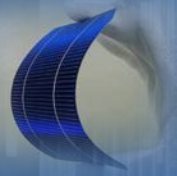
Industry day SUPSI

Interaction of two accredited test labs



SPF INSTITUT FÜR SOLARTECHNIK

Christof Biba, Evelyn Bamberger

Canobbio
6th Oct. 2017

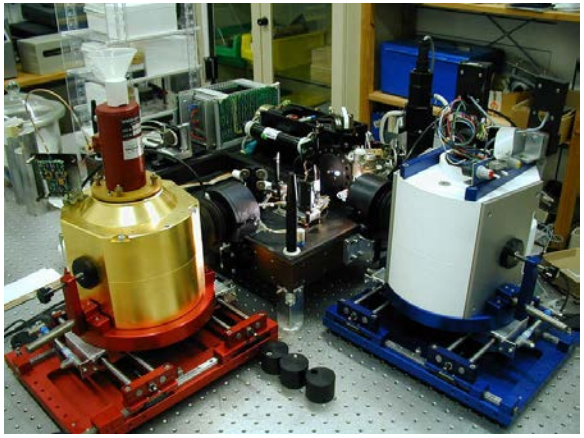
HSR
HOCHSCHULE FÜR TECHNIK
RAPPERSWIL
FHO Fachhochschule Ostschweiz

Portrait SPF

SPF Competence

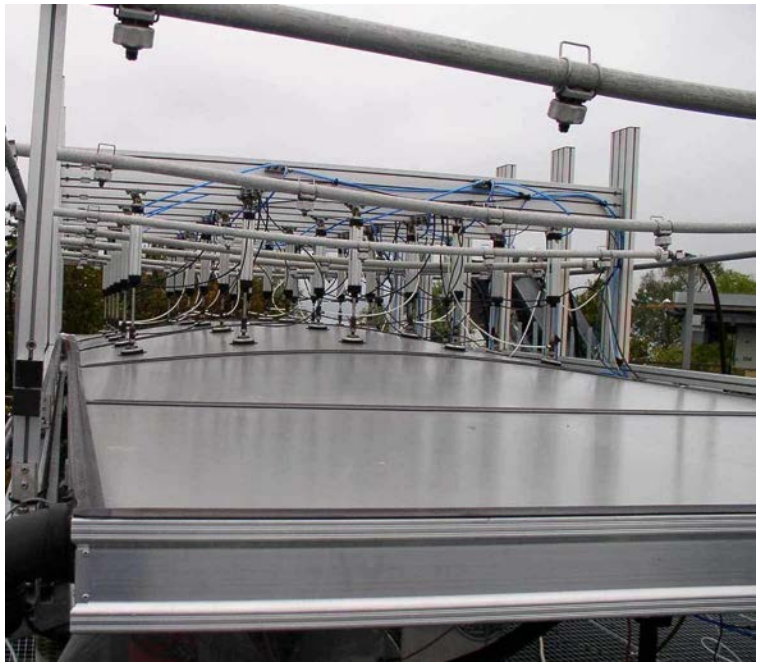
Solar Tracker

Optics laboratory



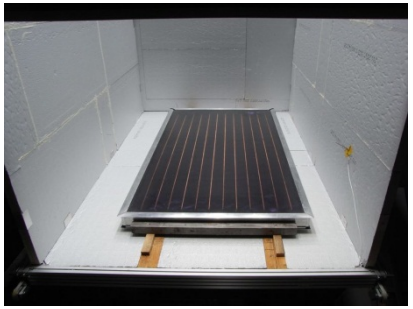
- **Accredited Lab**
  - Solarthermal and heat in buildings
  - Thermal and optical characteristics of the building envelope
  - Competence center for solarthermal (BFE)
- **Energy Systems**
  - Heat, Electricity & Mobility
- **Optical analysis & quality tests**
- **PV in building envelope**
- **Academic studies**

