School of Nano Science

School of PHYSICS

IPM Condensed Matter & Statistical Physics Group

Weekly Seminar

Silicon Photovoltaics: Present Status and Perspective of Affordable 30%-Efficient Solar Cells

Invited Speaker:

Dr. Ali Dabirian

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Abstract:

In 2015 the global cumulative installed photovoltaics (PV) capacity passed 180 GW (2.5 times of total electricity produced in Iran). Nearly 90% of this 180 GW is crystalline silicon PV with cell world-record efficiency set at 25.6% in 2014. This efficiency is very close to the fundamental limit of device efficiency in a single-junction Si solar cell, set by Auger recombination limit. To achieve higher efficiencies, multi-junction PV devices using a Si bottom-cell have been studied in the past few years. The amazing success of organometallic halide perovskite solar cells has brought along tremendous hope for developing double-junction perovskite/Si PV devices at low-cost with >30% power conversion efficiency.

In this presentation, I briefly review the global status of silicon PV status where I will discuss the latest discoveries in Si PV that led Panasonic to develop its world record 25.6%-efficient Si solar cell. Then I will present the latest developments in multi-junction perovskite/Si solar cells. In this context I will present light trapping strategies using plasmonic and photonic nanoparticles to maximize the efficiency of these solar cells.

Wednesday, 5 Khordad 95 (25 May, 2016), 2-3 pm

Farmaniyeh seminar room