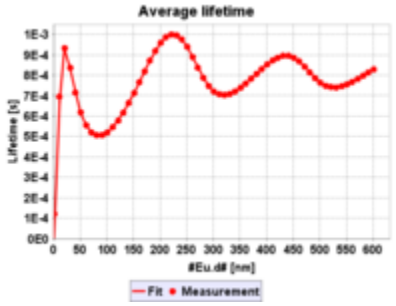
Physical parameter extraction

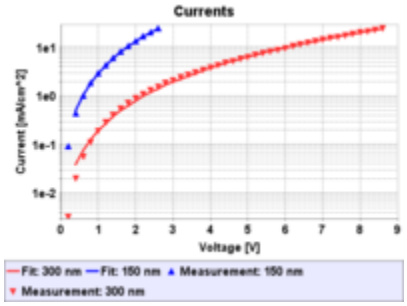
setfos is a convenient and powerful tool that allows you to fit measurement curves of both optical and electrical experiments to extract important physical parameters like:

- Exciton lifetimes
- Refractive index dispersions
- Charge transport parameters
- Intrinsic luminescence spectra
- Emission zones
- And many other parameters...



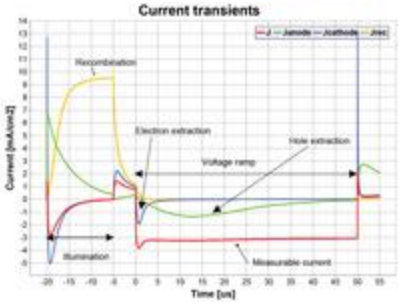
Exciton lifetime and quantum efficiency extraction

setfos can simulate the lifetime and quantum efficiency of excitons influenced by the optical environment.



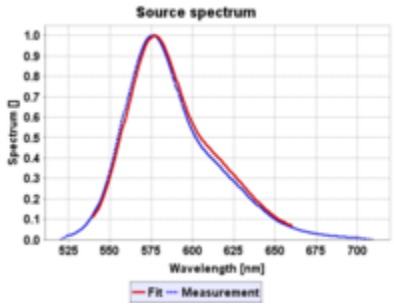
Charge transport parameter extraction from I-V curve measurements

The fast steady-state solver implemented in **setfos**allows one to fit I-V curves of single-layer devices faster than ever. Material characterization is now therefore accessible directly after a simple measurement. **Read more about this in services.**



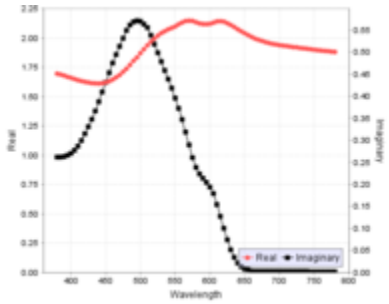
Charge transport parameter extraction from transient measurements

setfos *can simulate photo-CELIV and CELIV and provide superior analysis of measured data.*



Extraction of the emission zone and intrinsic luminescence spectrum

setfos *can treat interference effects and calculates the intrinsic luminescence spectrum of emissive material from a simple photo-luminescence measurement. The spatial emission zone is also extracted in addition.* **Read more about emission zone extraction in services.**



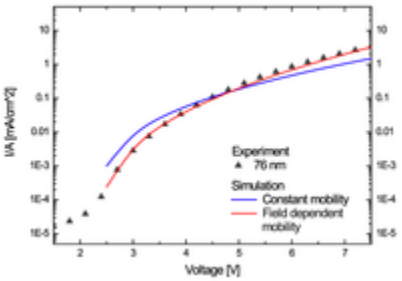
Extraction of wavelength dependent refractive indices

A very fast and reliable refractive index extraction method is implemented in **setfos** *to extract the wavelength dependent refractive index from simple optical measurements.*

Semiconducting Devices

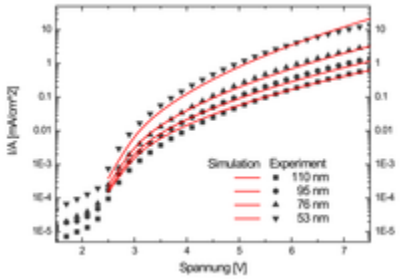
Charge-transport simulations of semiconducting devices

With the drift-diffusion model that features different charge mobility laws, **setfos** allows you to study the influence of the mobility law and the energy levels of a semiconducting thin film structure on the current-voltage curve and other figures-of-merit.



