

SCAPS Plotting tutorial

Comparison : « Experimental Data » and simulation

SCAPS 3.3.06 Action Panel

Working point
Temperature (K)
Voltage (V)
Frequency (Hz)
Number of points

Series resistance
☐ yes ☐ no
 Rs Ohm.cm²
S / cm²

Shunt resistance
☐ yes ☐ no
Rsh
Gsh

Action list

All SCAPS settings

Illumination: Dark ☐ Light ☐ Specify illumination spectrum, then calculate G(x) ☐ Directly specify G(x) ☐

Analytical model for spectrum ☐ Spectrum from file ☐
Spectrum file name: illuminated from left ☐ illuminated from right ☐
 AM1_5G_1_sun.spe
Spectrum cut off? ☐ yes ☐ no
Short wavel. (nm)
Long wavel. (nm)
Neutral Density
Transmission (%)
Incident (or bias) light power (W/m²) sun or lamp
after cut-off
after ND

Analytical model for G(x) ☐ G(x) from file ☐
G(x) model
Ideal Light Current in G(x) (mA/cm²)
Transmission of attenuation filter (%)
Ideal Light Current in cell (mA/cm²)

Action ☐ Pause at each step
☐ I-V V1 (V) V2 (V)
☐ C-V V1 (V) V2 (V)
☐ C-f f1 (Hz) f2 (Hz)
☐ QE (IPCE) WL1 (nm) WL2 (nm)

number of points
 increment (V)
 increment (V)
 points per decade
 increment (nm)

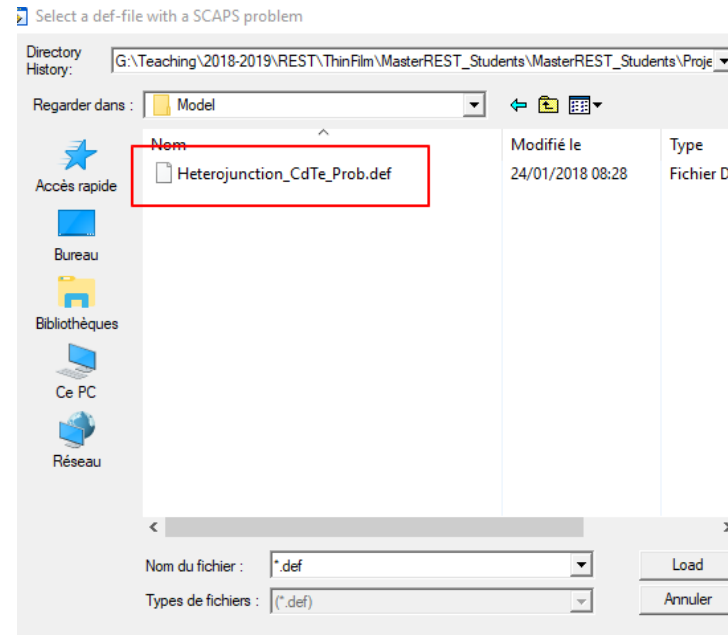
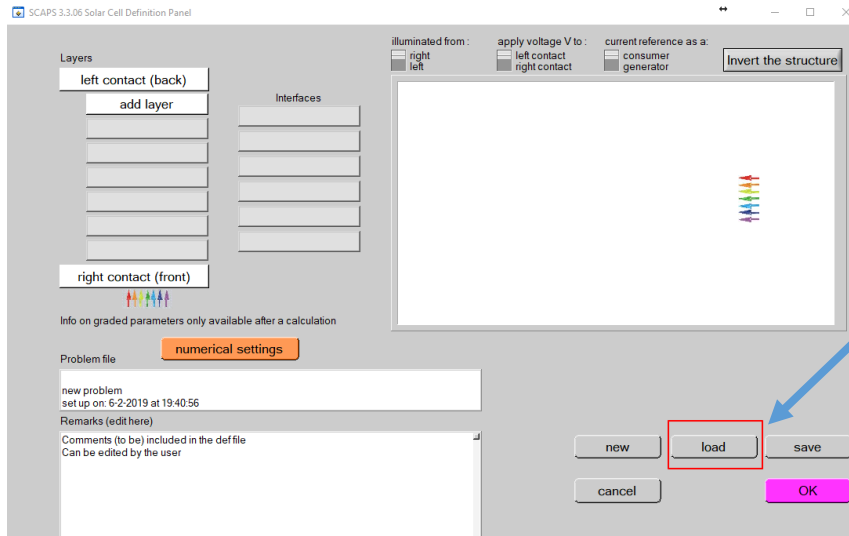
loaded definition file:

