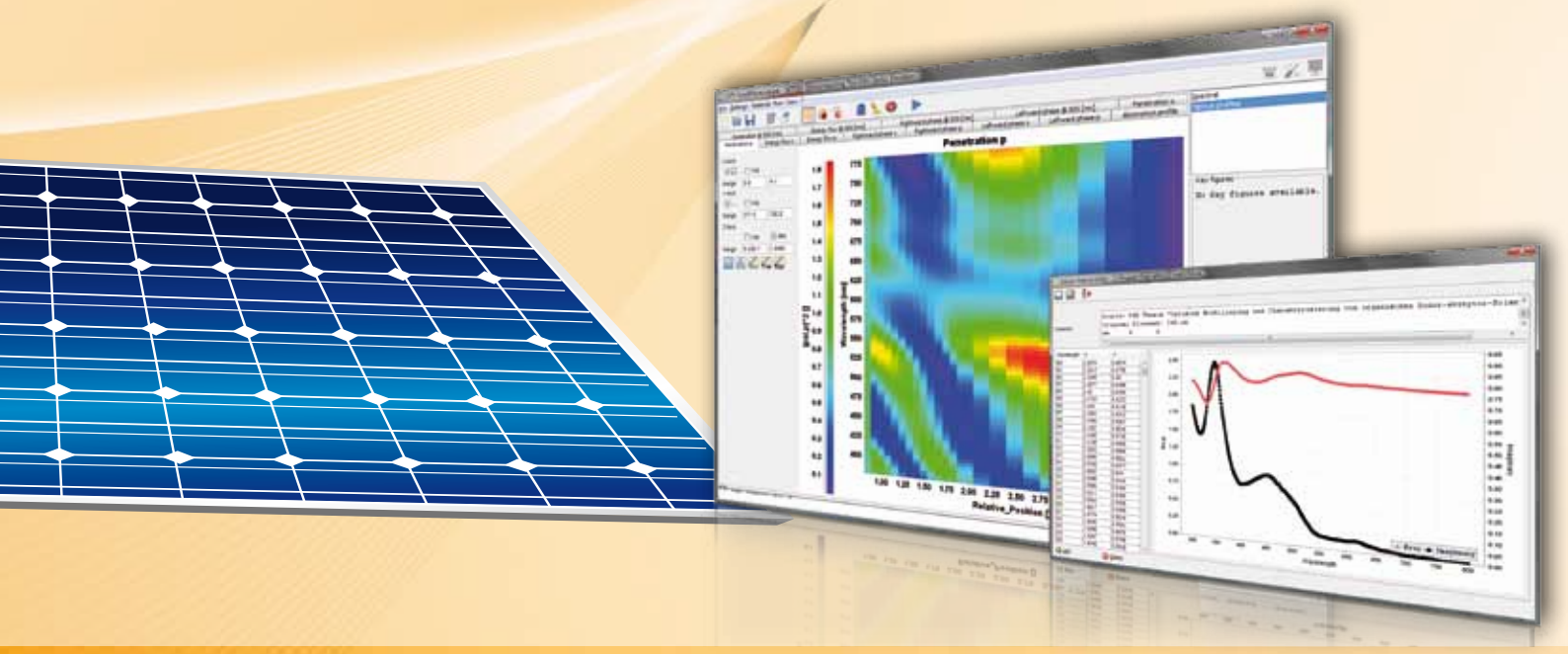
setfos 3.2

Scientific Software for Solar Cells



Easy-to-use **– get started in no time**

Fast **– runs on any standard PC**

Reliable **– developed together with leading scientists and engineers**

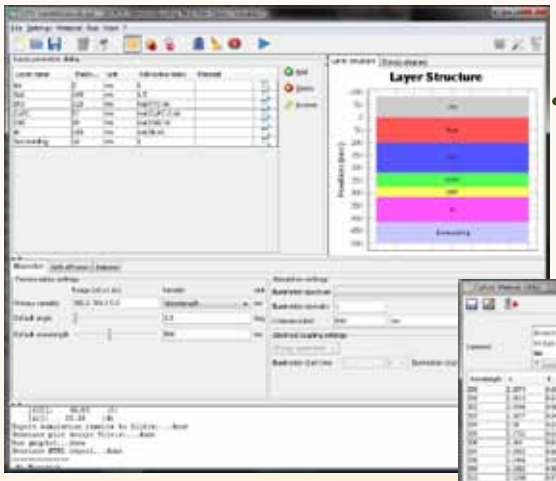
FLUXiM

scientific software · www.fluxim.com

setfos 3.2

Scientific Software for Solar Cells

Let SETFOS start solving your solar cell design challenges today!

