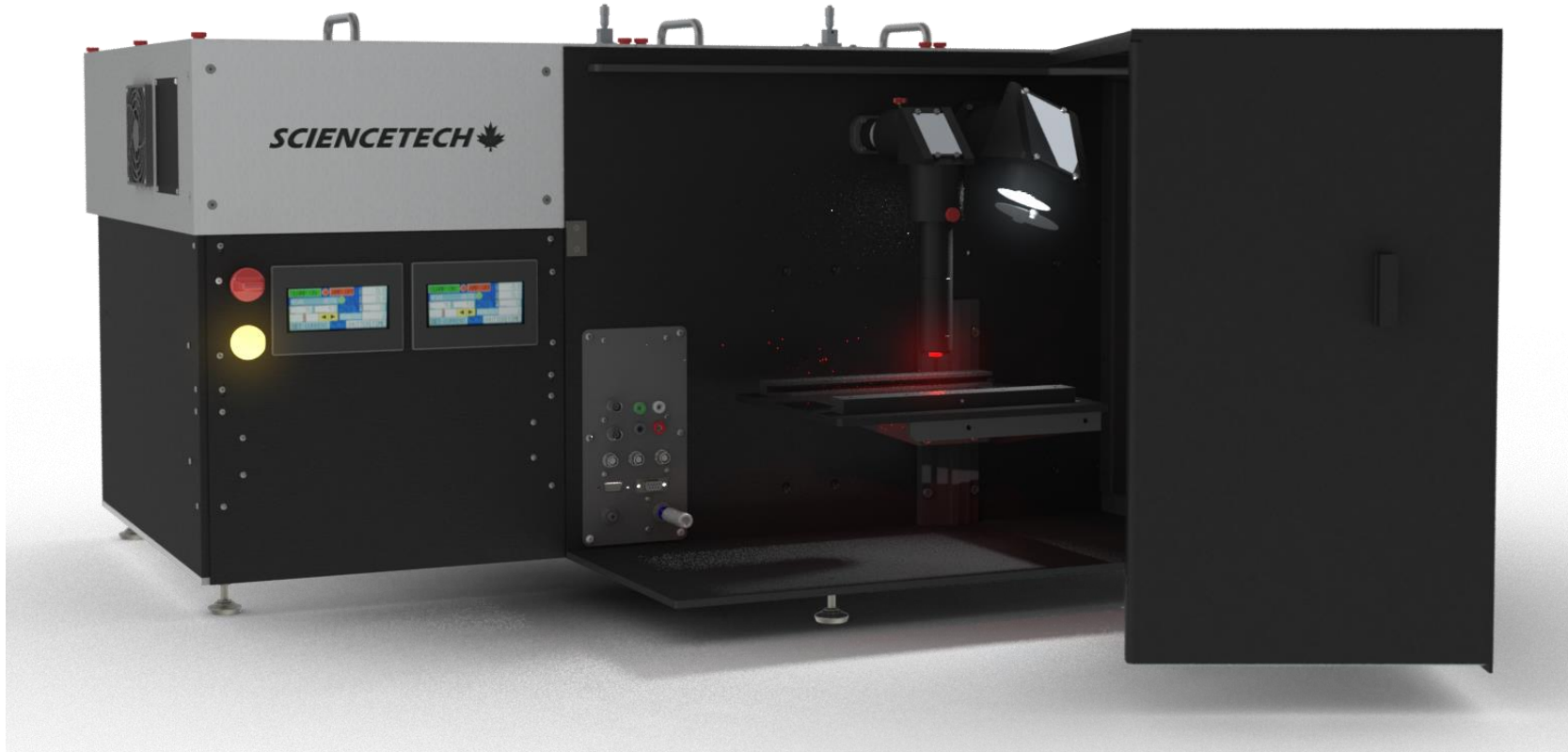
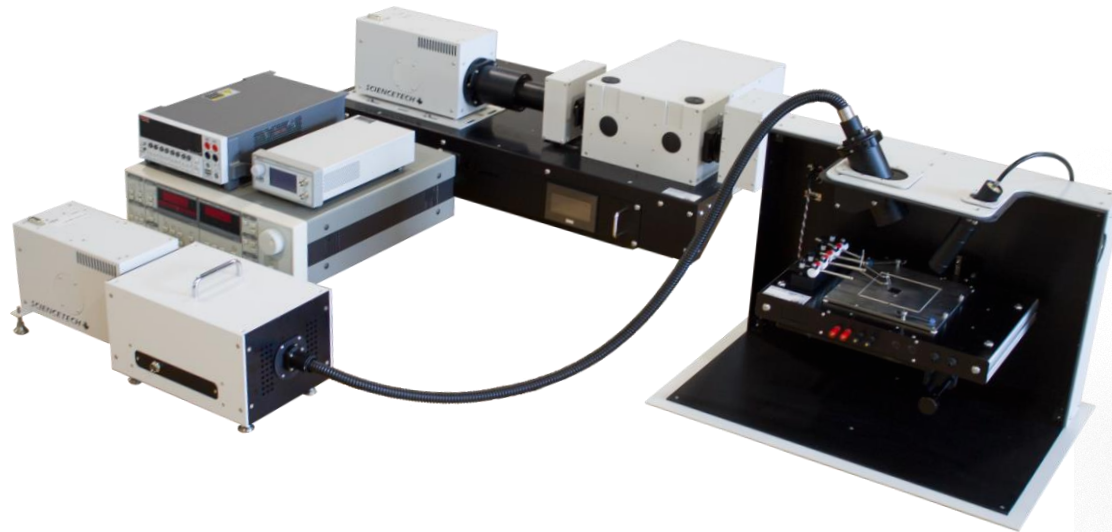


