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INSTITUTO DE NANOESTRUTURAS, NANOMODELAÇÃO E NANOFABRICAÇÃO

INVITED SPEAKER

PROF. EUGENE A. KATZ

The Jacob Blaustein Institutes for Desert Research,
Ben-Gurion University of the Negev, Sede Boqer Campus, Israel

Eugene A. Katz is professor at the Ben-Gurion University of the Negev. He received his MSc degree (1982) in Semiconductor Materials Science and Ph. D. (1990) in solid state physics from the National University of Science and Technology "MISIS", Moscow. His research interests include studies and development of a wide range of materials and devices for solar energy conversion such as organic and perovskite-based photovoltaics, concentrator solar cells operated at ultra-high solar concentration (up to 10,000 suns), as well as history of science. He has published more than 140 peer-reviewed papers on these topics (including those in Nature Energy, Advanced Materials, Energy & Environmental Science, etc) as well as popular-scientific book and a number of articles on science history and fullerene-like structures in nanomaterials, living organisms and architecture. Based on the latter activity he has developed and is teaching an interdisciplinary course "Bridges between fine art and natural sciences: cases of fullerenes, polyhedra, symmetry". Prof. Katz was awarded the IAAM Medal (by the International Association of Advanced Materials) for the outstanding research in the field of New Energy Materials & Technology.

"ULTRA-EFFICIENT PHOTOVOLTAICS: SOLAR CONCENTRATION VS EXTERNAL PHOTON RECYCLING

20TH
JULY, 2022
11:00 A.M.

AUDITORIUM UNINOVA

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SEMINAR

ULTRA-EFFICIENT PHOTOVOLTAICS: SOLAR CONCENTRATION VS EXTERNAL PHOTON RECYCLING

The maximum efficiency of any solar cell (so-called Shockley-Queisser limit) can be evaluated in terms of its ability to emit light in open circuit (OC) and to quench the luminescence in short circuit (SC) [1-2]. In my lecture I will review the basic principles of ultra-high efficient photovoltaics (PV) as well as their experimental realization using optical concentration of sunlight [3 - 6] and external photon recycling [7].

I will also discuss the results of our theoretical analysis [8-9] and the experimental evidence [10-11] that solar cells operated at ultra-high solar concentrations can be more tolerant to elevated temperatures. Based on thes results, an approach for a hybrid concentrating PV-thermal absorber operating at high solar concentration and at the high temperatures (673–873 K, suitable to efficient commercial steam turbines) will be suggested [12]. Such hybrid solar electricity generation can combine the high PV efficiency with the dispatchability of solar thermal power plants.

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