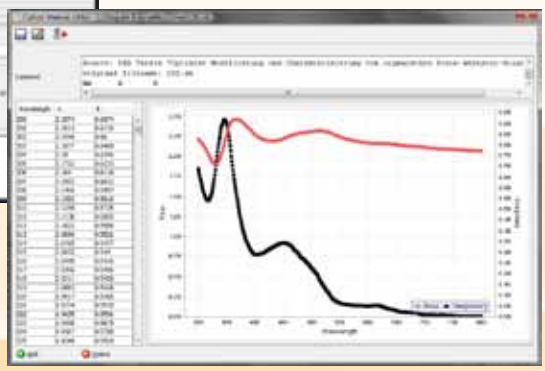


Main GUI window for device parameter input

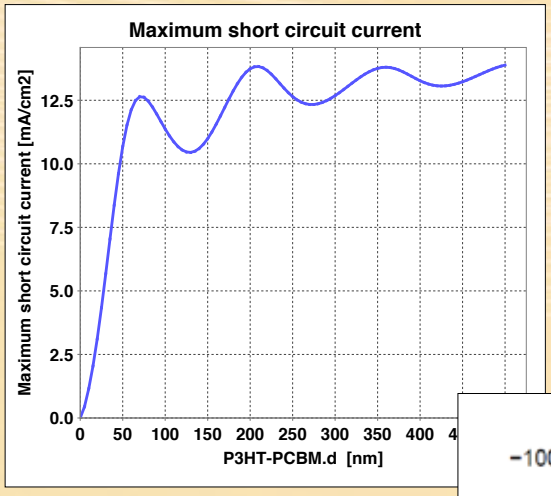
Step 1:

Define the solar cell structure

- Set layer thicknesses, refractive indices, illumination source, angle of incidence
- Specify coherent and incoherent layers
- Choose among several analytical refractive index models



Refractive index dispersion dialogue

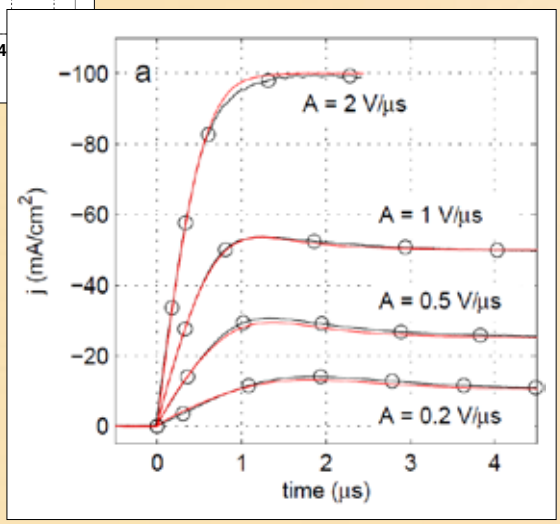


Maximum photocurrent vs. layer thickness

Step 2:

Sweep and optimize the device parameters

- After performing a one-shot simulation, sweep several device parameters simultaneously
- Inspect the variation of the obtained performance figures
- Optimize input parameters with respect to a custom-defined merit function



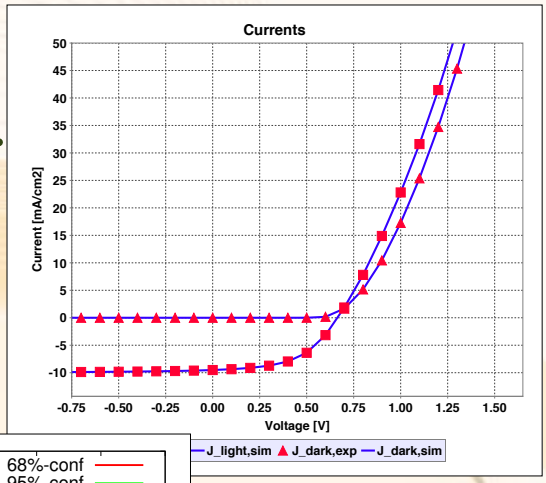
CELIV photocurrent transients for several voltage ramps. Comparison of experiment (black) and simulation (red). Courtesy of ZHAW

A new generation of scientific software is born.

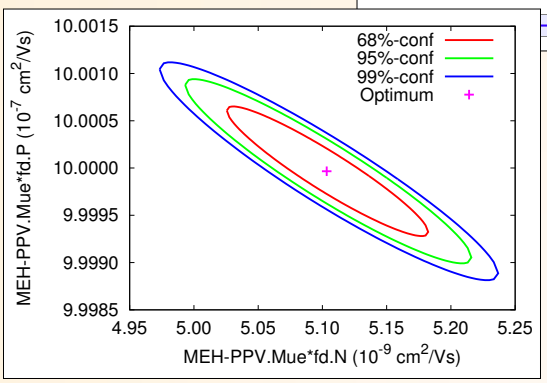
Step 3:

Use least-square fitting to extract material and device parameters

- After experimental device fabrication and characterization, validate the predicted performance
- Take advantage of advanced multi-variable and multi-target least-squares fitting algorithms
- Use the fitting feature for determining layer thicknesses and refractive index dispersions
- Quantify the correlation among the parameters and check the confidence intervals



