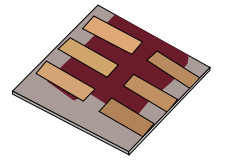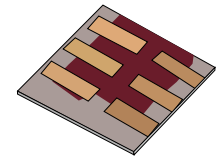# Overview

- 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

Make a new OFET simulation

- This will use a 2D solver instead of the 1D solver.

This will create a new 2D simulation
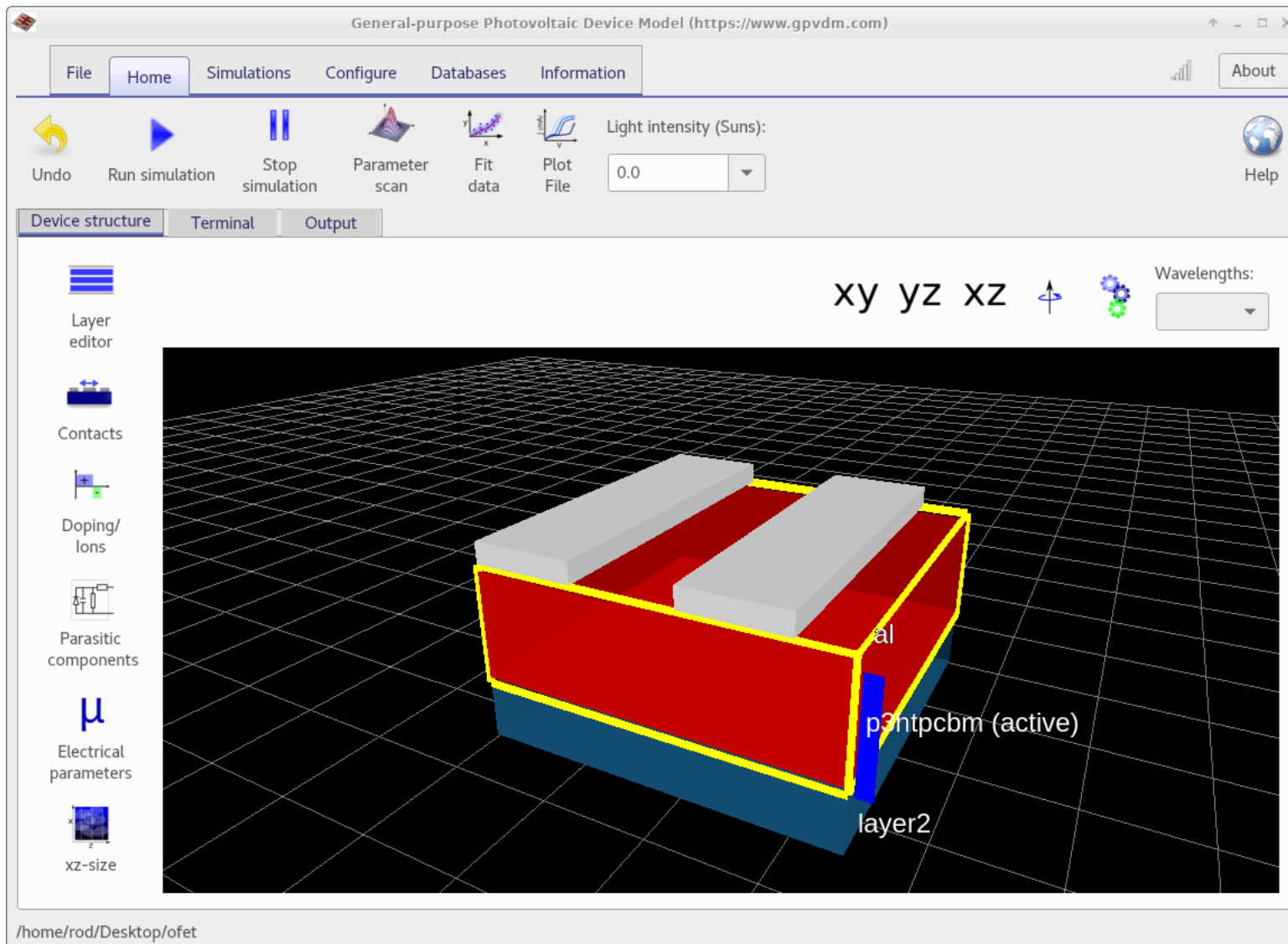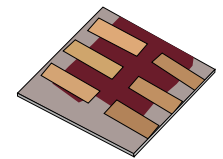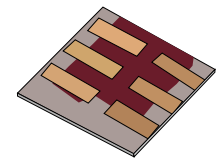

- Notice the contacts which are 2D structures.