1. Launch SCAPS Application

2. Click on SET problem button to start "Cell Definition Windows Load your problem definition file"

Comparison : « Experimental Data » and simulation

3. Load your problem definition file



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Working point
Temperature (K) 300.00
Voltage (V) 0.0000
Frequency (Hz) 1.000E+6
Number of points 5

Series resistance Shunt resistance
yes no
Rs Ohm.cm² 0.00E+0
Rsh S / cm² 1.00E+30
Gsh 0.00E+0

Action list All SCAPS settings
Load Action List Load all settings
Save Action List Save all settings

Illumination: Dark Light
Specify illumination spectrum, then calculate G(x) Directly specify G(x)

Analytical model for spectrum Spectrum from file
Spectrum file name: illuminated from left illuminated from right
Select spectrum file AM1_5G 1 sun.spe
Spectrum cut off? yes no Short wavel. (nm) 200.0 Long wavel. (nm) 4000.0
Neutral Density 0.0000 Transmission (%) 100.0000

Incident (or bias) light power (W/m²)
sun or lamp 0.00
after cut-off 0.00
after ND 0.00

Analytical model for G(x) G(x) from file
G(x) model Constant generation G
Ideal Light Current G(x) (mA/cm²) 20.0000
Transmission of attenuation filter (%) 100.00
Ideal Light Current in cell (mA/cm²) 0.0000

Action Pause at each step
I-V V1 (V) 0.0000 V2 (V) 1.0000
C-V V1 (V) -0.8000 V2 (V) 0.8000
C-f f1 (Hz) 1.000E+2 f2 (Hz) 1.000E+6
QE (IPCE) WL1 (nm) 300.00 WL2 (nm) 900.00

number of points
51 0.0200 increment (V)
81 0.0200 increment (V)
21 5 points per decade
61 10.00 increment (nm)

Set problem loaded definition file: Heterojunction_CdTe_Prob.def OK

Calculate: single shot Continue Stop Results of calculations Save all simulations
Calculate: batch Batch set-up EB G,R AC I-V C-V C-f QE Clear all simulations
Calculate: recorder Record set-up Recorder results SCAPS info
Calculate: curve fitting Curve fit set-up Curvefitting results
Execute script Script set-up Script graphs Script variables Quit

4. Setup I-V, QE simulation parameter and calculate

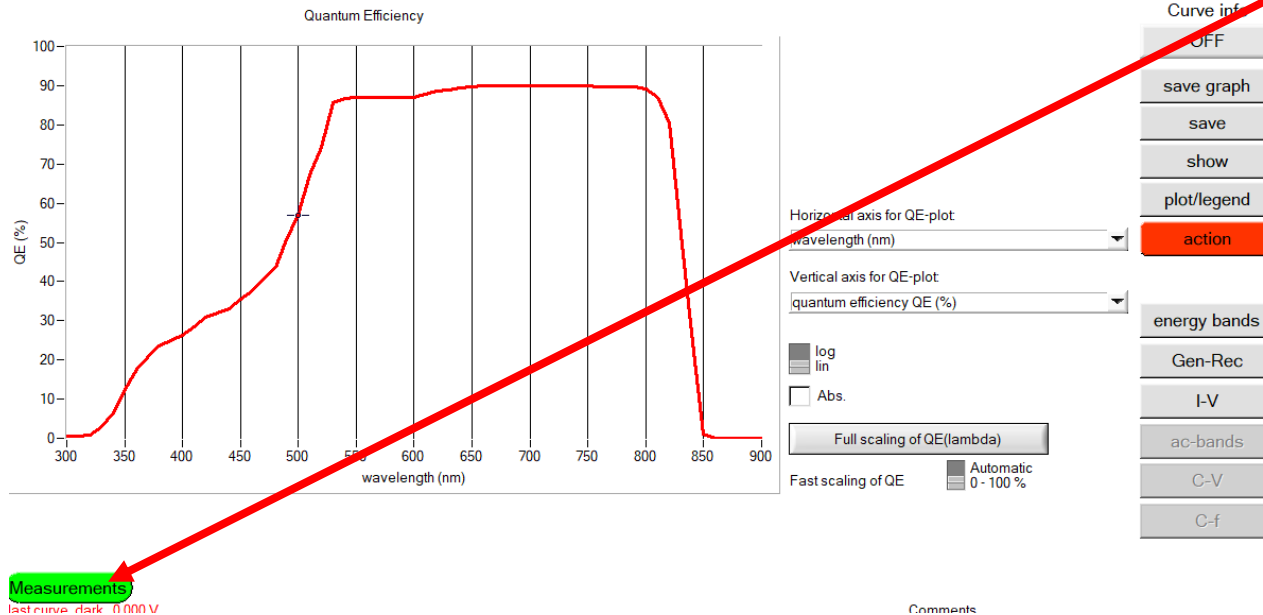
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5. Display I-V or EQ curve