Example: Collector Testing

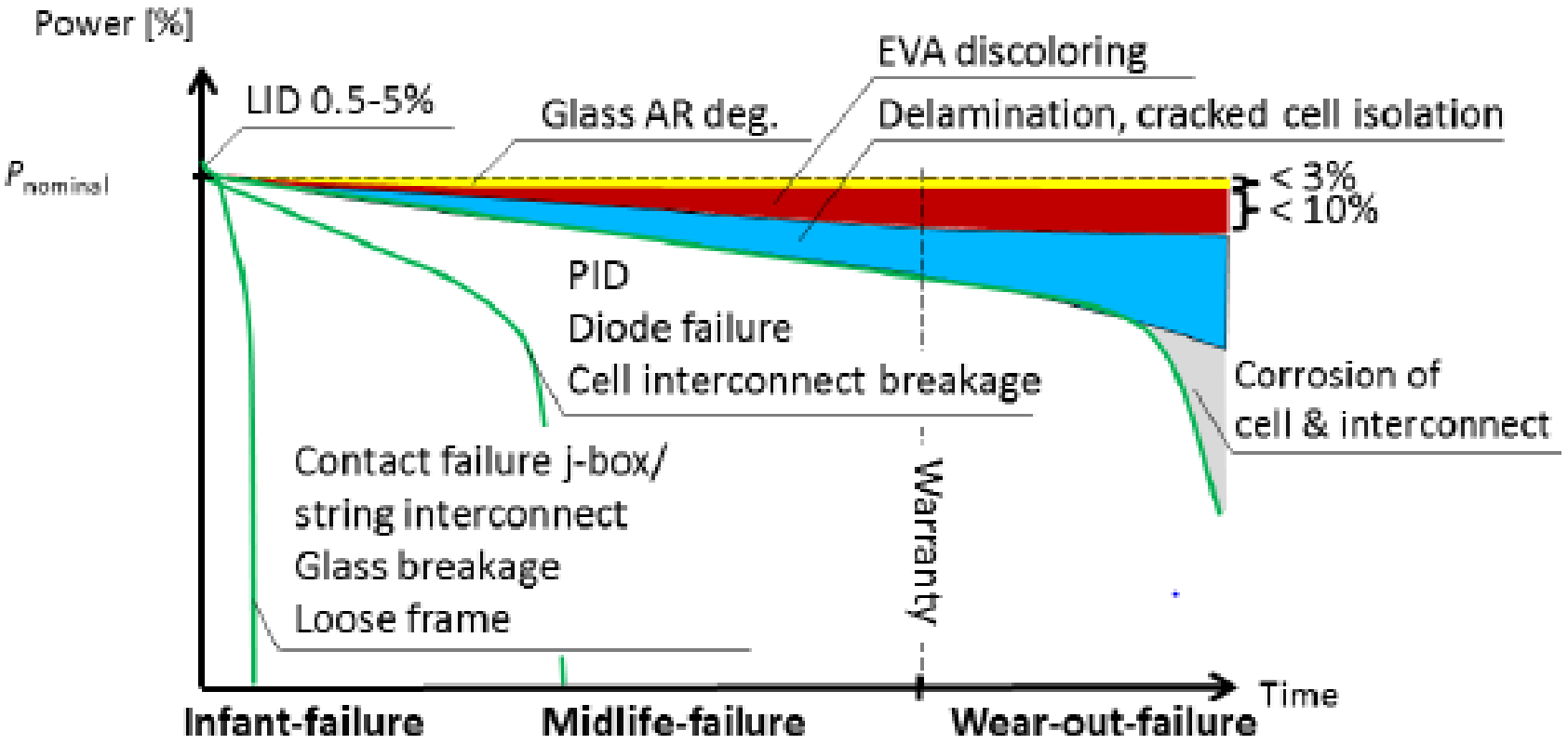


e.g. Solar Thermal / PV Glass

www.spf.ch/Certification.94.0.html



Many reasons to lose power after time …



LID Light induced degradation
PID Potential induced degradation

Cooperation SUPSI & SPF via multiple channels

Snowload Resistance Certificate

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  - Glasses
  - Snow load
  - Thermal insulation
  - Compensators and collector connections
  - Stagnation resistance
  - Domestic hot water modules