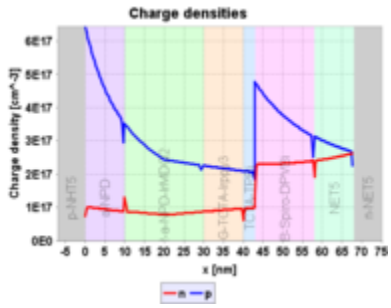
Constant, field and temperature dependent charge mobilities

setfos is able to simulate field and temperature dependent charge mobility as opposed to constant mobility to better suit the measured data.



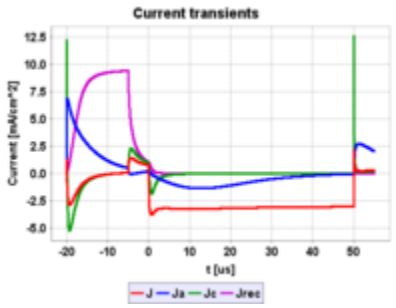
Extended Gaussian Disorder Model (EGDM) and Correlated Disorder Model (ECDM)

setfos is the first organic semiconducting numerical simulator implementing the Extended Gaussian Disorder Model (EGDM) and Correlated Disorder Model (ECDM).



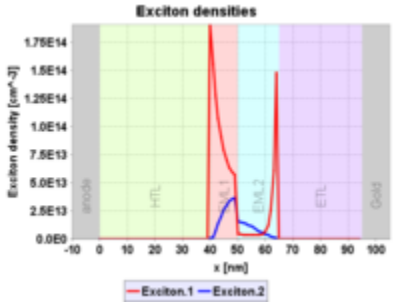
Charge transport in complex semiconducting devices

The steady-state solver implemented in **setfos** allows for fast and accurate calculation of charge distribution. Assess the electrical behavior of your device in seconds.



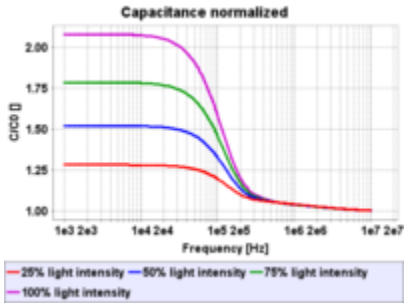
Steady state and transient simulations

Apart from the steady-state solver, **setfos** includes a transient solver that allows for time dependent device characterization. For example, CELIV simulations can be performed with ease.



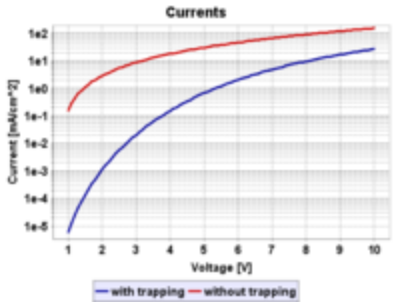
Exciton physics included

setfos also incorporates the exciton physics to account for fully coupled opto electrical simulations.



Fast impedance solver implemented

The fast impedance solver implemented in **setfos**allows for device simulation in the frequency domain too.



Different trapping models and doping incorporated

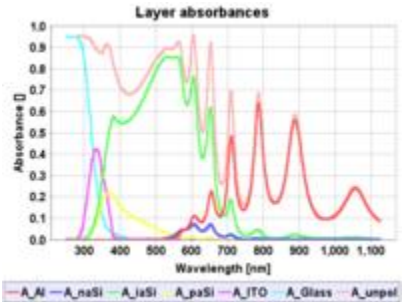
setfos comes with several charge trapping models like discrete, Gaussian and exponential shaped trap states. Studying the influence of charge trapping is performed with ease in **setfos**. Furthmore, we extended the drift-diffusion equations to account for doping.

Photovoltaic Cells

Light absorption and charge-transport in organic thin films

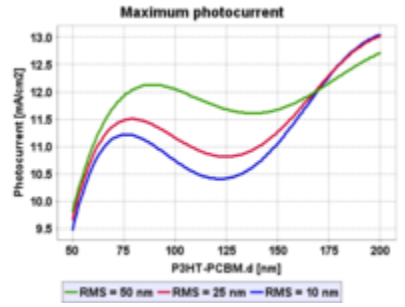
Calculate light absorption and charge-transport in organic solar cells. Below is a list of possible solar cell features implemented in **setfos**:

- Dark current curves
- Illuminated current curves
- CELIV photocurrent
- Light-scattering and rough interfaces
- Tandem solar cells
- Light absorption in any coherent and incoherent stack
- And many more...



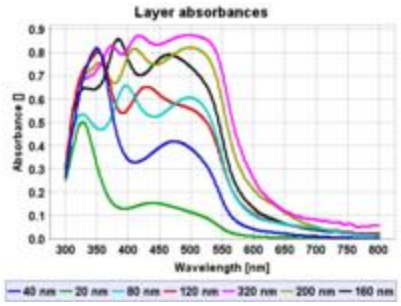
Performance evaluation of solar cells

The unique ability of **setfos** to treat arbitrary configurations of coherent and incoherent layer structures make this software an indispensible research tool both for organic and inorganic solar cells.