Adding another electrically active layer

- Click on the layer editor and then the +.

- Use the up and down arrows to move the layer to the correct place.

Take a look at the electrical mesh to make sure it adds up to the width/height.

•This values should have updated so that the mesh matches the width of the active layers.

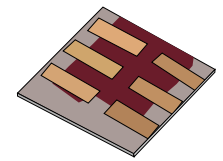# Let's now look at the contacts

The human readable name of the contact, you can call them what you want.
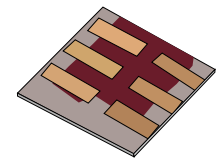
Name	Top/Bottom	Active contact	Start	Width	Depth	Voltage
top	top	false	0.0	0.001	0.0	-1.0
top2	top	false	0.002	0.001	0.0	0.0
bottom	bottom	true	0.0	0.0034641	5e-08	0.0

Edit contacts (www.gpvdm.com)

al

p3htpcbm (active)

C60 (active)

layer2

67

Is the contact at the top or bottom of the device.

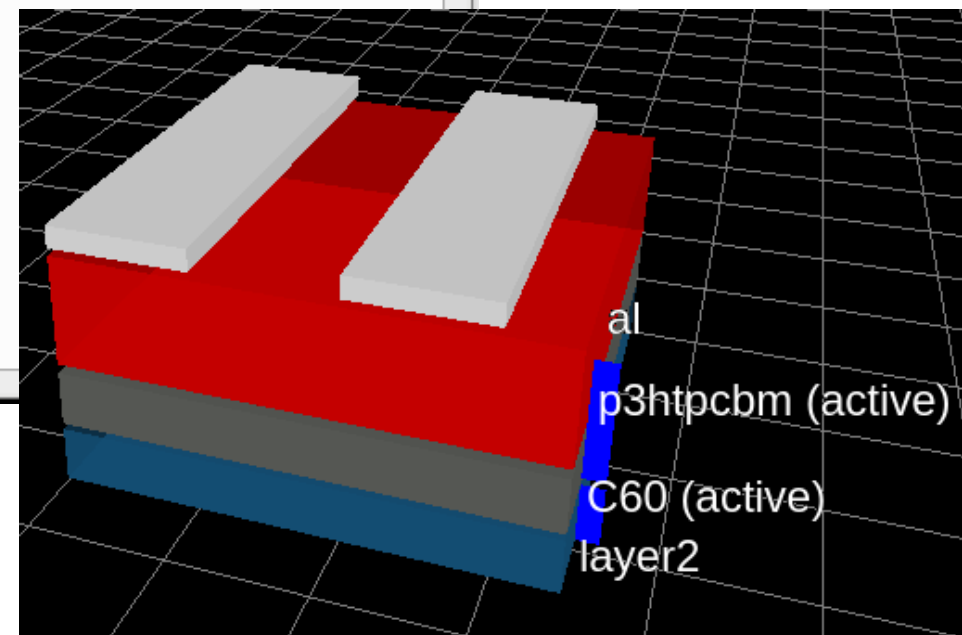**Edit contacts (www.gpvdm.com)**

Name	Top/Bottom	Active contact	Start	Width	Depth	Voltage
top	top	false	0.0	0.001	0.0	-1.0
top2	top	false	0.002	0.001	0.0	0.0
bottom	bottom	true	0.0	0.0034641	5e-08	0.0

al
p3htpcbm (active)
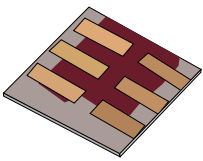C60 (active)
layer2

The contact to which the voltage ramp/transient/frequency pulse is applied.

