Overview

- What is gpvdm/theoretical overview?
- Installing gpvdm
- Running simple simulations
  - Your first gpvdm simulation
  - Changing electrical parameters
- Optical simulations and the materials database
- Perovskite solar cells and time domain simulations
- OFET simulations and finite difference meshing.
- Editing the device structure using the layer editor
- Meshing and dumping
- OLEDs
Make a new perovskite simulation

General-purpose photovoltaic device model
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https://www.gpvdm.com

To make a new simulation click New Simulation in the menu, open an existing simulation select Open simulation.

There is more help on the man pages. Please report bugs to: roderick.mackenzie@nottingham.ac.uk

Follow the gpvdm project: Youtube Twitter

https://www.gpvdm.com
Perovskite solar cells/time domain simulations.

A JV curve on a Perovskite device is really a time domain simulation due to the movement of ions.

We will therefore use Perovskite simulations to learn about time domain simulation in gpvdm.
• This menu is used to select the simulation mode.
• The simulations we have performed until now were in \( jv \) mode, this is a purely steady-state simulation.
• Set the value to \( jv_{\text{perovskite}} \), this is a time domain simulation including perovskite ions.
You can edit the density of ions using the ion/doping editor.
Running the simulation...

• Run the simulation (blue play button) then open the file \textit{jv.dat}

• Notice it's a \textit{jv} curve but it changes as a function of time

• Plot \textit{pulse\_v.dat} and \textit{pulse\_j.dat}, these plot voltage and current against time.
pulse_v.dat, pulse_j.dat
Current/voltage against time…..

• Notice the saw wave of the time domain JV experiment and the resulting current transient.
Editing time domain simulations

• We can edit time domain simulations using the **Time domain simulation editor tool**

https://www.gpvdm.com
Edit the applied voltage/light intensity
Making new simulations

- Use these tools to create new transient simulations.
- These new simulations will appear in the simulation menu in the main interface.
You can change the external circuit conditions using the **Circuit** tab.

- You could use this to do things like TPC/TPV, where you need short circuit/open circuit conditions.