# QUANTUM EFFICIENCY

## MEASUREMENT SYSTEM



## Design options and customization



**Modular Model System**



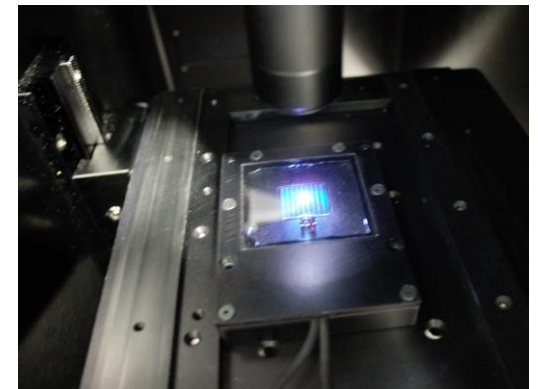
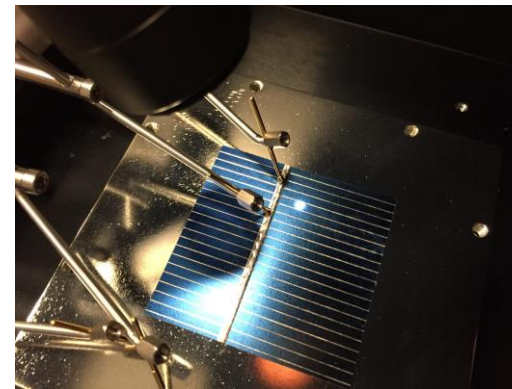
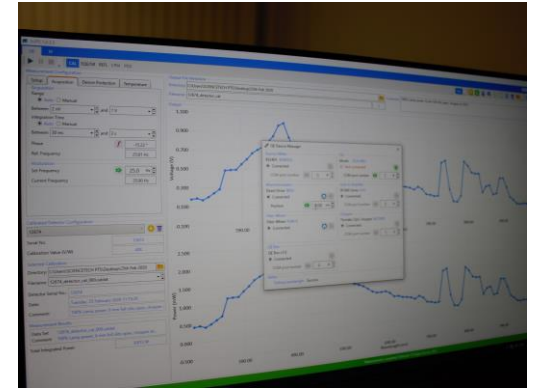
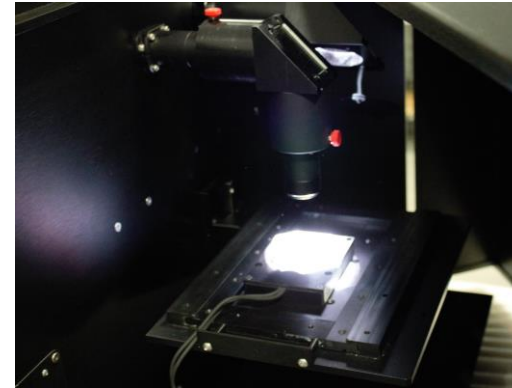
**Compact Model System**

