Using Jupyter Notebook to Teach Physics with Computation

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Abstract

Jupyter Notebook (formerly iPython Notebook) is a web application to create and share documents that contain live code, visualizations, and marked-up text and equations. Accessible to students and scalable to professionals, Jupyter Notebook is ideal for writing *code- and data- driven narratives* and is useful both for research and for teaching computational modeling, data visualization, collaborative computing, and reporting. Furthermore, the latest version of VPython runs in Jupyter Notebook.

Agenda

- **14:25 - 14:40**: Presentation (What is Jupyter?)
- **14:40 - 14:55**: Explore Example Notebooks
- **14:55 - 15:10**: Explore Workshop Notebooks
- **15:10 - 15:15**: Summary

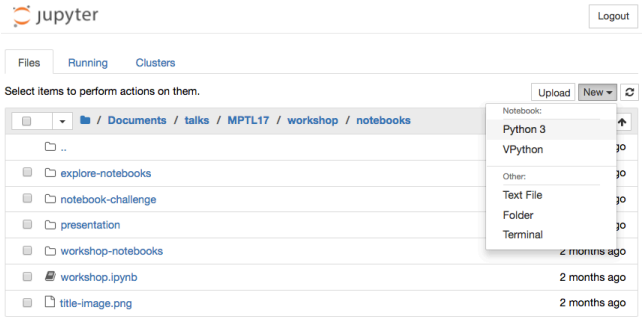
Download Notebooks and/or Test Jupyter

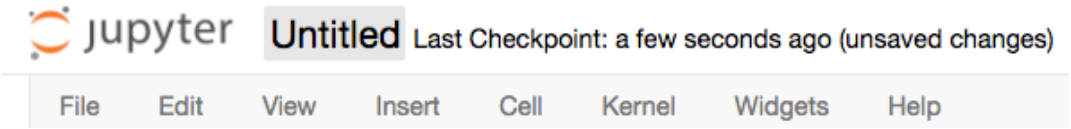
https://www.hpuphysics.com/ You can download a zip file of notebooks. To test Jupyter, use the password *jns*. Please use the folder corresponding to the name on your handout, such as *user01*. Notebooks are also available on GitHub.

Jupyter Cheat Sheet

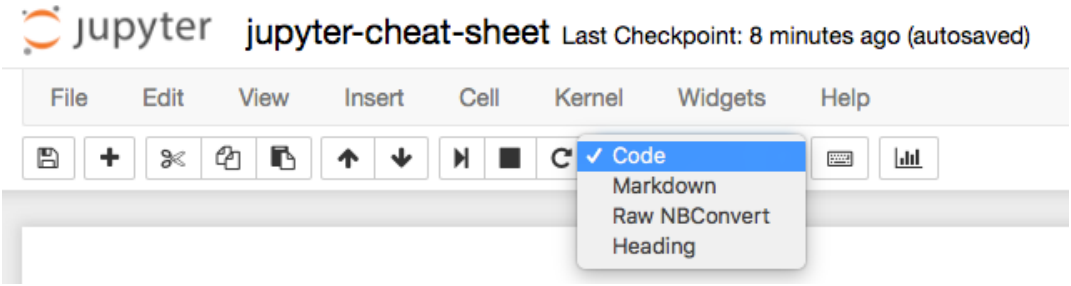
These are the simplest functions you will use on a regular basis.

1. **Install Jupyter** by installing Anaconda.
2. **Run Jupyter** by opening a terminal and running `jupyter notebook` from the command line.
3. **Create a new notebook** in the file system by selecting `New` and a particular kernel such as `Python 3`.
4. **Rename the notebook** by clicking the name of the file `Untitled` and typing a new name in the resulting dialog box.





5. **Select the Cell Type:** in the toolbar of the notebook, and select either `Markdown` or `Code`.



6. **Use Shift-Enter** to render a `Markdown` cell or run a `Code` cell.

Markdown Commands

1. Use `#` for level 1 header, `##` for level 2 header, etc.
2. Use numbers like `1.` for a numbered list; symbols like `-` for a bulleted list.
3. Use `[hypertext](URL)` to create a hyperlink, with text in brackets and the URL in parentheses.
4. Use a single dollar sign for math within text `$\vec{F}$`; use a double dollar sign for math centered on a line `$$\sum_1^N$$`.