Snow load resistance – PV modules

Test date	Manufacturer	Type	Snow load resistance	Certificate
22.06.2015	Eternit (Schweiz) AG	Swisspearl Integral 2 – GG	20 kN/m² (0° – 30°) 17 kN/m² (30° – 60°)	Certificate

21.11

Sno

Test

01.12

28.08

24.08

07.04

Scuola universitaria professionale della Svizzera italiana

SUPSI

SPF Solartechnik Prüfung Forschung

Qualitäts-Zertifikat

Schneelastzertifikat

Handelsname: Swisspearl Integral 2 – GG

Firma: Eternit (Schweiz) AG

Zertifikat Nr.: SPF-SUPSI-15-144-SNOW

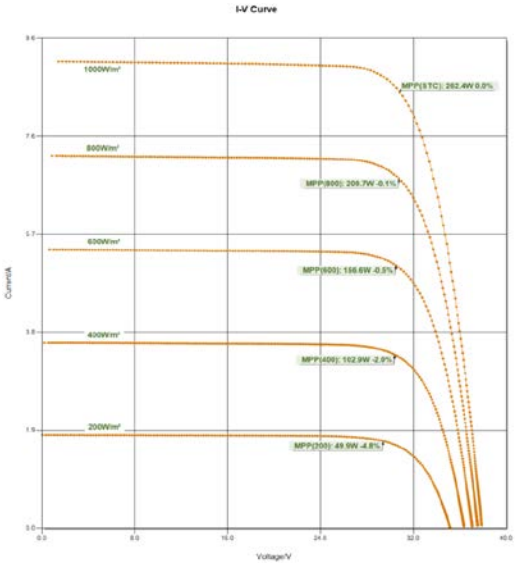
Gültigkeit: 06.2015 – 06.2020

Das PV Modulsystem **Swisspearl Integral 2 – GG** der Firma **Eternit (Schweiz) AG** in **CH-8867 Niederurnen** erfüllt die Anforderungen „SPF-SUPSI Schneelast Zertifizierungsvorschrift und Vertrag Version 1.0“. Als Grundlage gelten die SPF Prüfberichte **L144PV-A, L144PV-B, L144PV-C, L144PV-D** sowie die SUPSI Prüfberichte **14-246-A-REP7-rev1, 14-246-A-REP11-rev1**.

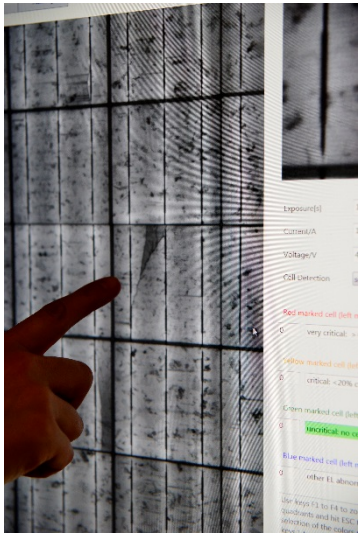
Mobile PV-Lab since 2016

Which measurements could be done?

