SLALOM - SoLAr CelL Multivariate OptiMizer

Complete documentation here: Guide/slalom_guide.pdf

SLALOM is a set of open-source Python programs implementing
a rigorous mathematical methods for the optimization of solar cells using as backend
a drift-diffusion device simulator.

It aims to be simple to use, to maintain and to extend.

It includes a core optimizer using the well tested robust mathematical methods,
a set of user interface utilities and some complete and working examples easily adaptable to
new solar cell technologies.

SLALOM uses, as device simulator, the Silvaco© Atlas tool.
It can be easily extended to use any simulator that have a standard input format and a command line interface.

SLALOM source code is available to download from:
https://github.com/sidihamady/SLALOM
https://hal.archives-ouvertes.fr/hal-01897934
http://www.hamady.org/photovoltaics/slalom_source.zip

SLALOM requirements:

- Python version 2.7.x or later
- numpy version 1.5 or later
- scipy version 0.13.1 or later
- matplotlib version 1.3.x or later
- tkinter 8.5 or later (required only for the GUI monitor)

Linux:

- Python is already installed with almost any Linux distribution.
- For RedHat (or clones such as CentOS or Scientific Linux, or Fedora), numpy, scipy and matplotlib can be installed using yum:

```
sudo yum install python-numpy python-scipy python-matplotlib python-matplotlib-tk python-tools
cd /opt
wget --no-check-certificate https://www.python.org/ftp/python/2.7.12/Python-2.7.12.tar.xz
tar -xvf Python-2.7.12.tar.xz
cd Python-2.7.12
./configure --prefix=/usr/local
make && make altinstall
wget https://bootstrap.pypa.io/get-pip.py
python2.7 get-pip.py
python2.7 -m pip install --upgrade numpy
python2.7 -m pip install --upgrade scipy
```

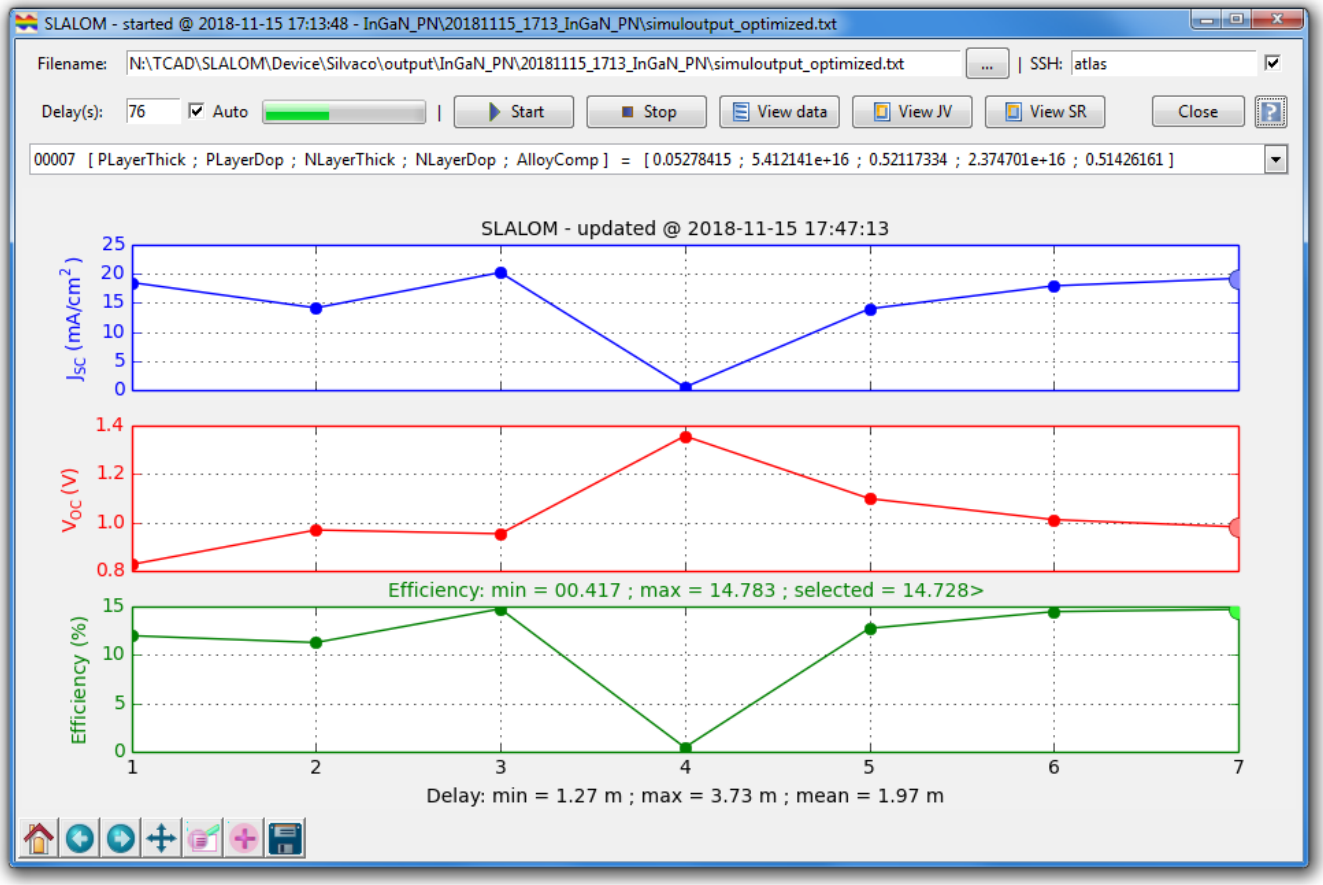
Windows:
Two methods (at least!) to install Python and scipy/numpy/matplotlib under Windows:

Method 1:

- Download Python: https://www.python.org/downloads/release/python-2712/
- Choose preferably Python 2.7.12 and install it
- install scipy/numpy/matplotlib/tkinter modules http://www.lfd.uci.edu/~gohlke/pythonlibs/ using pip (pip install module.whl)

Method 2:
Download and install the Anaconda distribution: https://www.anaconda.com/distribution/
preferably pick Python 2.7 version

See Guide/slalom_guide.pdf for a complete guide.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SSH: atlas
Delay(s): 76
Auto
Start
Stop
View data
View JV
View SR
Close
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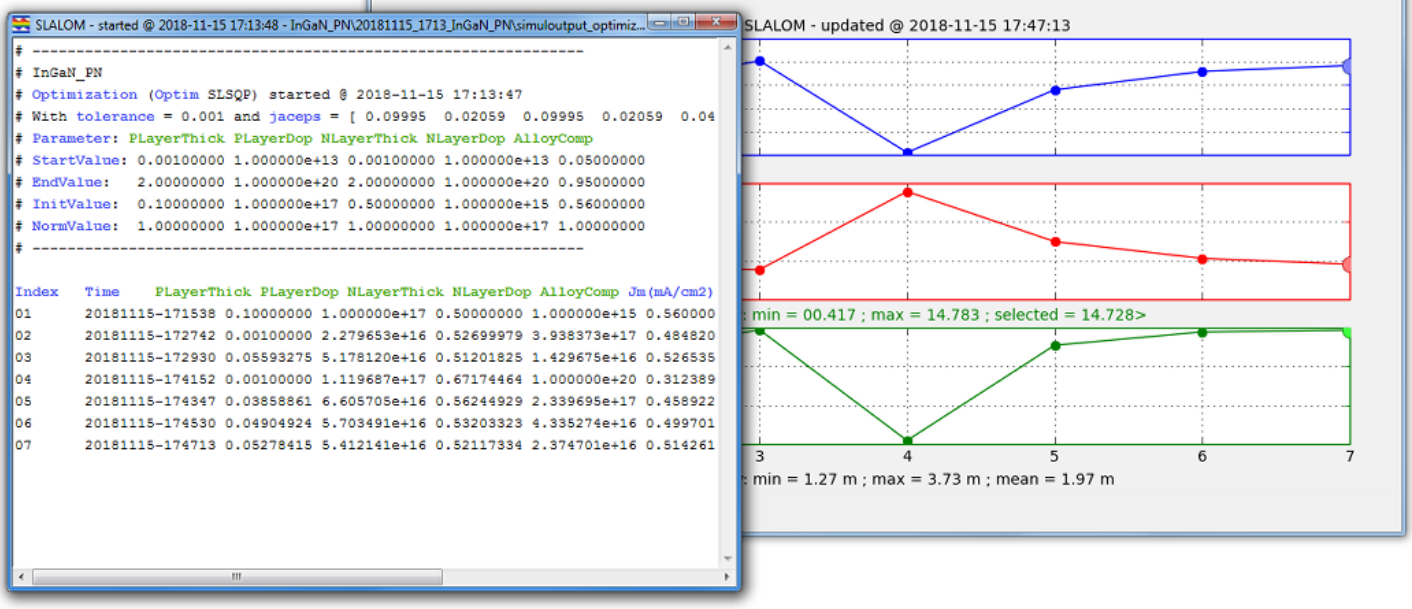
SLALOM - updated @ 2018-11-15 17:47:13
Jsc (mA/cm2)
Voc (V)
Efficiency: min = 00.417 ; max = 14.783 ; selected = 14.728>
Efficiency (%)