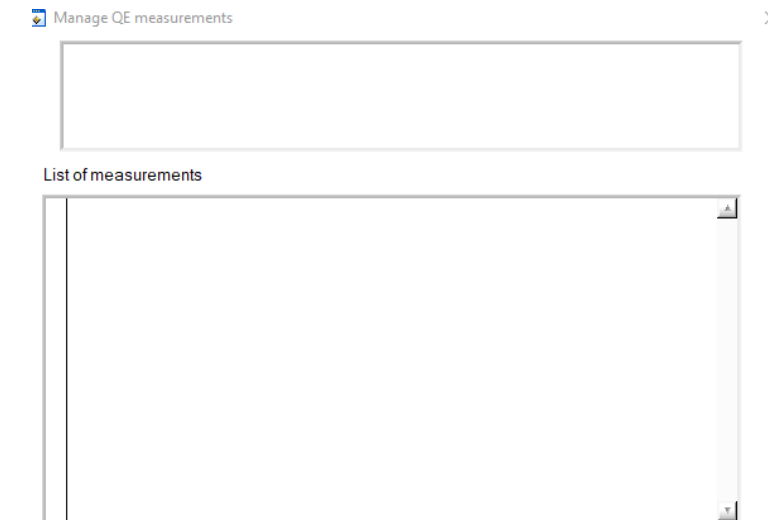
The screenshot displays the SCAPS software interface with the following components:

- Action:** Includes a checkbox for "-Pause at each step".
- Simulation Parameters:**
 - I-V:** V1 (V) = 0.0000, V2 (V) = 1.0000, number of points = 51, increment (V) = 0.0200.
 - C-V:** V1 (V) = -0.8000, V2 (V) = 0.8000, number of points = 81, increment (V) = 0.0200.
 - C-f:** f1 (Hz) = 1.000E+2, f2 (Hz) = 1.000E+6, number of points = 21, points per decade = 5.
 - QE (IPCE):** WL1 (nm) = 300.00, WL2 (nm) = 900.00, number of points = 61, increment (nm) = 10.00.
- Buttons and Options:**
 - Set problem** (orange button)
 - loaded definition file:** (text input field)
 - new problem** (text input field) with **OK** button.
 - Calculate: single shot** (red button)
 - Continue** (grey button)
 - Stop** (grey button)
 - Results of calculations** (yellow header) containing buttons: **EB**, **G,R**, **AC**, **I-V**, **C-V**, **C-f**, and **EQ** (highlighted with a red arrow).
 - Save all simulations** (white button)
 - Clear all simulations** (white button)
 - Recorder results** (yellow button)
 - Curvefitting results** (yellow button)
 - Script graphs** (yellow button)
 - Script variables** (yellow button)
 - Quit** (red button)
 - SCAPS info** (cyan button)
- Left Column:** A vertical stack of buttons: **Calculate: batch**, **Calculate: recorder**, **Calculate: curve fitting**, and **Execute script**.
- Setup Buttons:** **Batch set-up**, **Record set-up**, **Curve fit set-up**, and **Script set-up** (all in grey).