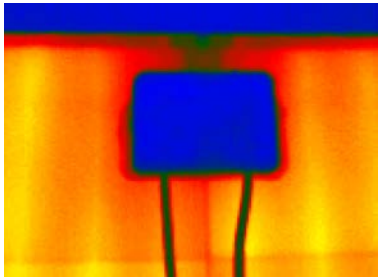
- I-V-Curve



- Electroluminescence

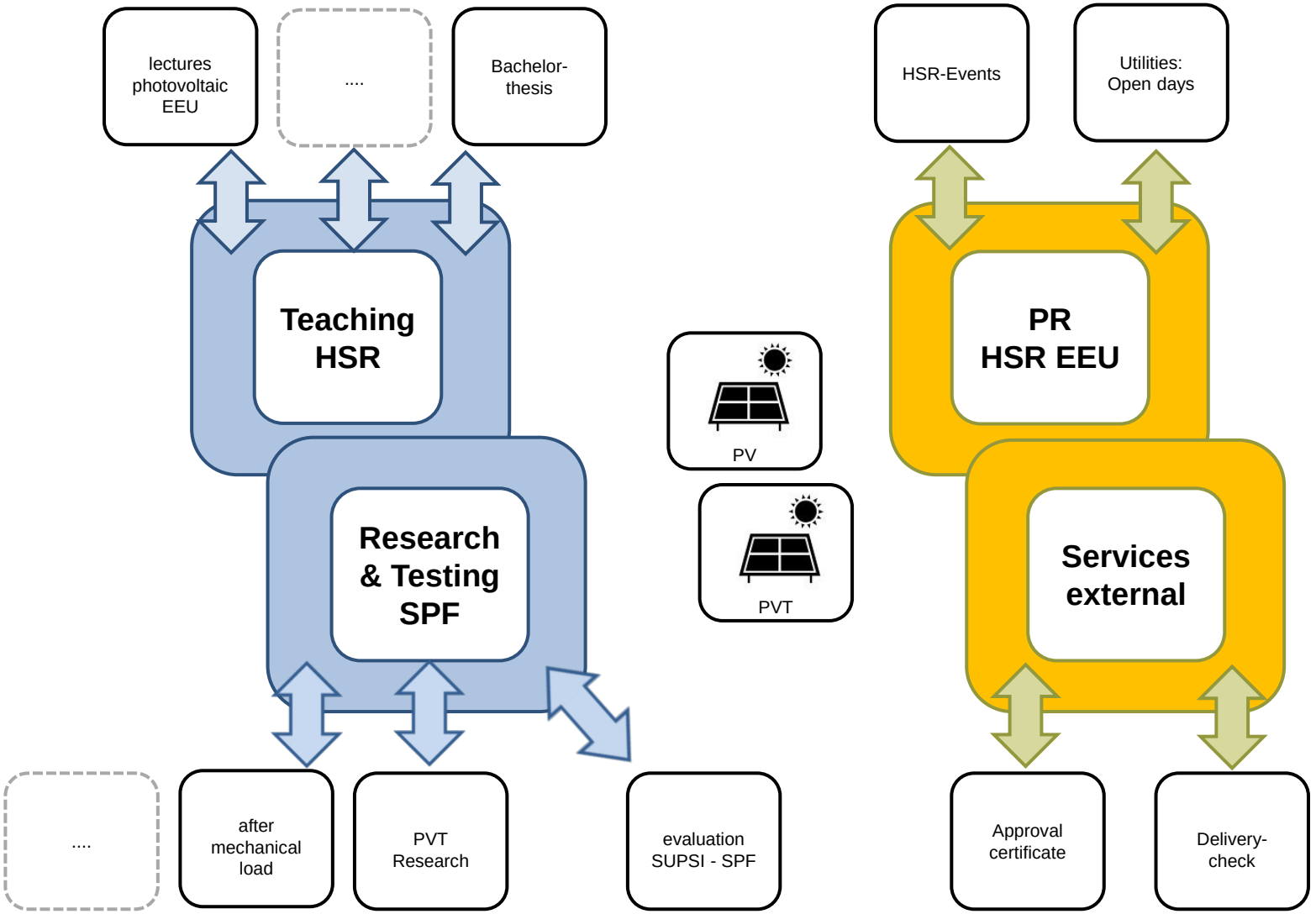


- Infrared

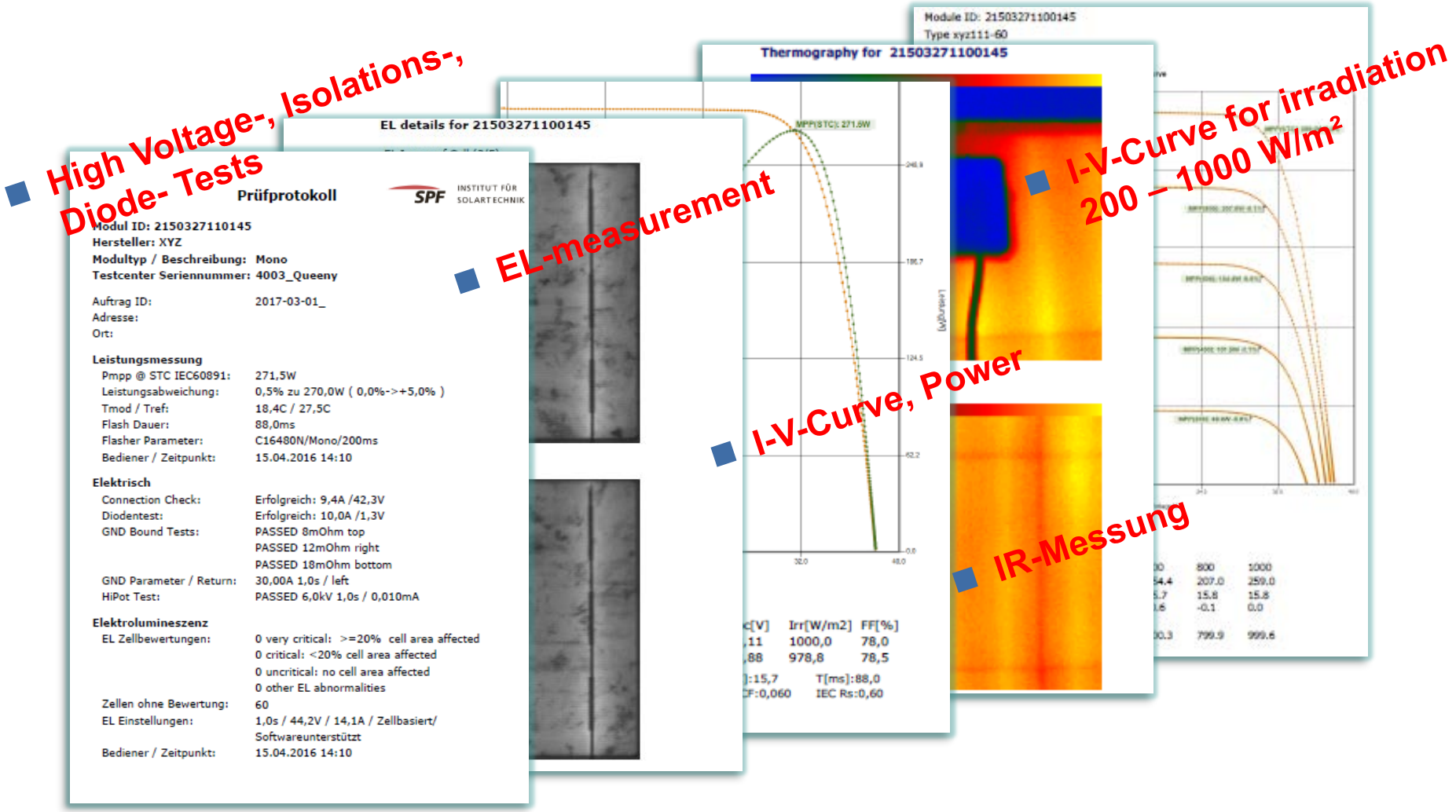


- High voltage / grounding

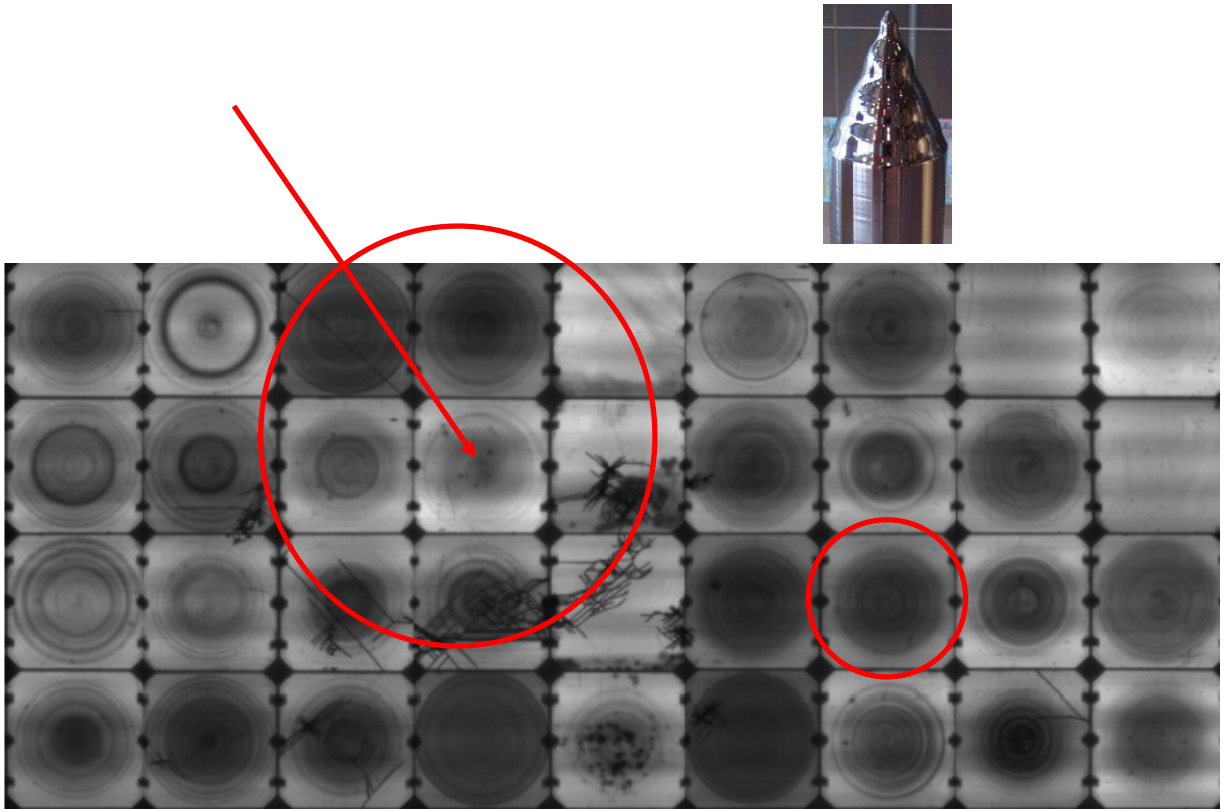
Many options …



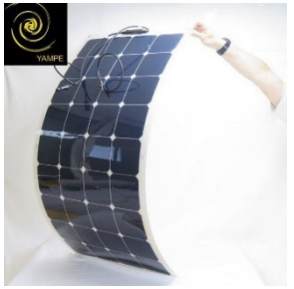
Standardised testing protocol



