



1500-SiC

Development of a new photovoltaic inverter
with silicon carbide (SiC) technology for full power
operation at 1500V

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Scientific, technical, commercial challenge(s) addressed

- Bias voltage of utility-scale solar plants increased to 1500V
- Consequently, the power electronics solution needs to deliver rated power near 1500V.
- «1500-SiC» delivered a solution incorporating a new 1700V-rated silicon carbide (SiC) diode, tested for operation at full power of a 1500V inverter.
- Special technical challenge: Operation at 3,000 m above sea level – radiation hardness of semiconductor!

Partners

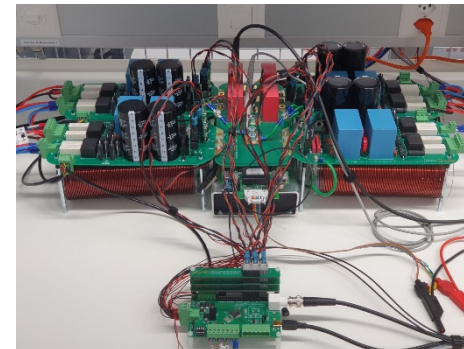
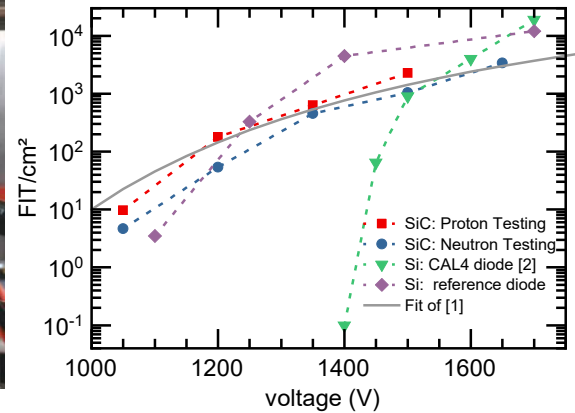
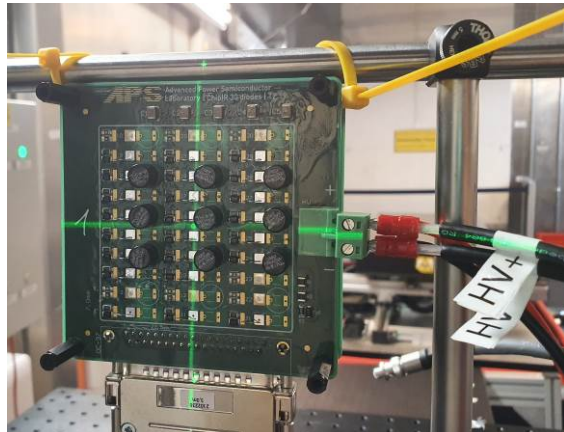
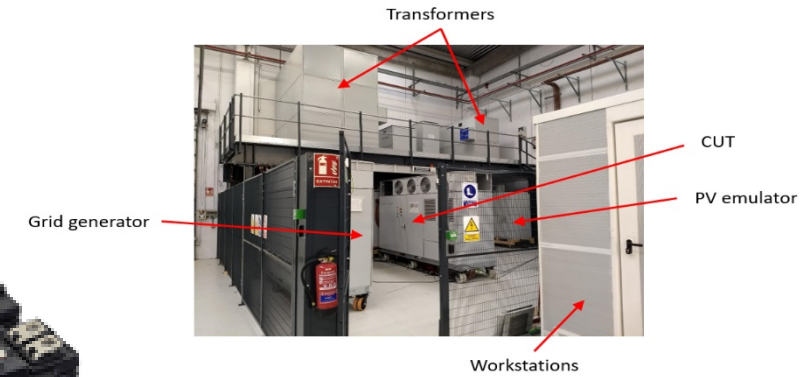
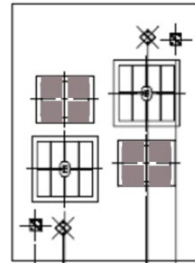
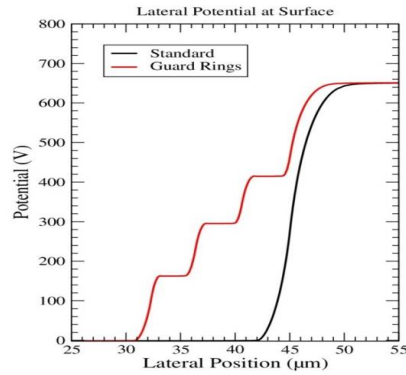
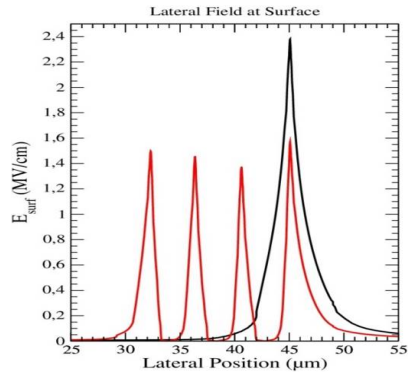
- Gamesa Electric from Spain, a worldwide supplier of PV inverters
- Infineon Technologies Austria, a worldwide supplier of semiconductors for power electronics
- the Advanced Power Semiconductor Laboratory (APS) at ETH Zurich (purely academic)

Key outcomes, results and benefits

	Previous solution	New PV inverter	Improvement
Rated power	2.25 MW	3.75 MW	+67%
Power density	370 kW/m ³	400 kW/m ³	+8%
Specific power	1.05 kW/kg	1.10 kW/kg	+5%
CEC efficiency	98.8%	99.3%	+0.5%

- High-volume production of SiC diodes (Infineon)
- New inverter product (Gamesa)
- Test stands and radiation hardness testing (APS – ETH Zurich)

Devices, Characterization, Manufacturing, Qualification



Noteworthy dissemination and exploitation

- Two new products on different levels (E, A)
- New, strategic testing facility (CH)
- Dissemination limited to pre-pandemic events: Science Brunch (A)

Experiences gained in transnational set-up and critical factors and lessons learned for future successful transnational R&I projects

- Communication
- People
- Synergy – clear and distinct areas of expertise at all levels rather than competitive efforts
- Tangible, clear common goals help
- Timelines need to be agreed upon – excellent collaboration in 1500-SIC!

« Exchange of Experiences » - Webinar

Insights, outcomes and results from transnational projects supported under SOLAR-ERA.NET – 6 October 2021



- Overall, very positive impression – would continue/re-apply in an instant!
- «Freedom to operate» is highly beneficial for both joint and individual success in diverse teams!