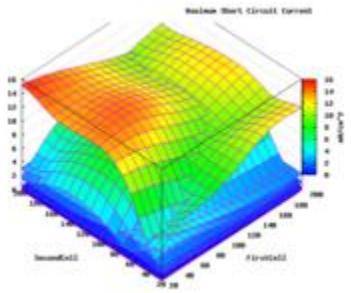
Light scattering and rough interfaces

Enhance light absorption by introducing scattering interfaces and rough interfaces. Let **setfos** quantify the influence on the maximum generated short circuit current. Easily use analytical models to define the scattering behavior of an interface or even import the light scattering behavior from BRDF or BSDF measurements.



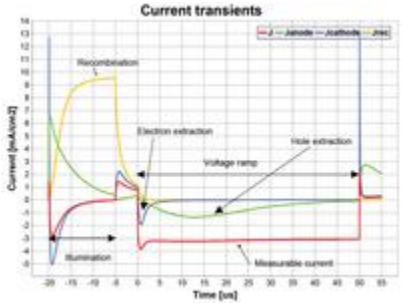
Layer thickness optimization

Calculate the layer thickness dependent absorption spectra that resolve interference effects.



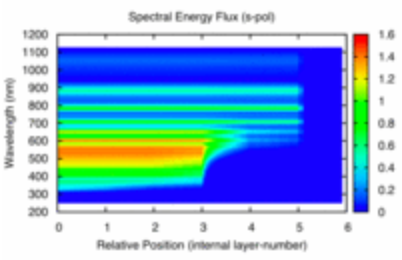
Current-matching by adjusting the active layer thicknesses

setfos allows the optimization of tandem solar cells



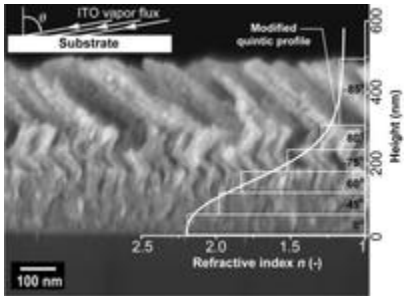
CELIV simulation for organic solar cells

setfos can simulate photo-CELIV and CELIV and provide superior analysis of measured data.



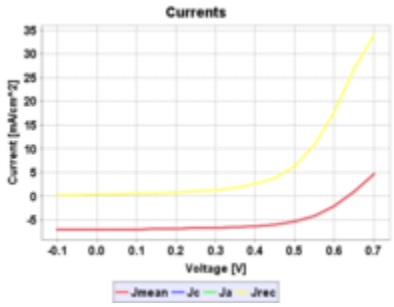
Calculation of optical energy flux and absorption profile

setfos can resolve position dependent energy fluxes across the solar cell.



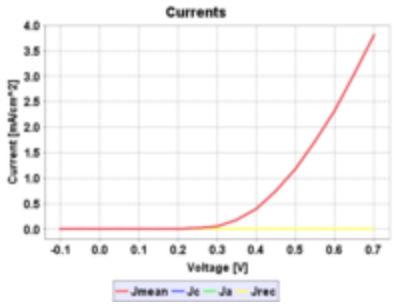
Solar cell with rough interfaces and light-scattering

Various optical models in **setfos** *allow the calculation and treatment of light-scattering and rough interfaces.*



I-V characteristics of organic solar cells

Calculate recombination losses, peak-power characteristics, maximum short-circuit current by coupled optical-electrical calculations.



Dark current

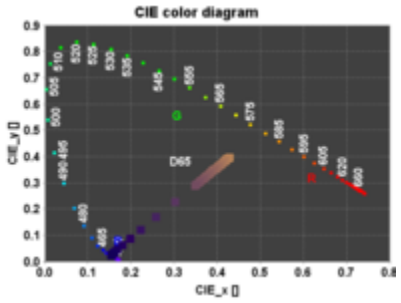
setfos *quantifies the dark current through a solar cell. Due to a fast steady-state solver, calculate I-V curves dominated by diffusion in no time.*

Emissive Optics

Light-emission from dipoles

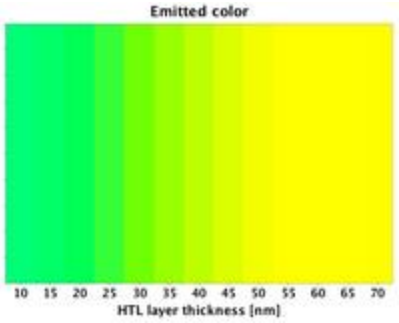
Characterize your optoelectronic device or design it to satisfy given requirements. **setfos**allows for easy modeling, optimizing and tuning of the device performance like:

- Color filters
- Emission color matching
- Luminance maximization
- Analysis of optical modes and photon statistics
- Exciton kinetics
- Emission zone extraction in OLEDs
- And many more...