Delay: min = 1.27 m ; max = 3.73 m ; mean = 1.97 m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InGaN_PN
Optimization (Optim SLSQP) started @ 2018-11-15 17:13:47
With tolerance = 0.001 and jaceps = [0.09995 0.02059 0.09995 0.02059 0.04
Parameter: PLayerThick PLayerDop NLayerThick NLayerDop AlloyComp
StartValue: 0.00100000 1.000000e+13 0.00100000 1.000000e+13 0.05000000
EndValue: 2.00000000 1.000000e+20 2.00000000 1.000000e+20 0.95000000
InitValue: 0.10000000 1.000000e+17 0.50000000 1.000000e+15 0.56000000
NormValue: 1.00000000 1.000000e+17 1.00000000 1.000000e+17 1.00000000
Index Time PLayerThick PLayerDop NLayerThick NLayerDop AlloyComp Jm(mA/cm2)
01 20181115-171538 0.10000000 1.000000e+17 0.50000000 1.000000e+15 0.560000
02 20181115-172742 0.00100000 2.279653e+16 0.52699979 3.938373e+17 0.484820
03 20181115-172930 0.05593275 5.178120e+16 0.51201825 1.429675e+16 0.526535
04 20181115-174152 0.00100000 1.119687e+17 0.67174464 1.000000e+20 0.312389
05 20181115-174347 0.03858861 6.605705e+16 0.56244929 2.339695e+17 0.458922
06 20181115-174530 0.04904924 5.703491e+16 0.53203323 4.335274e+16 0.499701
07 20181115-174713 0.05278415 5.412141e+16 0.52117334 2.374701e+16 0.514261
SLALOM - started @ 2018-11-15 17:13:48 - InGaN_PN\20181115_1713_InGaN_PN\simuloutput_optimized.txt
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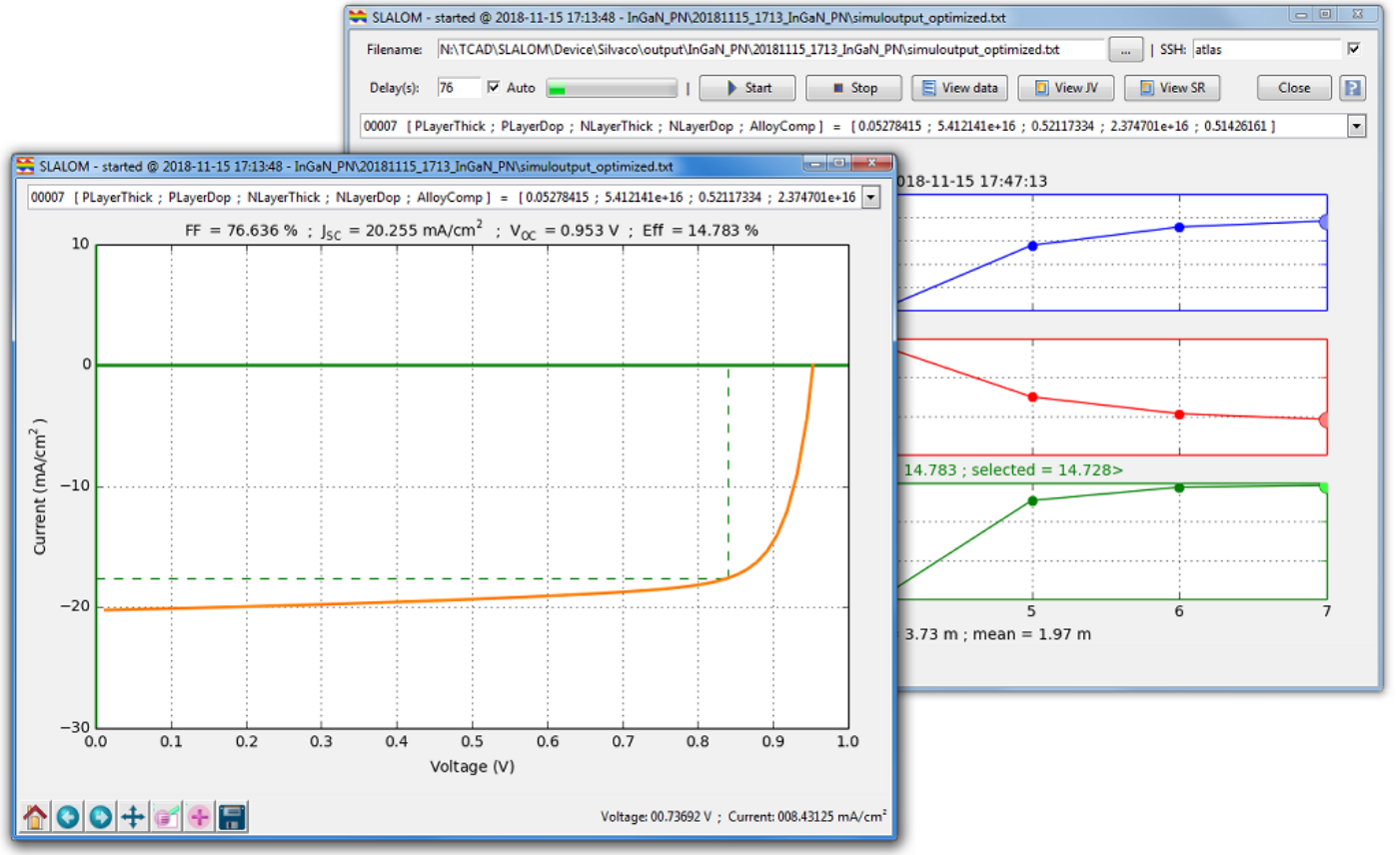
min = 00.417 ; max = 14.783 ; selected = 14.728>
min = 1.27 m ; max = 3.73 m ; mean = 1.97 m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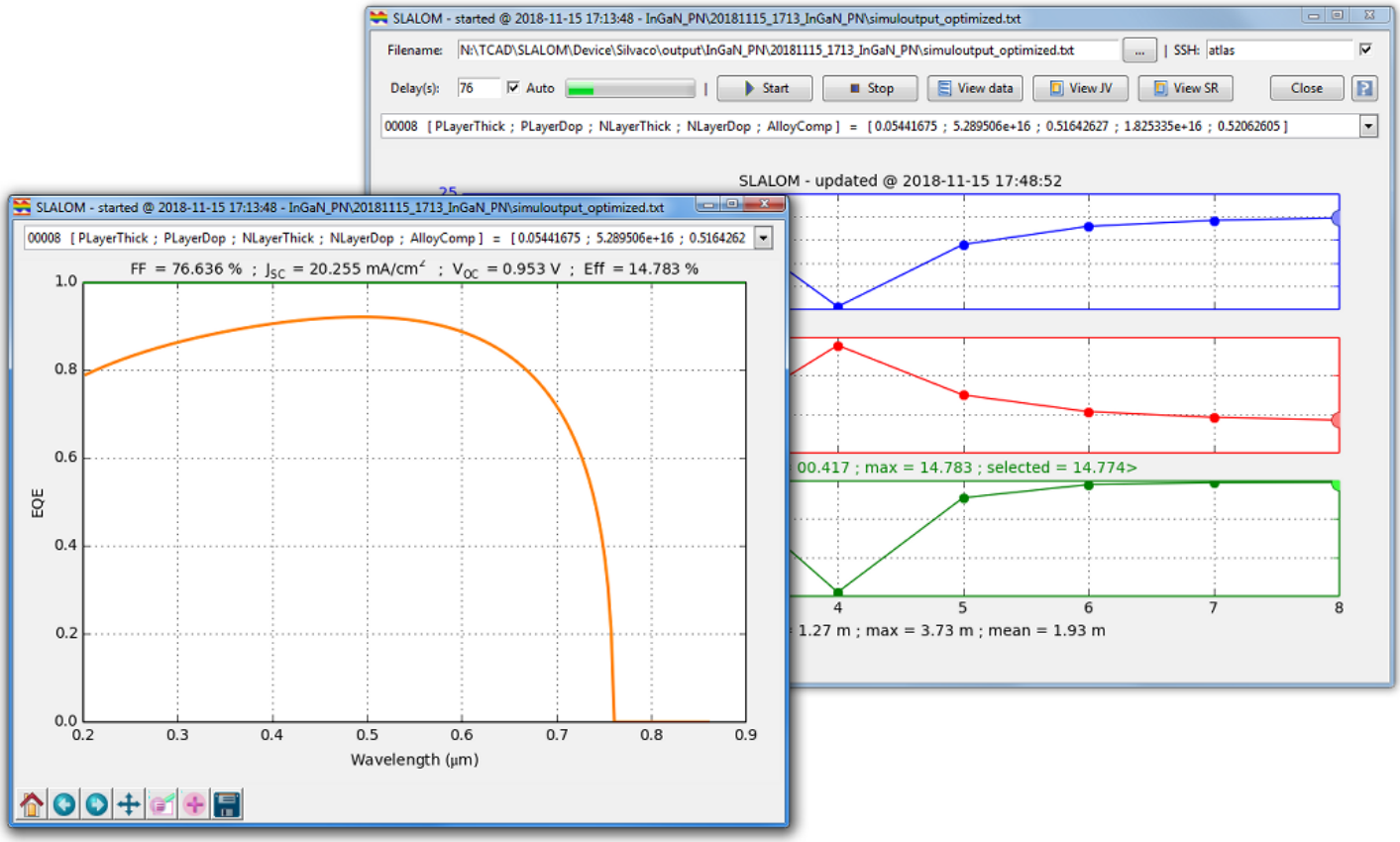
Filename: N:\TCAD\SLALOM\Device\Silvaco\output\InGaN_PN\20181115_1713_InGaN_PN\simuloutput_optimized.txt
SSH: atlas
Delay(s): 76
Auto
Start
Stop
View data
View JV
View SR
Close
00007 [PLayerThick ; PLayerDop ; NLayerThick ; NLayerDop ; AlloyComp] = [0.05278415 ; 5.412141e+16 ; 0.52117334 ; 2.374701e+16 ; 0.51426161]
FF = 76.636 % ; JSC = 20.255 mA/cm2 ; VOC = 0.953 V ; Eff = 14.783 %
Current (mA/cm2)
Voltage (V)
Voltage: 00.73692 V ; Current: 008.43125 mA/cm2
018-11-15 17:47:13
14.783 ; selected = 14.728>
3.73 m ; mean = 1.97 m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Filename: N:\TCAD\SLALOM\Device\Silvaco\output\InGaN_PN\20181115_1713_InGaN_PN\simuloutput_optimized.txt
SSH: atlas
Delay(s): 76
Auto
Start
Stop
View data
View JV
View SR
Close
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FF = 76.636 % ; JSC = 20.255 mA/cm2 ; VOC = 0.953 V ; Eff = 14.783 %
EQE
Wavelength (µm)
SLALOM - updated @ 2018-11-15 17:48:52
00.417 ; max = 14.783 ; selected = 14.774>
1.27 m ; max = 3.73 m ; mean = 1.93 m