SCIENCETECH has built a reputation on custom solutions. Whether you need a small modification to an existing system or a completely novel design built from the ground up to meet your technical specifications

## Cost-effective Complete Turn Key system

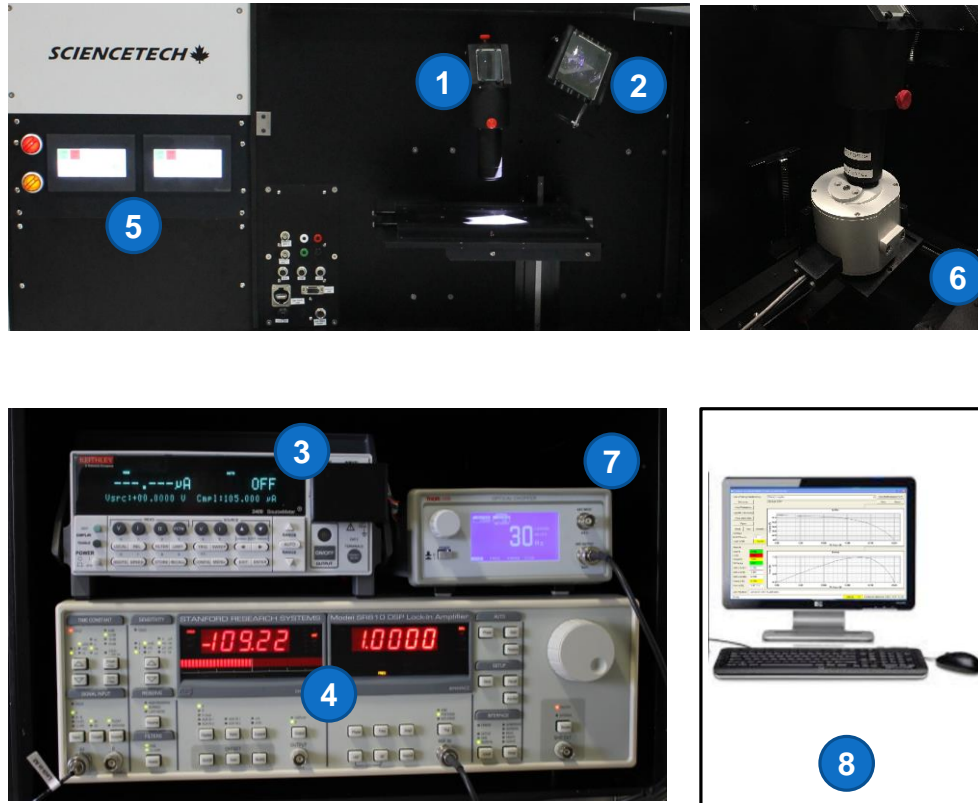
### Measurement Allows

- Spectral Range: 250-2500 nm
- Spectral Response (SR)
- Incident Photon to Current Conversion Efficiency (IPCE)
- External Quantum Efficiency (EQE)
- Internal Quantum Efficiency (IQE)
- IV Measurement
- Reflectance and transmittance measurements
- Photocurrent measurement (upgrade option)
- Temperature Control (upgrade option)
- DC measurement (upgrade option)