Fitting of current-voltage curves



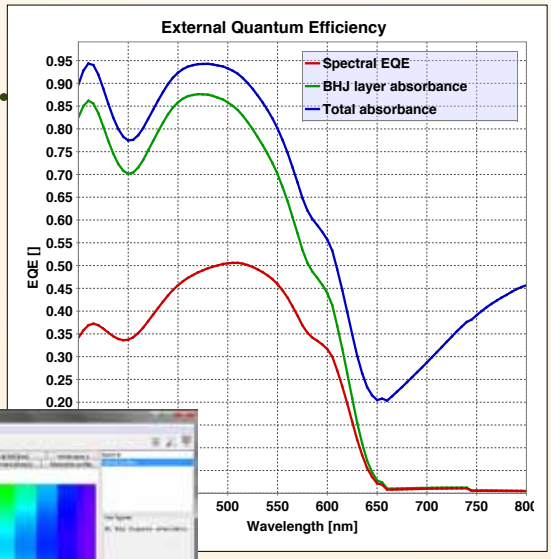
Confidence ellipses of nonlinear least-squares parameter fit

Step 4:

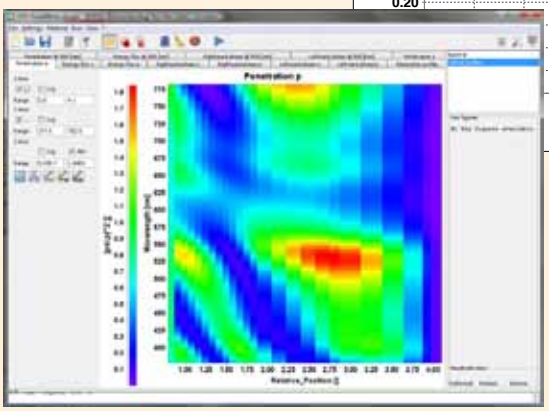
Get more insight!

- Compare simulated and measured spectral photocurrent response*
- Visualize the inner workings, i.e. electric field, charge and recombination profiles, etc.*
- Resolve the photocurrent in wavelength and spatial domain*
- Take advantage of the optional, powerful script mode

* Requires combination of «Absorption» and «Drift-diffusion» modules



Spectral EQE vs. Absorbance*



Spectral light penetration

swiss made software

setfos 3.2

Scientific Software for Solar Cells

Flexible – choose the software modules you need

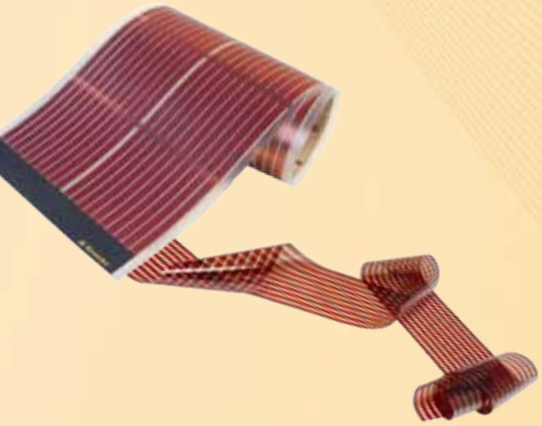
Comprehensive – simulate photons, excitons and electrons

Customer Satisfaction

«SETFOS is a fast and useful simulation tool for organic photovoltaic devices. The intuitive simulator structure and interface, designed specifically for organic devices, implements some clever ideas and solutions which accelerate and simplify complete routine device simulations. In particular, the «Absorption» simulation module is an accurate, user-friendly, fast tool for thin film PV architectures.»

Dr. Mauro Morana, Program Manager
Konarka Austria, Linz, Austria

KONARKA®



Physical Models and Features	Modules: Absorption	Modules: Drift-diffusion
Nonlinear least-squares fitting considering measurement uncertainty and providing confidence intervals and parameter correlations**	✔	✔
Reflectance, transmittance and layer-specific absorbances as well as light-incoupling efficiency	✔	
Combination of coherent and incoherent thin films/substrates	✔	
Reflectance color, layer-specific maximum photocurrent	✔	
Spectral penetration of light and energy flux	✔	
Several refractive index models (Tauc-Lorentz, Effective medium approx., Sellmeier etc.)	✔	
Photon absorption rate profile	✔	
Spectral photocurrent, charge density and field profiles*	✔	✔
Spectral external quantum efficiency* I **	✔	✔
CELIV photocurrent simulation*	✔	✔
Performance figures (J_{sc}, V_{oc}, η, FF, MPP, ...)*	✔	✔
(Charge-transfer) Exciton dissociation		✔
Charge drift-diffusion, trapping and recombination		✔
Field-, temperature- and density-dependent mobility models, Gaussian disorder model		✔
DC and transient solvers with customizable numerics		✔
Series resistance in DC and transient current simulation**		✔

* Requires combination of «Absorption» and «Drift-diffusion» modules
** new in version 3.2!

Fluxim AG
CH-8835 Feusisberg, Switzerland
Phone: +41 44 500 47 70
Fax: +41 44 500 47 79
Mail: info@fluxim.com
Web: www.fluxim.com

FLUXiM
scientific software · www.fluxim.com