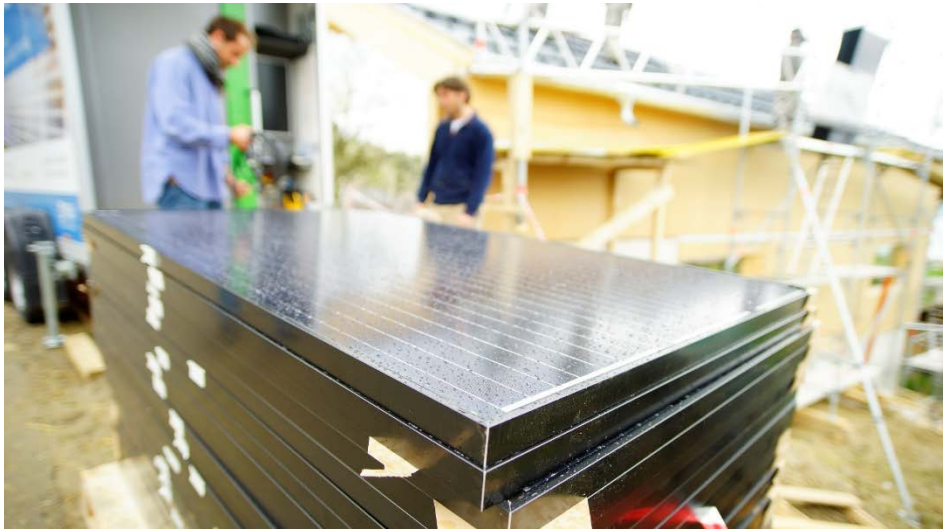
Use of the PV-Lab within lectures



Quelle: Dominik Trütsch



How to use the mobile PV-Lab for service

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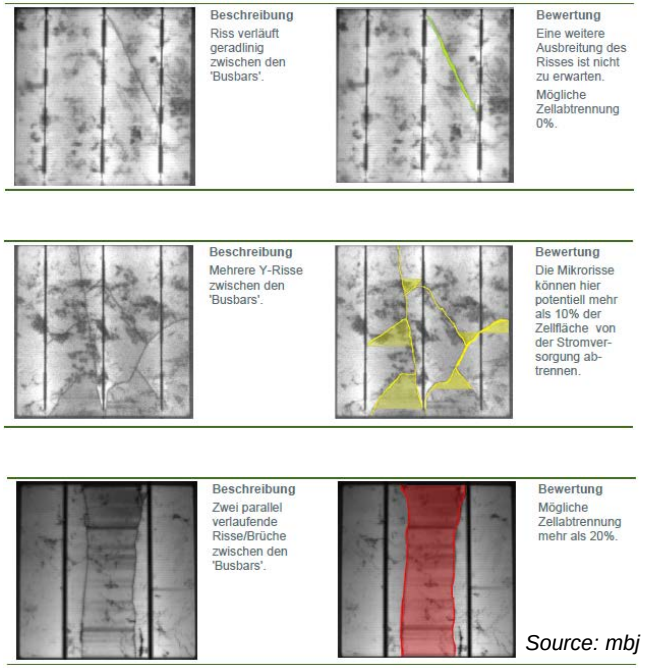
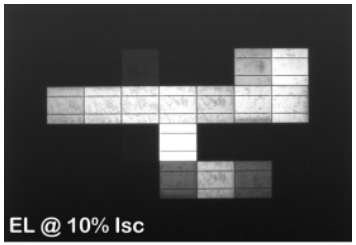
QUALITÄTS-ANALYSEN
VON SOLARMODULEN
MBJ


SOLAR-TESTLABOR

