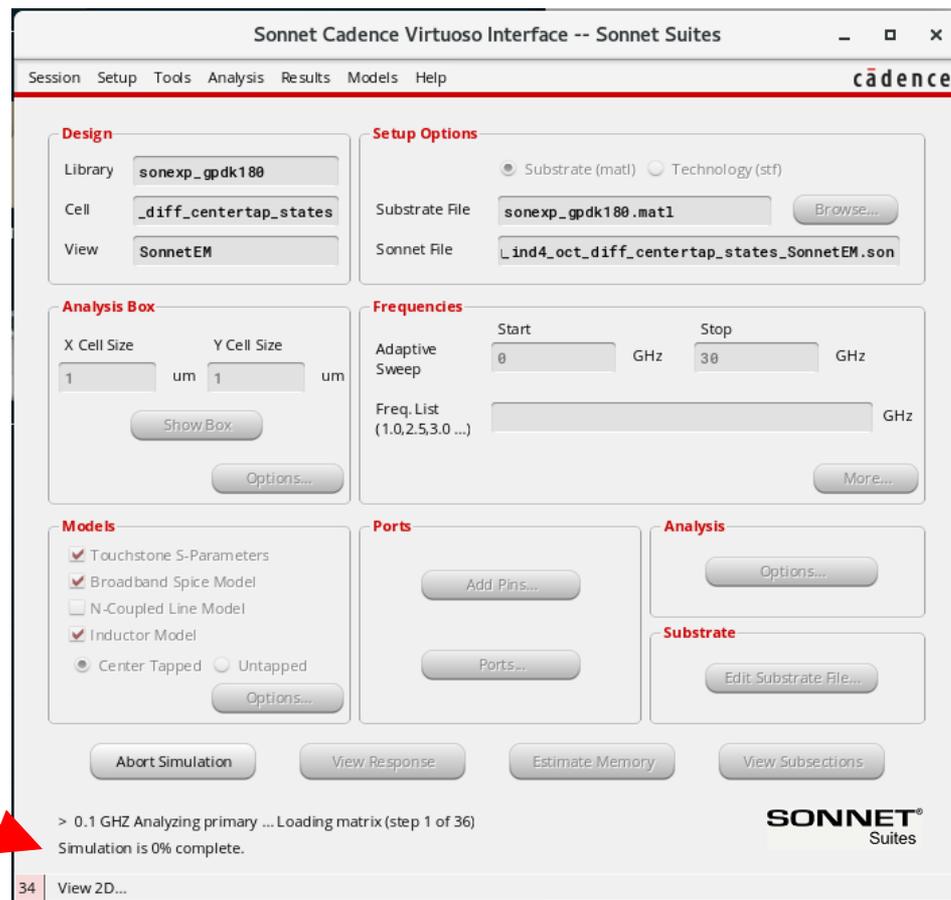


- After selecting options and metal level, click and drag in the layout editor.