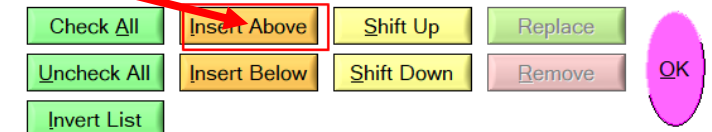
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6. Click on “measurements “ button and choose the .qe file

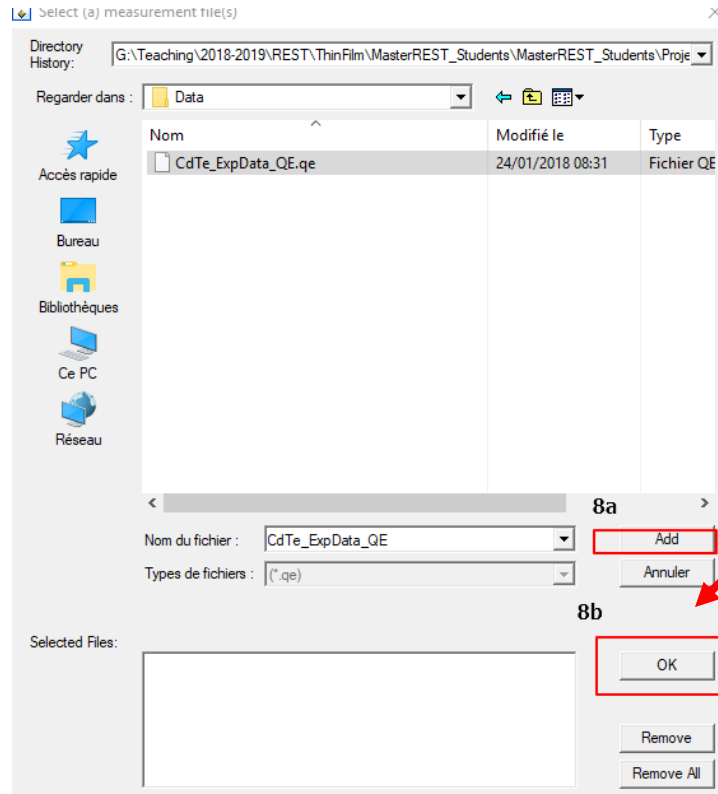


7. Click on “InsertAbove “ button and choose the .qe file

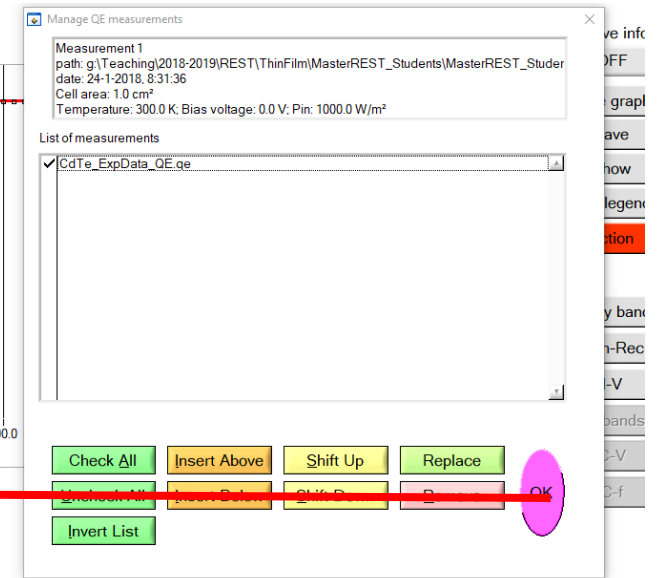
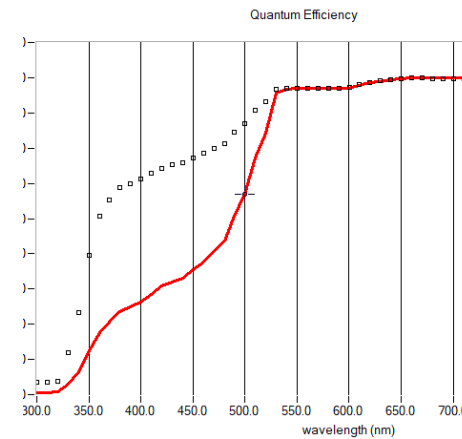


