

# LuQY Pro

## The Absolute Luminescence Quantum Yield System: Plug and Play PL, EL & QFLS Measurements

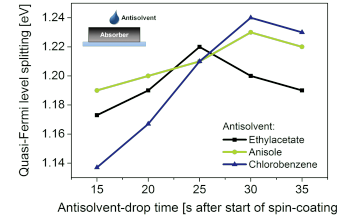
When developing opto-electronic devices, such as LEDs or solar cells, it is essential to improve their radiative efficiency. This requires precise techniques to determine the luminescence quantum yield. The LuQY Pro is an easy-to-use, non-invasive and versatile system with unparalleled compactness to swiftly quantify absolute electro- and photoluminescence photon fluxes of thin film absorbers, layer stacks or complete devices under various operating conditions.



# Software & Applications

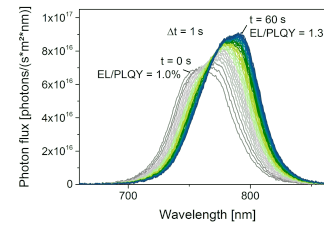


- Absolute photon flux measurement**  
Records single or multiple EL/PL spectra for pre-set laser intensity and voltage bias
- Immediate calculation of EL/PLQY & QFLS**
- Automated measurement sweeps**  
Directly constructs pseudo-JV and ideality factor plots by sweeping Laser intensity or bias voltage and determining the QFLS at each operating point.



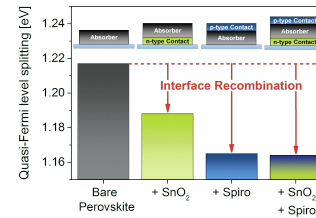
## Quality Assessment

Quality assessment for rapid **Process Control** after each fabrication step or for **Accelerated Material and Process Parameter Screenings**.



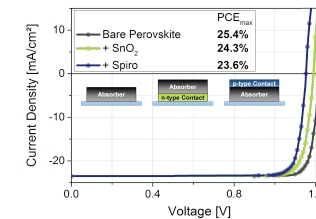
## Transient Effects

**Fast Acquisition** resolves **Shifts in Emission Spectrum & Intensity** as well as **EL/PLQY and QFLS** on timescales from 10 ms to several hours.



## Resolve Bulk & Interface Recombination

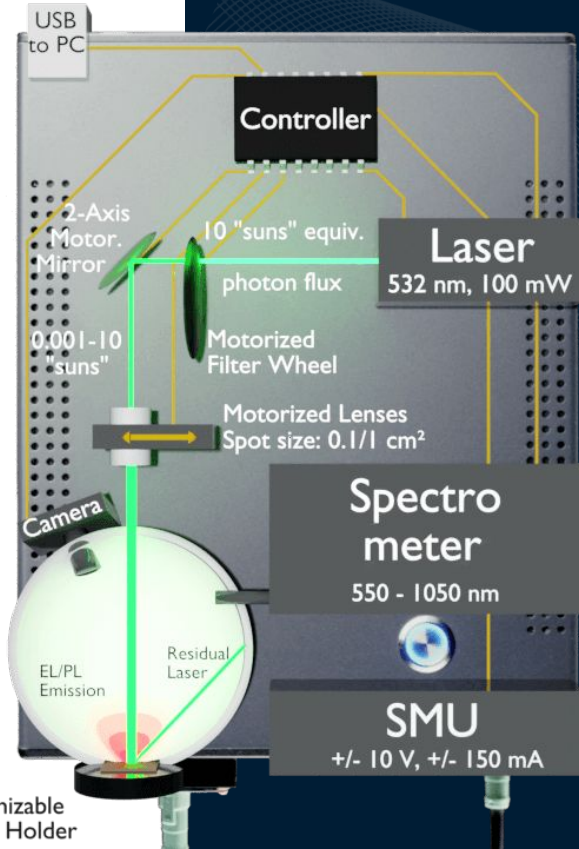
**Quantifying Bulk and Interface Recombination Losses** in semiconductor thin films, layer stacks or complete devices such as solar cells or LEDs.



## Efficiency Potentials & Loss Mechanisms

**In-depth analysis** of efficiency potentials and loss mechanisms in semiconductor thin films, layer stacks or complete devices, e.g. by determining **Ideality Factors and Pseudo-JV Curves from Intensity and/or Bias-Voltage Dependent EL/PLQY & QFLS**.