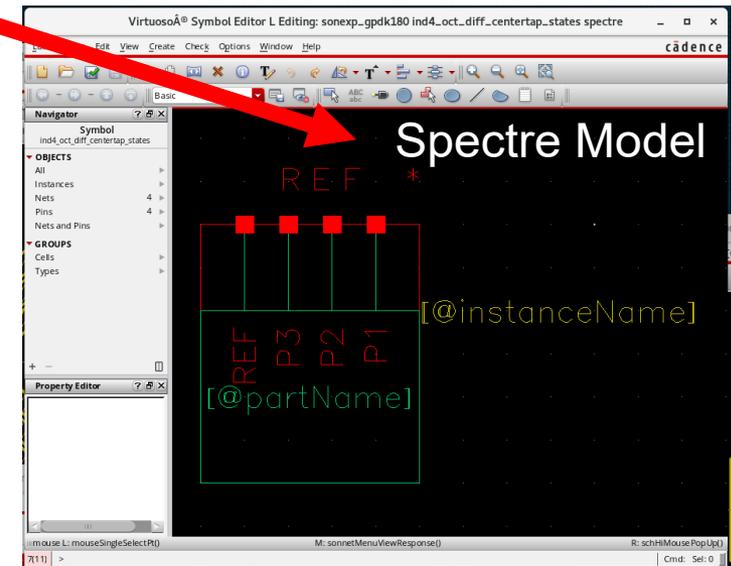
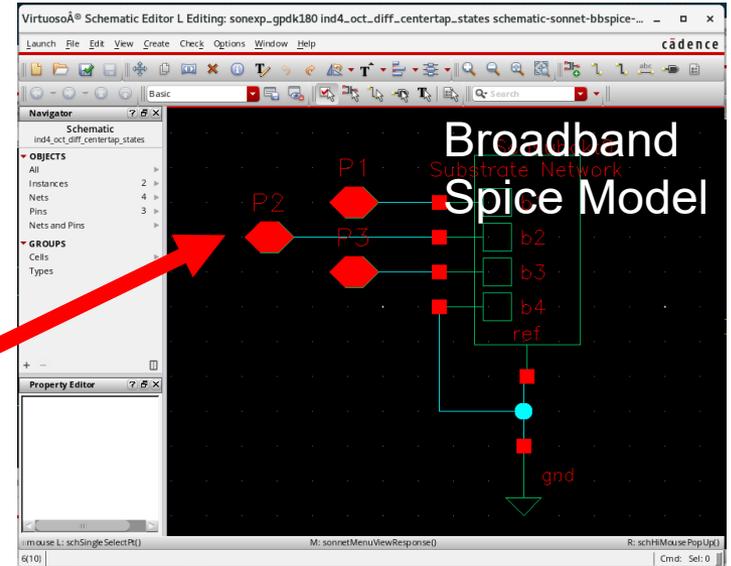
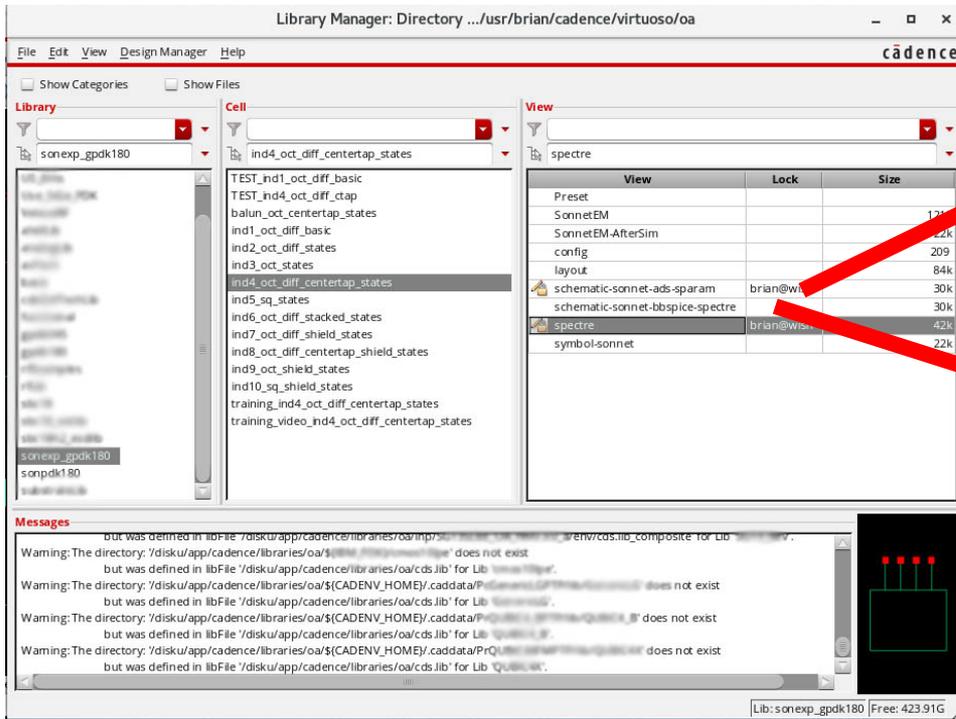
# Check the Layout in Sonnet



- Hit simulate and it will call and run Sonnet in the background.
- The window can be closed and the simulation will continue.



# View Models



- Thank you for your time!
  - Any questions or comments?



**PRECISION ELECTROMAGNETICS**