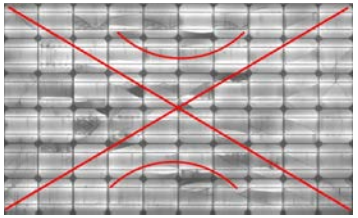
Assessment & interpretation – e.g. EL



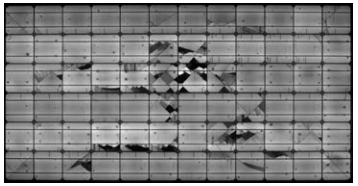
Source: mbj



- → PID



- → uniform load

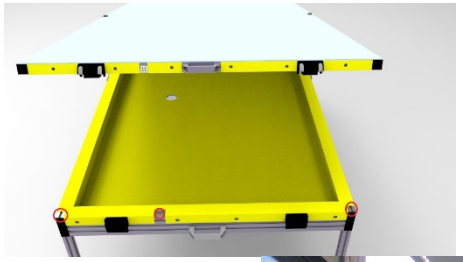


- → fallen module

settings

- **air conditioning STC 25 C°**
- **long-Pulse LED Flasher**
  - polycristalline reference cell
  - class triple A: spectrum (A+), stability (A+++), homogeneity (A), according to IEC 60904-9 Ed.2
  - Irratiation 200 – 1200 W/m^2
- **Power accuracy: +/- 3%, repeatability: < 0.5%**
- **2 MBJ NIR-CCD (cooled) cameras**
  - resolution 300 µm/Pixel (20 MPixel per module)
- **MBJ IR camera 160 x 120 pixel**
- **24´´ monitor**