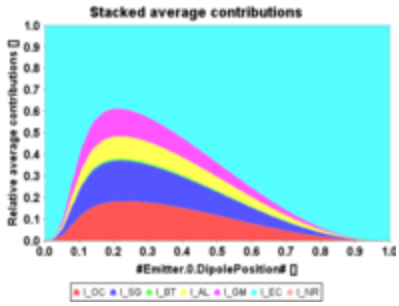
Color filters

The flexible dipole model in **setfos** allows to design OLEDs and study the impact of incoherent color filters. Easily tune parameters like layer structure, thicknesses and absorption coefficients to achieve a request color coordinate.



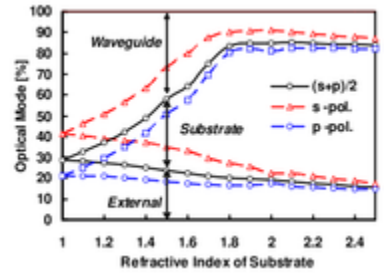
Emission color matching

setfos optimization routines can be exploited to design the right combination of layer thicknesses that lead to a particular emission color in OLEDs. Let **setfos** find the optimum in a matter of seconds.



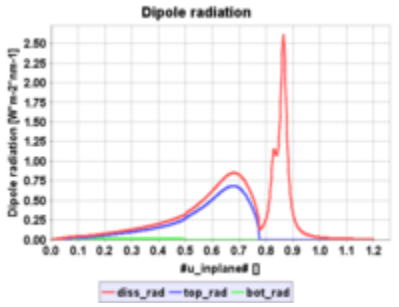
Analysis of emission modes in OLEDs

setfos can quantify the power emitted into different optical modes of a multilayer structure. Quantify top and bottom emitted power, absorption losses, energy trapped in the layer stack and power coupled to evanescent modes at metal interfaces. Study the dipole dynamics and gather interference induced lifetimes and quantum yield of the emitting state.



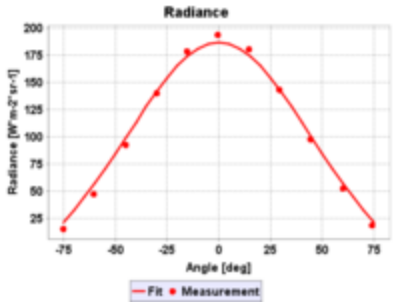
OLED efficiency optimization with high-index substrates

Use the analysis of the emission modes in **setfos** to optimize the efficiency of the OLED. Quantify the improved efficiency by introducing high-index substrates.



Radiative lifetime of emissive dipoles

setfos can quantify the power dissipated in each emission mode for a multiple set of parameters like the wavelength, the layer thicknesses, the refractive indices and for several emission zones.



Extraction of the emission profile from angle-resolved radiance

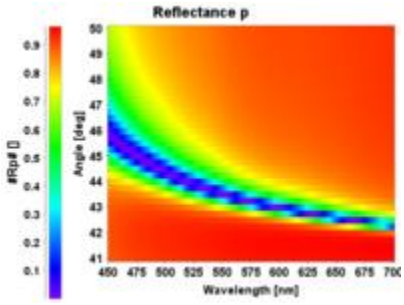
Extract the emission profile or other parameters from angle-resolved quantities like the radiance.

Passive Optics

Easy design of thin film structures

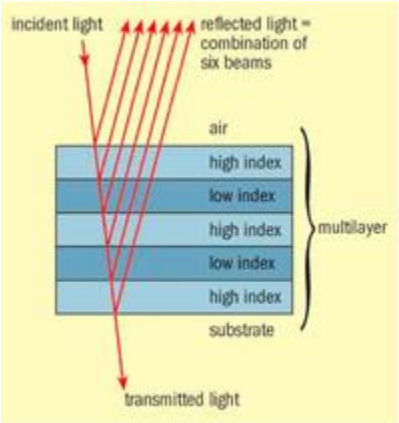
setfos easily and quickly allows the design of devices like:

- Antireflection coatings
- Resonators
- Sensors
- Mirros
- And many other devices...



Surface plasmon resonance sensor

setfos can be used to study the surface plasmon resonances in thin film devices.



Multilayer spectral filter and mirrors

Due to interference effects, refractive multilayered thin films can be designed in order to transmit, reflect, absorb a certain region of the incident spectrum, depending on the incidence or observation angle.