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TOPIC:

Ultimate efficiency for single nanowire solar cells

ABSTRACT:

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III-V semiconductor nanowires, due to their unique dimensions and high refractive indices offer several advantages for solar cells. The advantages of III-V semiconductor nanowire solar cells have been very well documented in the literature. Very recently, InP nanowire array solar cells with 13.8% efficiency and single GaAs nanowire solar cells with 40% 'apparent' efficiency have been demonstrated based on the understanding of optical behaviour of nanowire arrays and single nanowires, respectively.

In my presentation, I will discuss the origin of very large 'apparent' efficiency for single nanowire solar cells. I will present a semi-analytical approach to determine an upper limit for the efficiency achievable using single nanowires as solar cells and discuss the validity of comparing or benchmarking the performance of single nanowire solar cells against the Shockley-Queisser limit for single junction, planar solar cells.

PROFILE:

Dr. S. Mokkaapati received M.Sc. in Physics and M.Tech in Materials Science degrees from the University of Hyderabad, Hyderabad and the Indian Institute of Technology, Kanpur respectively. She received her Ph.D. from the department of Electronic Materials Engineering, Research School of Physics and Engineering at the Australian National University, Canberra, where she is currently employed. Prior to her current employment, she was a post-doctoral Fellow at the Center for Sustainable Energy Systems, Australian National University. Her current research interests include nanowire lasers, nanowire solar cells and plasmonics.