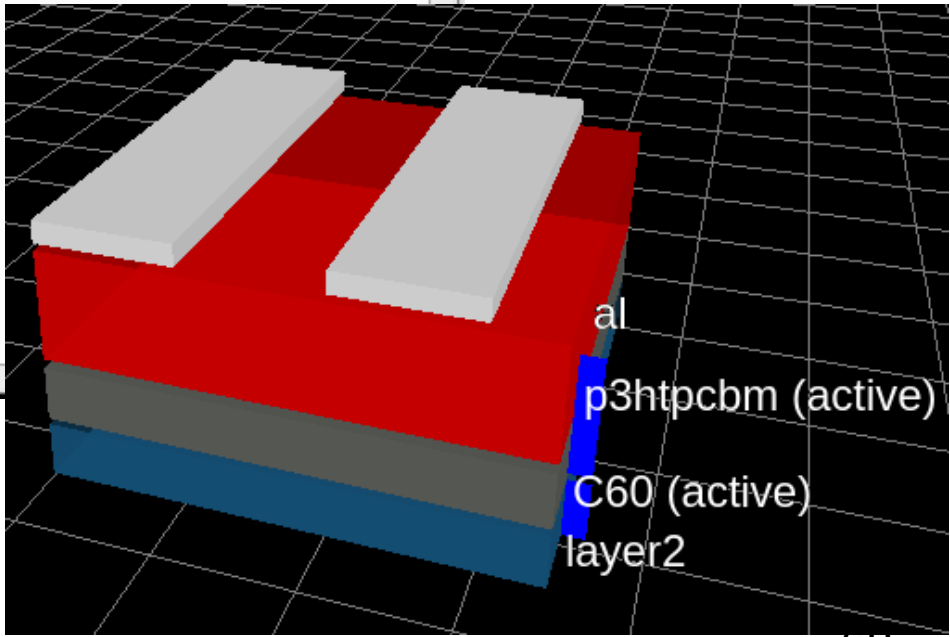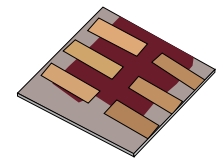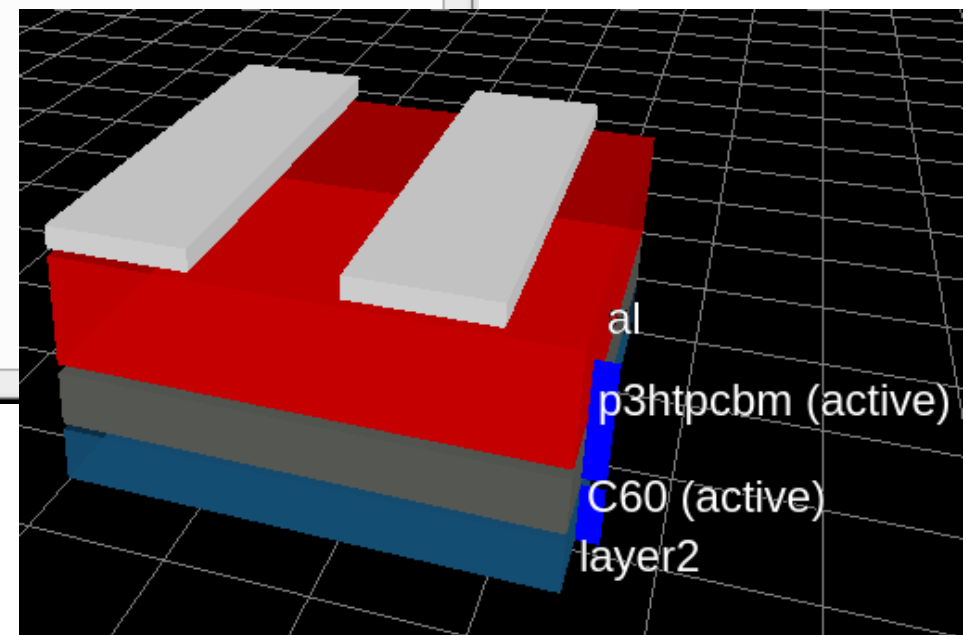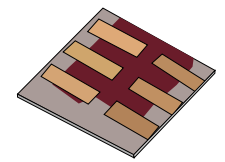| Name	Top/Bottom	Active contact	Start	Width	Depth	Voltage
top	top	false	0.0	0.001	0.0	-1.0
top2	top	false	0.002	0.001	0.0	0.0
bottom	bottom	true	0.0	0.0034641	5e-08	0.0

al
p3htpcbm (active)
C60 (active)
layer2

69

Start of the contact from the left of the device in meters.