Extension of options: based on a Bachelor-Thesis

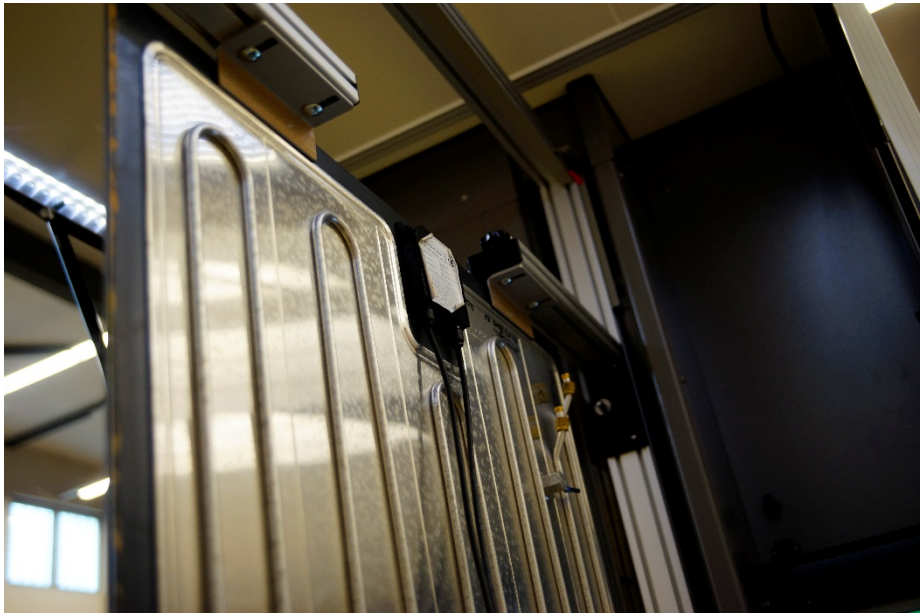


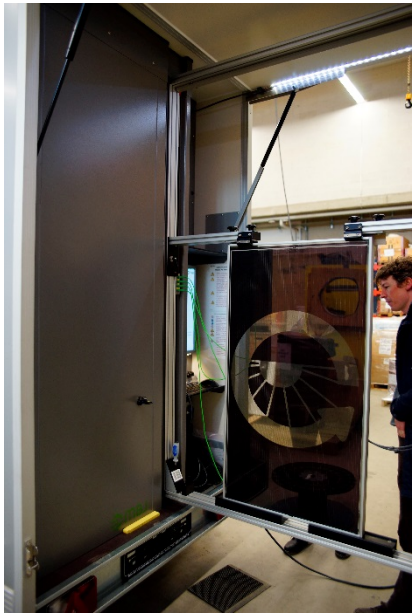
Quelle: Joel Barmettler

- **High-voltage-test**
  - Grounding consistency (MST 13)
  - Leakage resistance (MST 16 based on IEC 61730-2)
  - Wet leakage test: leakage current under wet conditions (MST 17)

Which modules could be measured?

- **Si-standard, PVT, amorphous, CdTe, Bifacial, PERC, small**
- **max. 1 m x 2 m x 0,1 m**



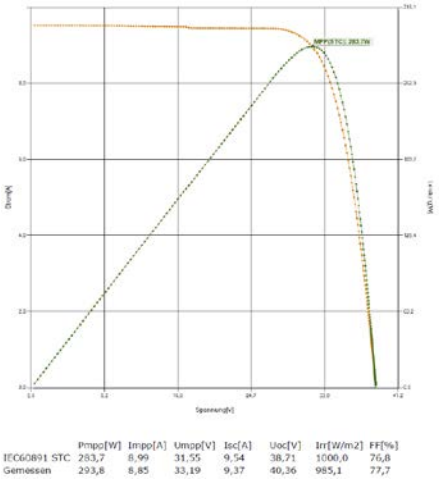


Example: special task

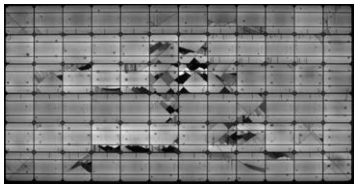
SUPSI & SPF on work

results and future projects SPF & SUPSI

- **customer 1 – choice of product**
  - distributor, comparison of rated to measured power
- **customer 2 – incoming quality check**
  - project manager for systems > 50kWp
- **customer 3 - certification**
  - association, swissolar, manufacturer
- **customer 4 – fault analysis**
  - operator of PV-system
- **customer 5 – evaluation**
  - public institution, research



	Pmpp[W]	Impp[A]	Umpp[V]	Isc[A]	Uoc[V]	Irr[W/m2]	FF[%]
IEC60891 STC	283,7	8,99	31,55	9,54	38,71	1000,0	76,8
Gemessen	293,8	8,85	33,19	9,37	40,36	985,1	77,7



Come together ….

- **contact:**
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  christof.biba@spf.ch