Electroluminescence in multiple modules on tracker in the field: massive efficient polarization

L.A. Carpintero-Gómez[1], C. Terrados[2,3], D. González-Francés[2], O. Martínez[2], M.A. Gonzalez-Rebollo[2], V. Alonso-Gómez[2*]

[1] Cobra Instalaciones y Servicios, S.A. C/ Cardenal Marcelo Spínola, 10. 28016. Madrid (Spain)

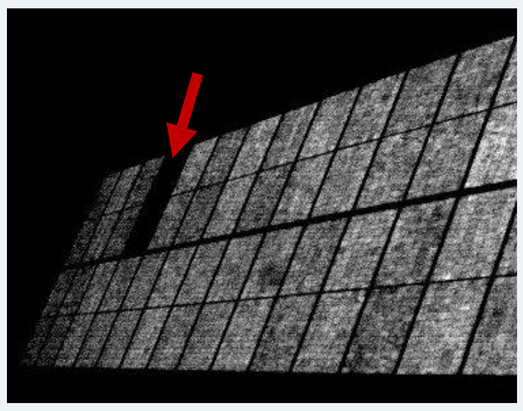
[2] GdS-Optronlab Group, Dpto. Física de la Materia Condensada, Universidad de Valladolid. Edificio LUCIA, Paseo de Belén, 19. 47011 Valladolid (Spain) *victor.alonso.gomez@uva.es

[3] Dpto. Ingeniería Electromecánica, Universidad de Burgos. Av. Cantabria s/n. 09006 Burgos (Spain)

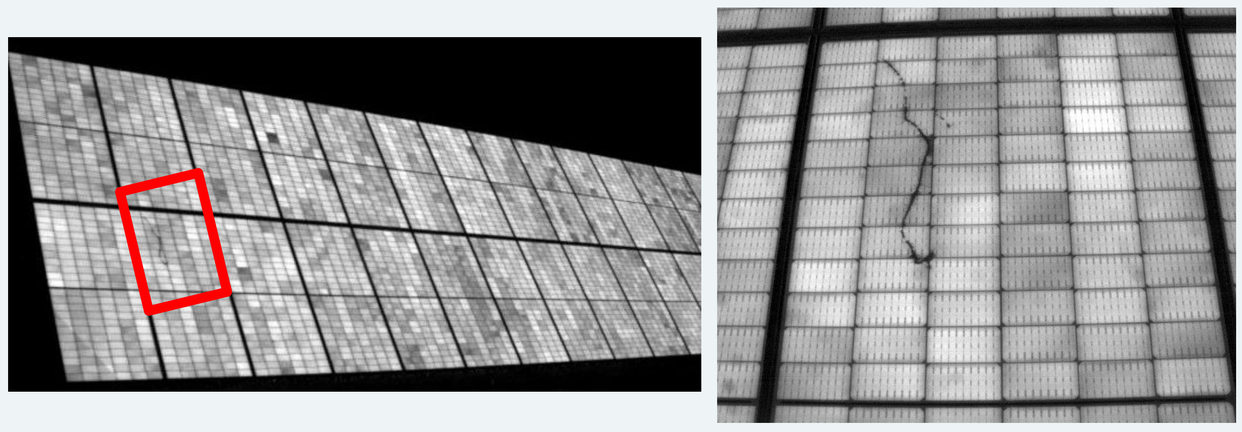
AIM AND APPROACH

- More efficient and cost-effective procedure for large-scale daylight EL (dEL) measurements in PV plants
- Pillars of this strategy: working during the day without disassembling the modules and without the use of power supplies
- An InGaAs camera (model: Hamamatsu C12741-03, 640x512 pixel) has been used to take the dEL images

