

JOINT OSA STUDENT CHAPTER – AMO/QO PIZZA SEMINAR

“A Great Solar Cell Has To Be a Great LED”; So What’s Wrong With Subsidized Solar Panels

Prof. Eli Yablonovitch

University of California, Berkeley

Thursday, March 30, 2017

IQSE Seminar Room, 12:00 Noon

(578 MPHY)



ABSTRACT

A new scientific principle has produced record-breaking solar cells. The mantra: “A great solar cell has to be a great LED”, has smashed all efficiency records, and is in commercial production. Nonetheless, the overhang of > 60 GigaWatts/year of subsidized, outdated, Chinese silicon solar panel factories is blocking the scaling of the superior technology. Silicon solar panels are in line to provide about 10% of electricity, but the new super-efficient technology can eventually provide almost all of the world’s electricity and fuel. In the interim, the solar/LED symmetry will revolutionize thermophotovoltaics, the creation of electricity directly from heat; and will enable electroluminescent refrigeration, a refrigerator in which light is the working fluid.

BIOGRAPHY

Eli Yablonovitch is Director of the NSF Center for Energy Efficient Electronics Science (E³S), a multi-University Center based at Berkeley. In his photovoltaic research, Yablonovitch introduced the $4(n^2)$ (“*Yablonovitch Limit*”) light-trapping factor that is in worldwide use, for almost all commercial solar panels. His mantra that “a great solar cell also needs to be a great LED”, is the basis of the world record solar cells: single-junction 28.8% efficiency; dual-junction 31.5%; quadruple-junction 38.8% efficiency; all at 1 sun. He has been elected to the NAE, the NAS, and as Foreign Member, UK Royal Society. Among his honors are the Buckley Prize of the American Physical Society and the Isaac Newton Medal of the UK Institute of Physics.

Prof. Yablonovitch introduced the idea that strained semiconductor lasers could have superior performance due to reduced valence band (hole) effective mass. With almost every human interaction with the internet, optical telecommunication occurs by strained semiconductor lasers. He is regarded as a Father of the Photonic BandGap concept, and he coined the term “Photonic Crystal”. The geometrical structure of the first experimentally realized Photonic bandgap, is sometimes called “*Yablonovite*”. His startup company Ethertronics Inc., has shipped over 1.7 billion cellphone antennas. He also co-Founded Luxtera Inc., the originator and world leader of Silicon Photonics.

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(Pizza, salad, and soda to be served at 11:30 a.m.)