## Research Grade Instrumentation

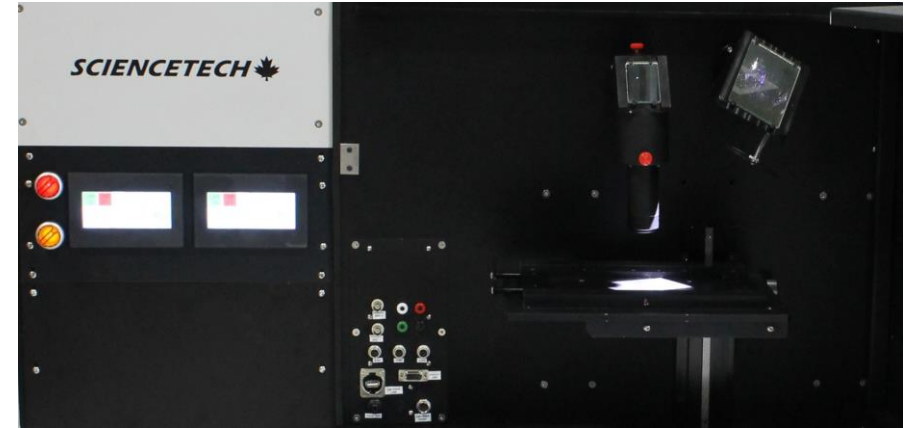
Our models include:



- 1 SCIENCE TECH Tunable Light Source (250-2500nm). Motorized triple grating turret system. Czerny-Turner design with adjustable band pass 0.2 to 24nm.
- 2 Bias Light Source. SCIENCE TECH Solar Simulator AAA (ASTM E927). AM1.5G Filter
- 3 Keithley 2400 source meter.
- 4 Stanford Lock-in amplifier SR800
- 5 Two Power supply controlled by Programmable Logical Control (PLC).
- 6 Integrating sphere for IQE Measurement Model
- 7 Optical chopper controller
- 8 PC computer with modern user friendly Software

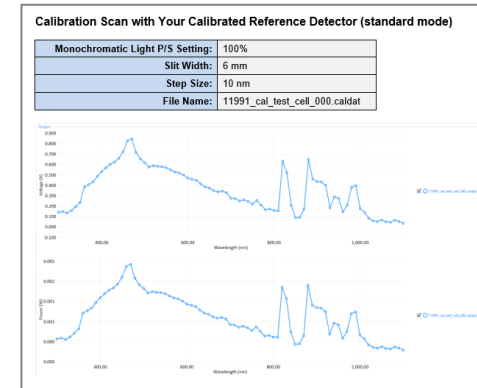
## Standards Compliance

- **ASTM E 1021-15:** Standard Test Method for Spectral Responsivity Measurements of Photovoltaic Devices
- **ASTM E948-09:** Standard Test Method for Electrical Performance of Photovoltaic Cells Using Reference Cells Under Simulated Sunlight
- **IEC 60904-8:** Measurement of spectral responsivity of a photovoltaic (PV) device
- **IEC 60904-1:** Measurement of photovoltaic current-voltage characteristics

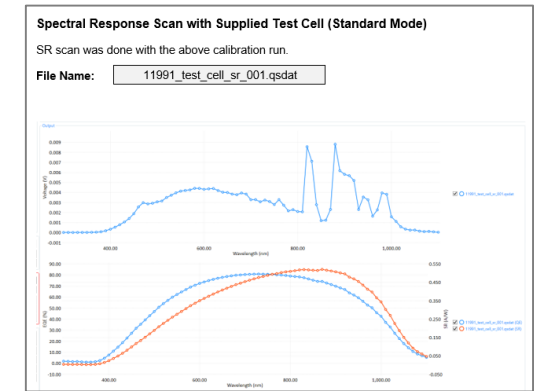


## Performance Report

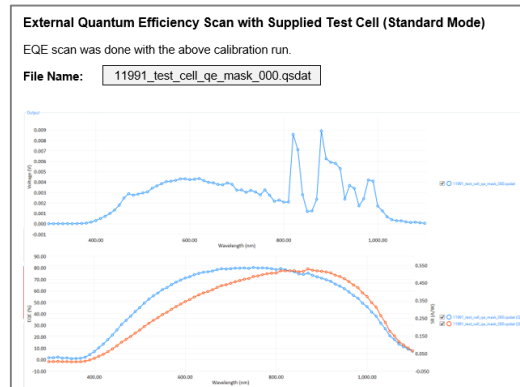
- Test cell included for verification (SCI-REF-NL)
- Quality Control Report including test results (Calibration, Spectral response, quantum efficiency and IV measurements)