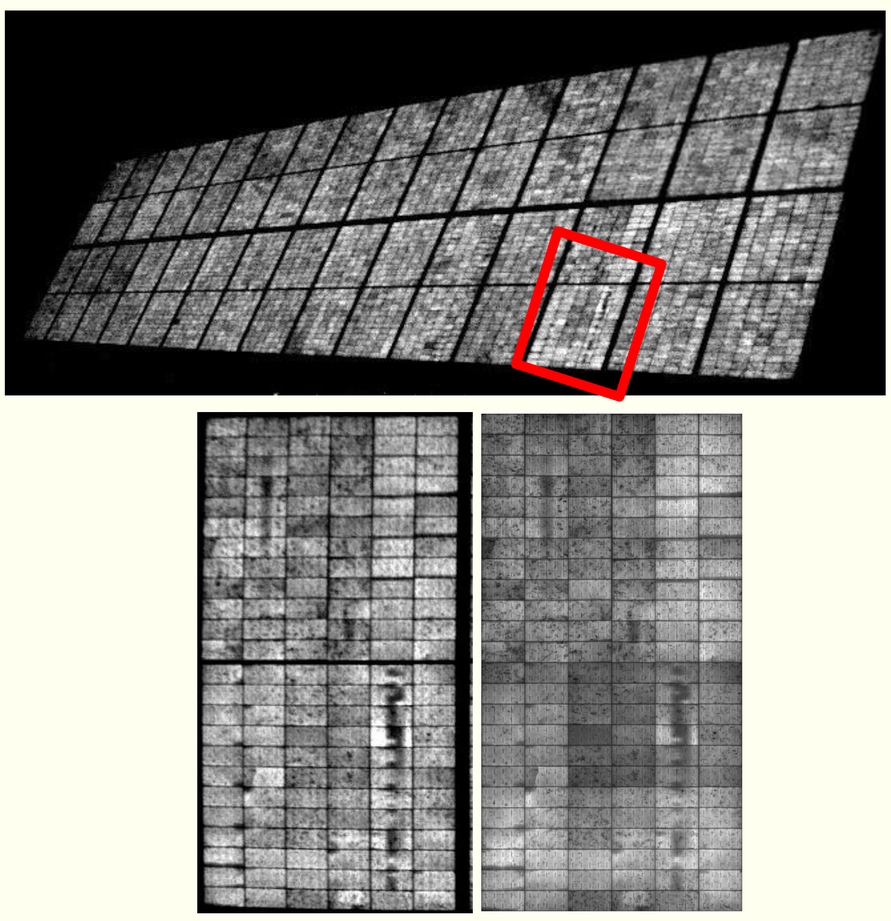
PRELIMINARY RESULTS



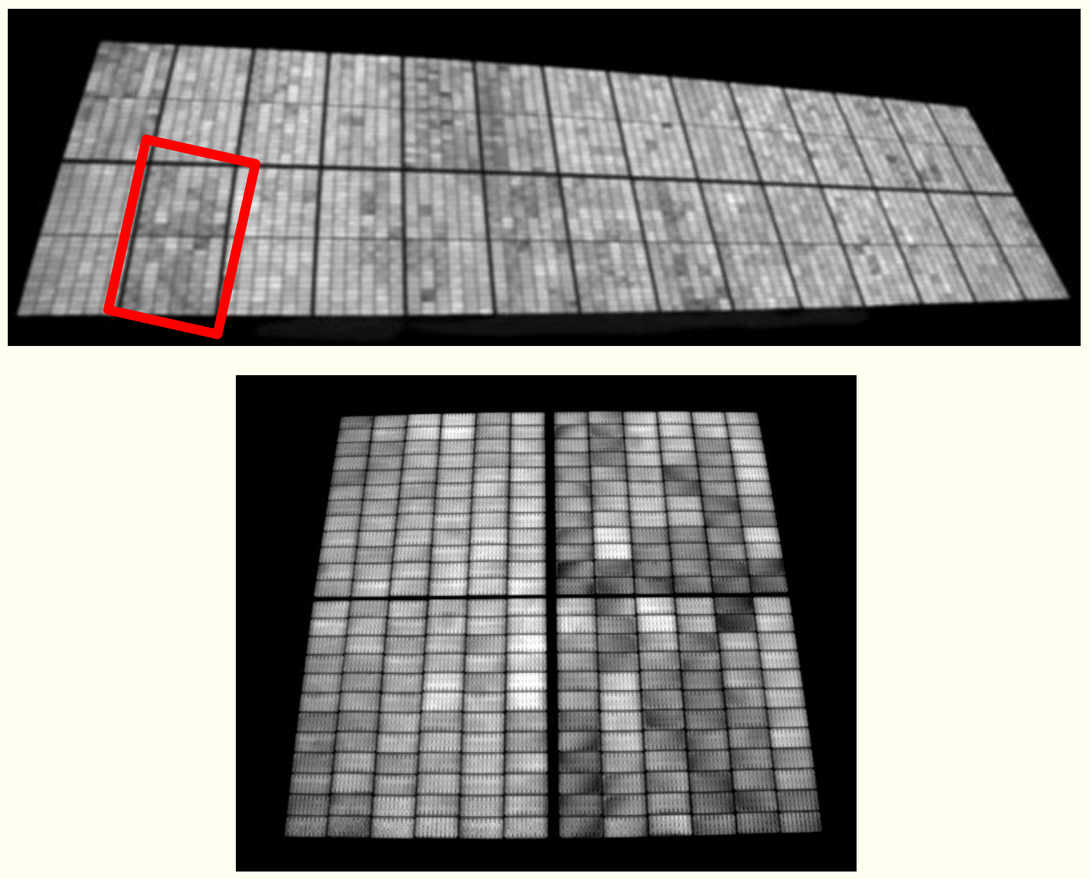
Defective module in a string.