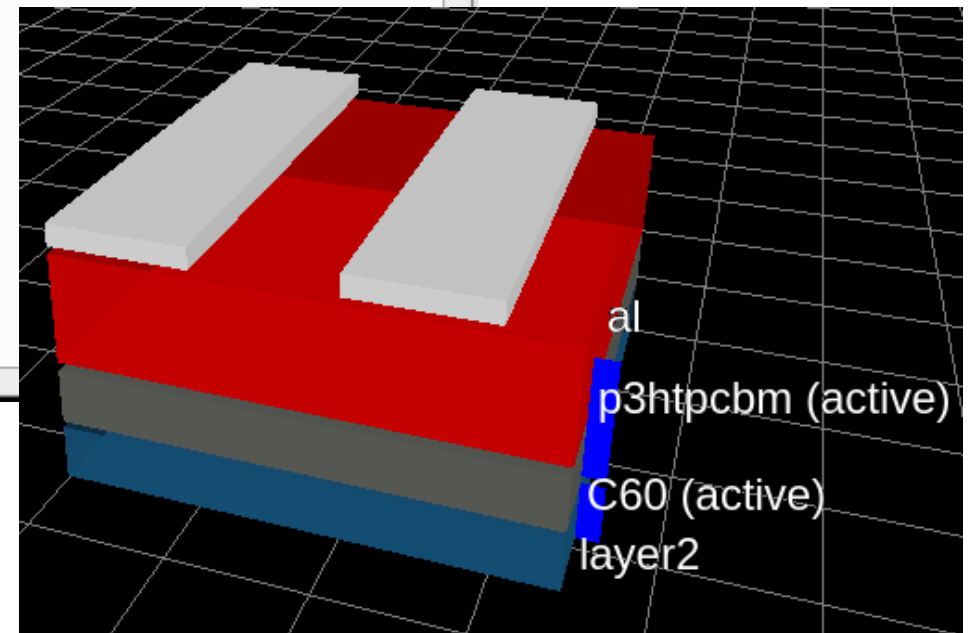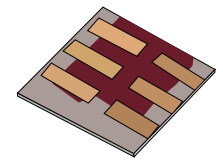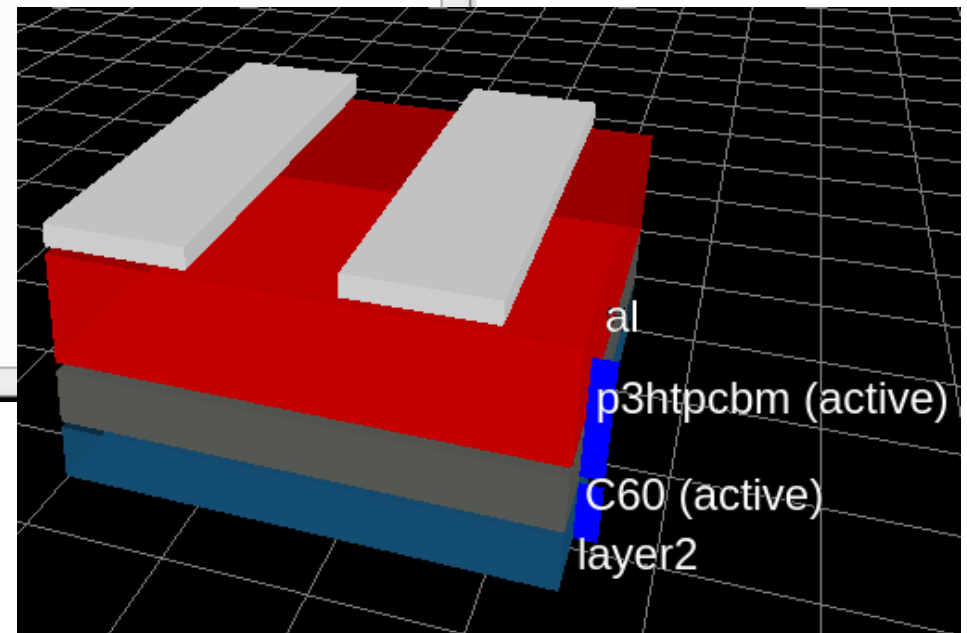| Name	Top/Bottom	Active contact	Start	Width	Depth	Voltage
top	top	false	0.0	0.001	0.0	-1.0
top2	top	false	0.002	0.001	0.0	0.0
bottom	bottom	true	0.0	0.0034641	5e-08	0.0