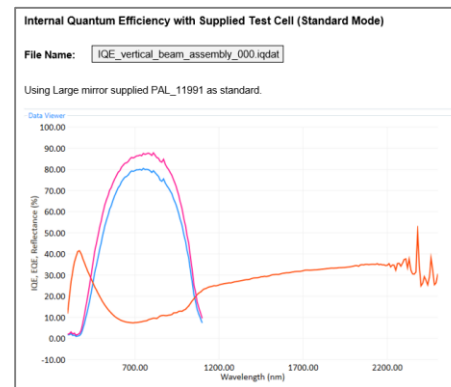
Calibration Scan



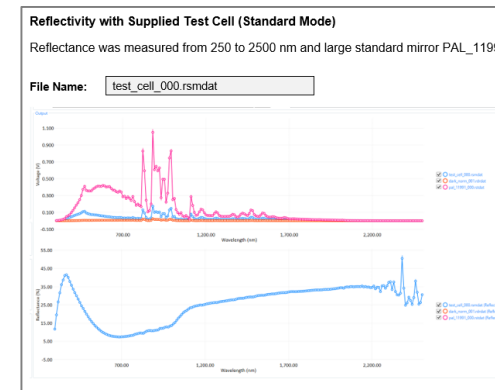
Spectral Response



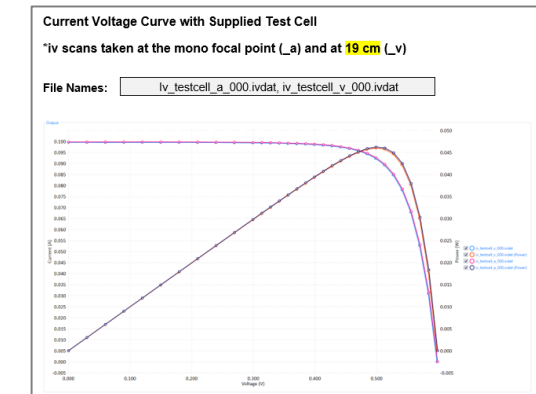
EQE/IPCE



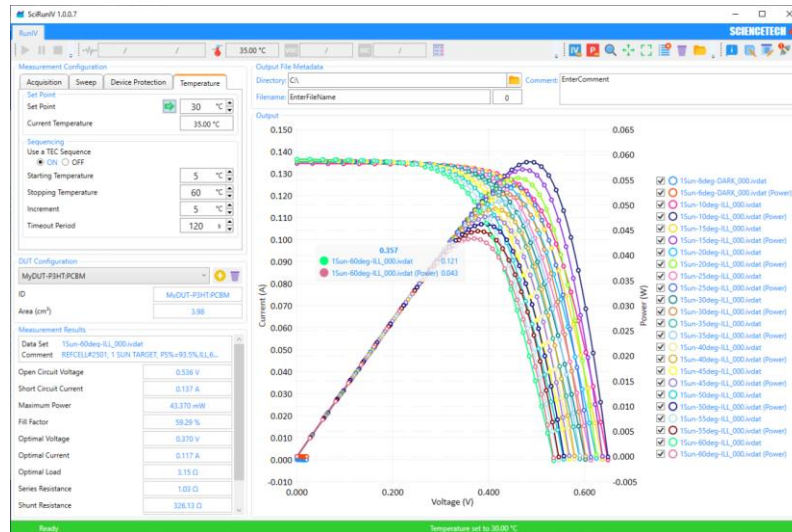
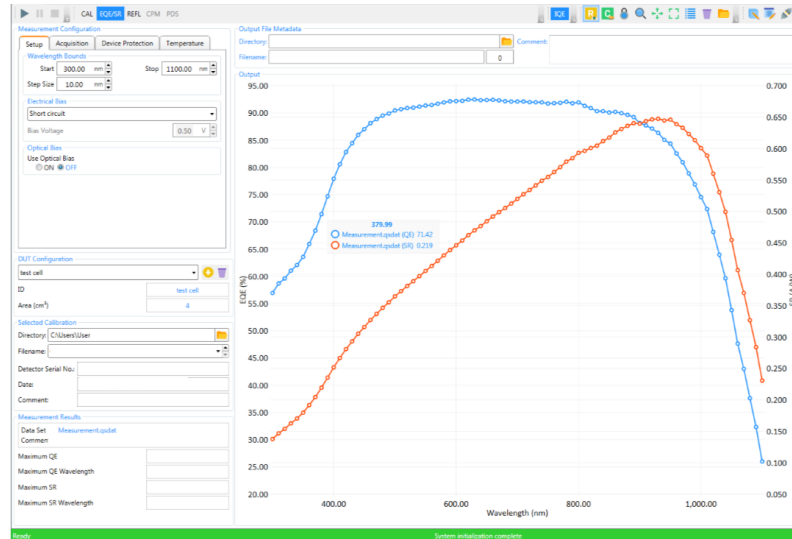
IQE