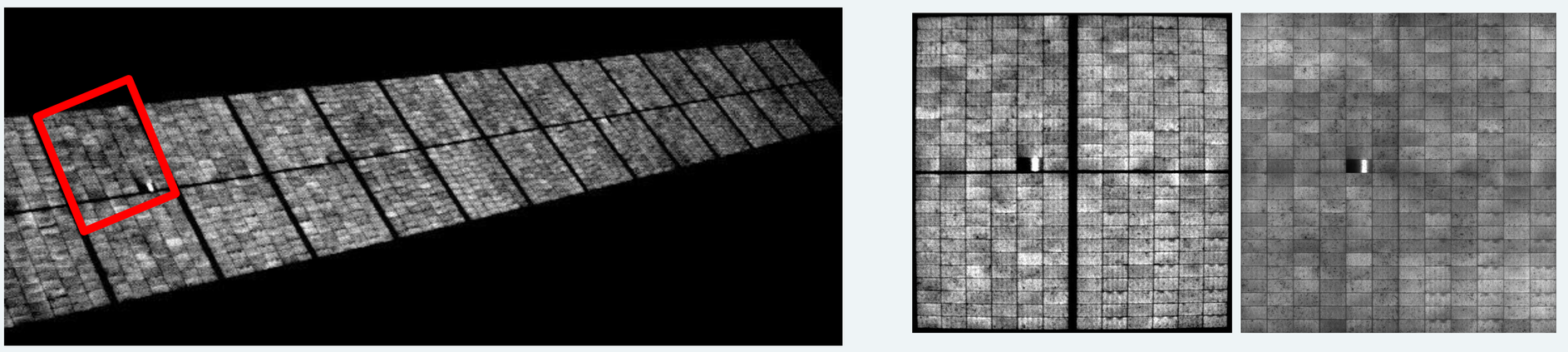
dEL images showing some of the 30 modules of a string (left). More detailed dEL image of a defect (scratch) observed in one of the panels (right).



dEL image of a whole string (up). Detailed dEL image of a panel with some defects (down-left). EL image of the same panel obtained in the dark with a silicon camera (down-right)



dEL image of a whole string (up). Detailed image of dEL obtained by polarizing the module with a power supply (down). The result is similar to the one shown in the image above.



dEL image of a whole string (left). Detailed dEL image of a panel with a defect (center). EL image of the same panel obtained in the dark with a silicon camera (right).

CONCLUSIONS

- New process has been developed to obtain dEL images without the need for a power supply.
- Results achieved are comparable to those obtained by traditional procedures and allows the detection of any defects in the photovoltaic panels.

REFERENCES

Daylight luminescence system for silicon solar panels based on a bias switching method, Miguel Guada, Ángel Moretón, Sofía Rodríguez-Conde, Luis Alberto Sánchez, Mario Martínez, Miguel Ángel González, Juan Jiménez, Leonardo Pérez, Vicente Parra, Oscar Martínez, Energy Science Eng. 2020, https://doi.org/10.1002/ese3.781.

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