al

p3htpcbm (active)

C60 (active)

layer2

70

Width of the contact in meters

The voltage applied to the contact.

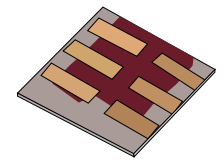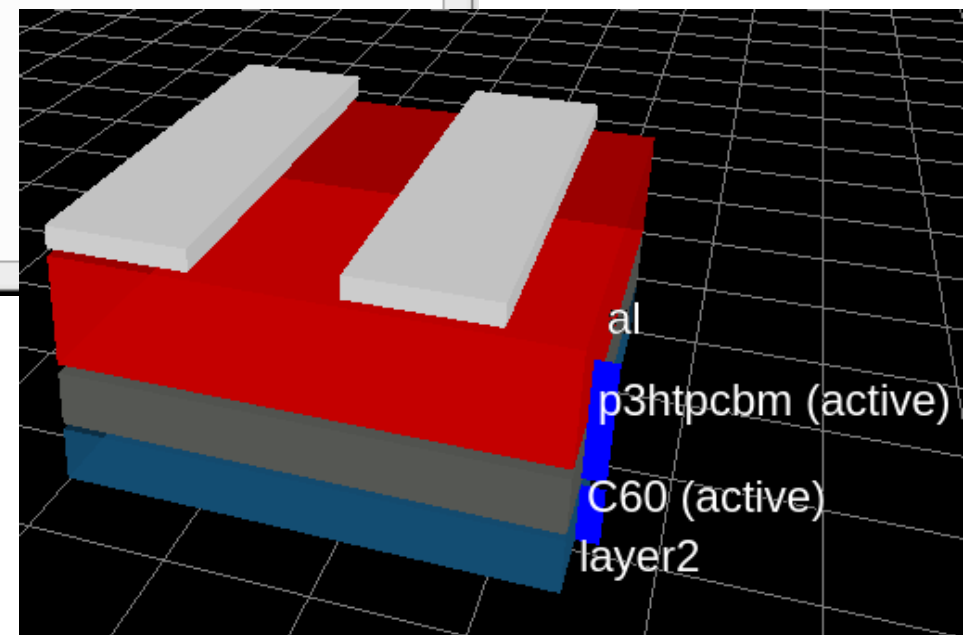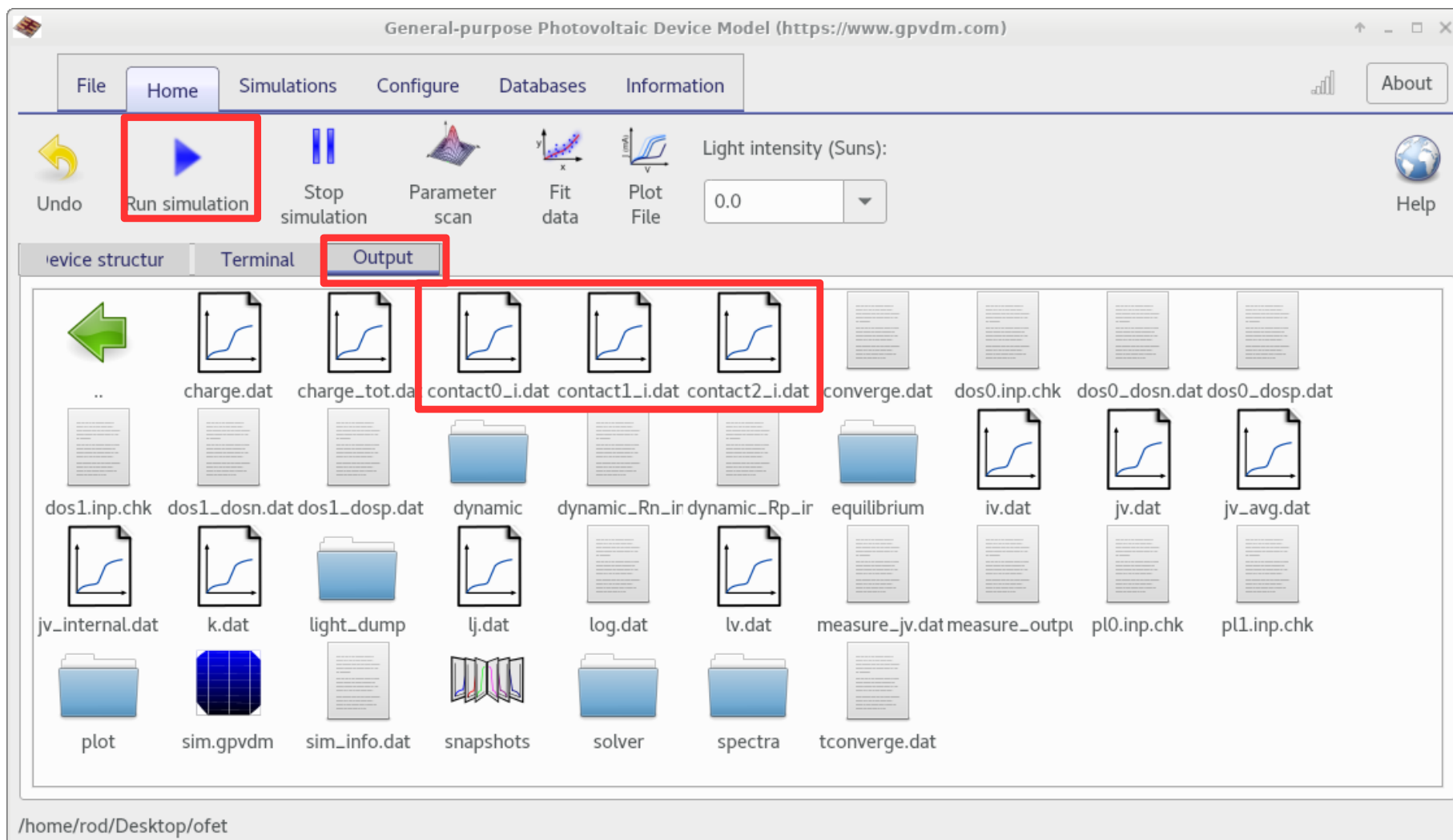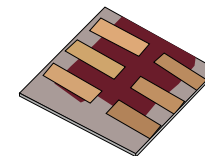| Name	Top/Bottom	Active contact	Start	Width	Depth	Voltage
top	top	false	0.0	0.001	0.0	-1.0
top2	top	false	0.002	0.001	0.0	0.0
bottom	bottom	true	0.0	0.0034641	5e-08	0.0