Reflectivity



Current Voltage



## Modern User Friendly Software

- The new SciPV provides an excellent user experience and advanced functionality.
- Spectral response (SR), external quantum efficiency (QE), internal quantum efficiency (IQE), and spectral reflectance measurements
- **IV module reporting parameters:** Open Circuit Voltage, Short Circuit Current, Maximum Power, Fill Factor, Series Resistance, Shunt Resistance, Average Optical Power, Cell Efficiency, Voltage at Maximum Power, Current at Maximum Power and Resistance at Maximum Power
- **QE module reporting parameters:** Maximum QE, Maximum QE Wavelength, Maximum SR, Maximum SR Wavelength, Total Integrated Power, Maximum Reflectance and Maximum Reflectance Wavelength

## References - Research paper publications

Find some of the research papers that use our Sciencetech PTS Quantum Efficiency System in the last 10 years

- Turshatov, Andrey, et al. "Micellar carrier for triplet–triplet annihilation-assisted photon energy upconversion in a water environment." *New Journal of Physics* 13.8 (2011): 083035. [Read More](#)
- Sengupta, D., et al. "Zinc oxide photo-anode based chlorophyll sensitized solar cell."(2014) [Read More](#)
- Garcia-Angelmo, A. R., et al. "Thin film solar cell of SnS absorber with cubic crystalline structure." *physica status solidi (a)* 212.10 (2015): 2332-2340. [Read More](#)
- Das, P., et al. "Nano-crystalline thin and nano-particulate thick TiO<sub>2</sub> layer: Cost effective sequential deposition and study on dye sensitized solar cell characteristics." *Materials Research Bulletin* 66 (2015): 32-38. [Read More](#)
- Pratiyush, Anamika Singh, et al. "High Responsivity in Molecular Beam Epitaxy (MBE) grown  $\eta$ -Ga<sub>2</sub>O<sub>3</sub> Metal Semiconductor Metal (MSM) Solar Blind Deep-UV Photodetector." arXiv preprint arXiv:1702.04470 (2017). [Read More](#)
- Sengupta, D., B. Mondal, and K. Mukherjee. "Genesis of flake-like morphology and dye-sensitized solar cell performance of Al-doped ZnO particles: a study." *Journal of Nanoparticle Research* 19.3 (2017): 100. [Read More](#)
- Nittala, Pavani Vamsi Krishna, and Prosenjit Sen. "Scaling a fluorescent detection system by polymer-assisted 3-D integration of heterogeneous dies." *Journal of Microelectromechanical Systems* 27.5 (2018): 896-909. [Read More](#)
- Solanke, Swanand, et al. "Multi-layer MoS<sub>2</sub>/GaN UV-Visible photodetector with observation of MoS<sub>2</sub> band edge in spectral responsivity." arXiv preprint arXiv:1803.11012 (2018). [Read More](#)
- Junda, Maxwell M., et al. "A Versatile Optical Model Applied to CdTe and CdSe 1–y Te y Alloys: Sensitivity to Film Composition and Relative Defect Density." 2018 IEEE 7th World Conference on Photovoltaic Energy Conversion (WCPEC)(A Joint Conference of 45th IEEE PVSC, 28th PVSEC & 34th EU PVSEC). IEEE, 2018. [Read More](#)



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