

Ben-Gurion University of the Negev
Blaustein Institutes for Desert Research
The Swiss Institute for Dryland Environmental and Energy Research
Alexandre Yersin Department of Solar Energy and Environmental Physics

Title:

Agrivoltaics with Spectral Splitting

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Abstract:

Installing photovoltaic panels over agricultural land can enable a large land resource for solar power generation and alleviate the shortage of available land in Israel and elsewhere. Some crops benefit from the partial shading and the microclimate created under the PV panels array. But many other crops require full sunlight, and their yield declines when illumination is reduced. The benefit of additional income to the farmer from power generation is then offset by reduced agricultural productivity and income. A proposed solution for this conflict is spectral splitting of sunlight, where Photosynthetically Active Radiation (PAR, 400 – 700 nm) passes through to the plants, while the rest of the solar spectrum is directed to the PV collectors. A spectrum splitting collector is described with a 'hot mirror' aligned at 45° angle to the incident direct sunlight, a PV panel parallel to the direction of incident sunlight, and one-axis tracking. The construction of such collectors should be relatively simple and they are based on commercially available components, except for the hot mirror that is currently lacking a good low-cost solution. Investigation of this concept will be described, including optical and electrical simulation of a collector field, modeling of crop productivity under modified sunlight, and experiments to validate the optical, electrical and agricultural performance.

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Research partners: Volcani Institute, North Carolina State University, Ariel University

Date & Location:

Tuesday, November 23, 2021, 11:00

Lecture Room – Physics building (entrance floor)