- So in this case we are applying -1V to **top**, 0V to **top2** and applying a voltage ramp to **bottom** – *as we are in JV simulation mode.*
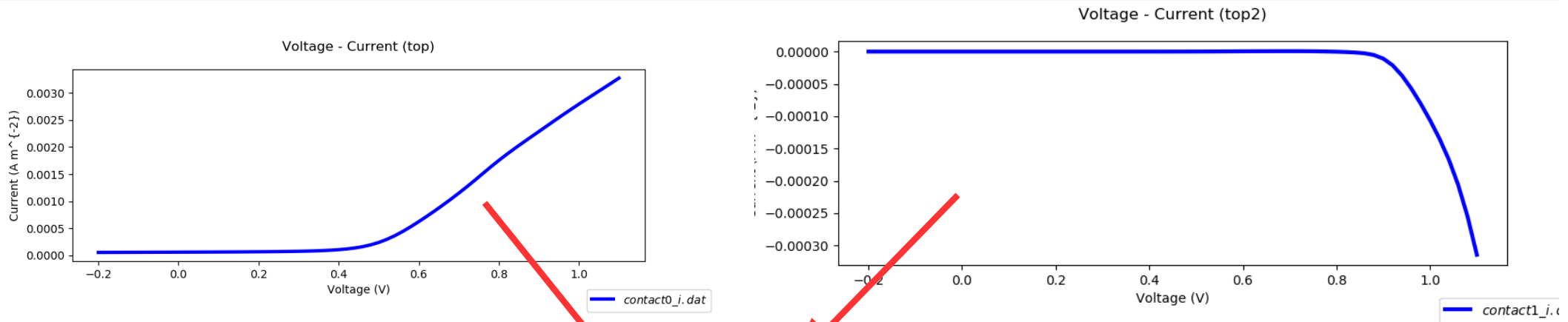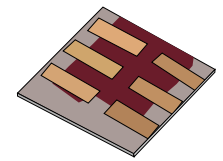
al