# System & Layout



Swift quantification of **Absolute Photon Fluxes** from electro- and photoluminescence (**EL & PL**) of semiconductor thin films & devices

**USB-“Plug & Play”**: the included software records emission spectra & directly calculates **EL/PL Quantum Yield & QFLS** (quasi-Fermi level splitting)

**Small & Portable Layout** allows flexible usage e.g. in gloveboxes

## One-Click & High-Throughput Measurement

- Absolute number of photons from steady-state EL/PL spectra (550–1050 nm)
- Automated, continuously adjustable laser intensity from 0.001-10 “Suns”
- Current/voltage biasing and sensing via integrated source & measure unit (SMU)
- EL/PLQY sensitivity range: 1E-4 %

# Technical Specifications & References



## Technical Specifications

### Laser

Photoexcitation intensity (continuously adjustable)	0.001 – 10 “Suns”
Photoexcitation wavelength	532 nm
Photoexcitation spot size (interchangeable)	0.1 cm <sup>2</sup> / 1 cm <sup>2</sup>

### Spectrometer

Spectral detection range	550 - 1050 nm
Quantum yield sensitivity range	10-4 – 100%
Corresponding min. resolvable iVoc for 1.6 eV absorber band gap	1.0 eV
Spectrometer integration time	1 ms – 35 min
Signal to noise ratio	600:1

### SMU

Current-voltage source and measure unit (SMU) max. ratings	+/-10 V, +/-150 mA
Max. sample dimensions (L x W, unrestricted height)	30 x 30 mm
Max. no. of contactable subcells on sample by integrated relays box	6 subcells
Dimensions (L x W x H)	220 x 390 x 130 mm
Weight	6.1 kg
Connectors	1x DC, 1x USB 3.0

## References

>10 publications using the LuQY Pro in renowned journals e.g.:

- Nature Energy
- Joule
- Advanced Energy Materials
- ACS Applied Energy Materials
- Advanced Functional Materials
- Progress in Photovoltaics
- Solar RRL

### nature energy

Explore content ▾ About the journal ▾ Publish with us ▾ Subscribe

nature > nature energy > articles > article

Article | Published: 12 January 2024

### Enhancing the efficiency and longevity of inverted perovskite solar cells with antimony-doped tin oxides

Jia Li, Haoming Liang, Chuanshao Xiao, Xiangkun Jia, Renjun Guo, Jinni Chen, Xiao Guo, Ran Luo, Xi Wang, Minghui Li, Michael Rossler, Alina Hauser, Flavio Linardi, Ezra Alvianto, Shunchang Liu, Jiaqiang Feng & Yi Hou

Nature Energy, 9, 308–315 (2024) | [Cite this article](#)



The LuQY Pro can be integrated into SCIPRIOS' automated deposition systems e.g. the SpinBot. This allows high throughput screening and direct luminescence analysis of semiconductor stoichiometries, contact layers, deposition parameters, etc.



**TII 東京インスツルメンツ** 株式会社 〒134-0088 東京都江戸川区高葛6-10-14 T.Iビル Tel.03-3686-4711  
**TOKYO INSTRUMENTS** 営業所: 〒532-0003 大阪府大阪市淀川区高津4-1-46 新大阪ビル Tel.06-6393-7411  
 グローバルにネットワークを広げ、最先端の科学をお客様に提供 URL: <https://www.tokyoinst.co.jp> Mail: [sales@tokyoinst.co.jp](mailto:sales@tokyoinst.co.jp)

**TII Group Company** **UNISOKU** 超高真空・超低歪半導体プロセス装置 超高真空測定装置、クライオスタット **LOTIS TII** Nd:YAGレーザー、Ti:Sレーザー、OPQレーザー

- 本カタログに記載されている内容は、改良のため予告無く変更する場合があります。【製品の仕様、性能、価格などはカタログ発行時のものです】
- 本カタログに記載されている内容の一部または全部を無断で転載することは禁止されています。
- 本カタログに記載されているメーカー名、製品名などは各社の商標または登録商標です。

## Contact

**Dr. Lukas Kegelmann**  
[www.qyb.berlin](http://www.qyb.berlin)  
[contact@qyb.berlin](mailto:contact@qyb.berlin)



QYB Quantum Yield Berlin GmbH  
 Braunschweiger Str. 71  
 12055 Berlin, Germany