Comparison : « Experimental Data » and simulation

8. Select the file and Click on “**add**” then on “**ok**”



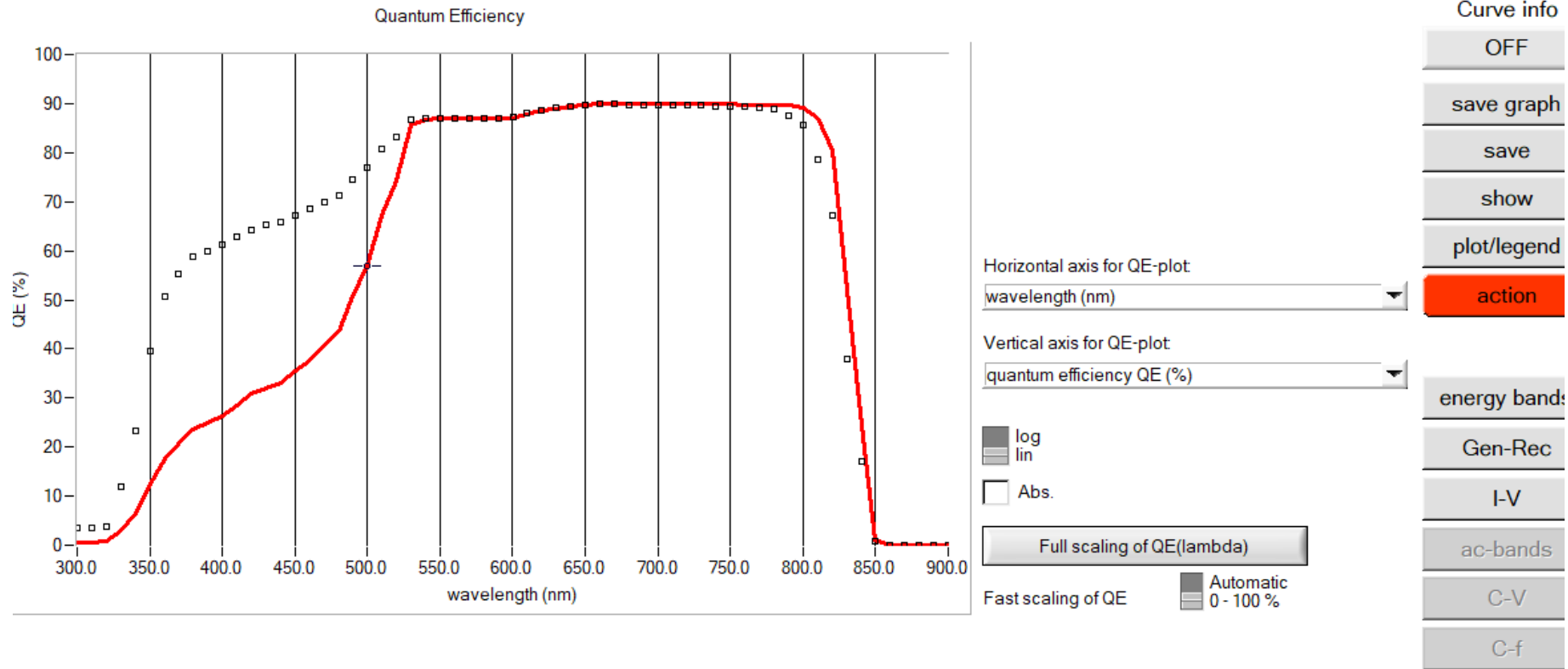
8. Click on “**ok**”



Measurements:
ve. dark, 0.000 V

m file: g:\Teaching\2018-2019\REST\ThinFilm\MasterREST_Students\MasterREST_Students\Proje

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Measurements