p3htpcbm (active)

C60 (active)

layer2

Run the simulation…, by clicking on the play button.

- Then let's look at the output.

https://www.gpvdm.com
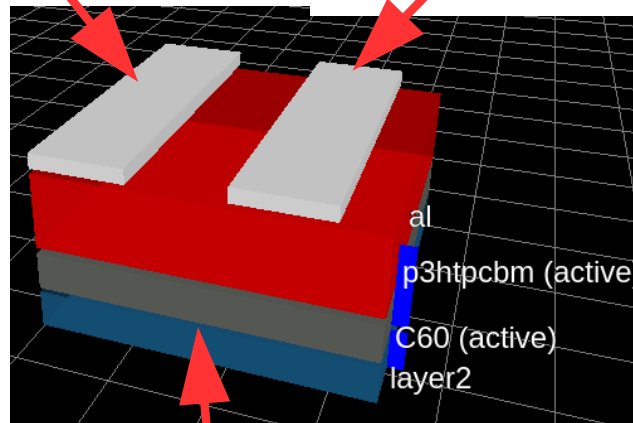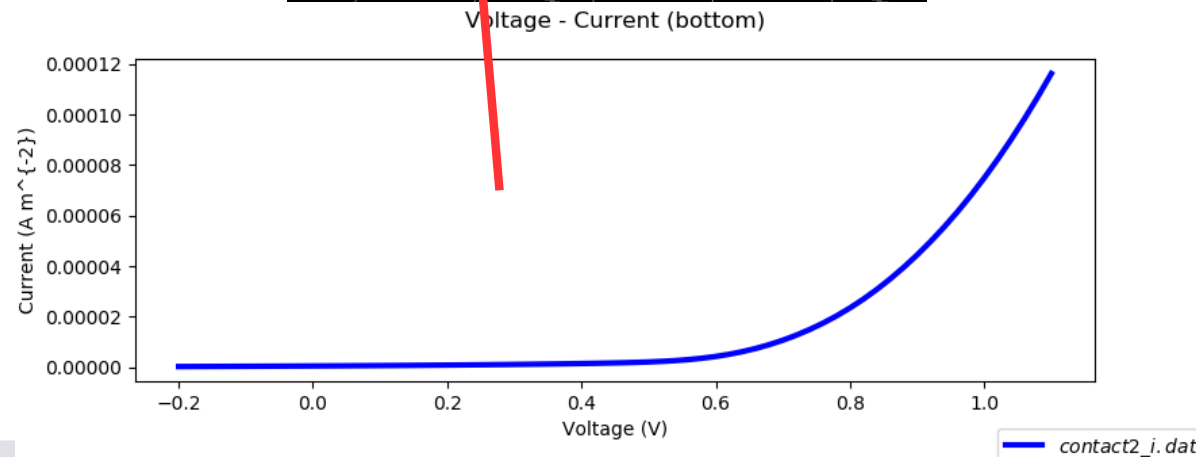
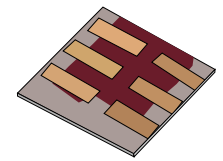# Current in/out of the contacts and the gate current..

- Current going into left contact (+), current coming out of the right contact(-).

- Gate current much smaller than source/drain therefore amplification.

Using the snapshot tool to view what is going on in 2D during the simulation.

- Click play in the snapshot window and select phi.dat, to view how the potential changes within the device.