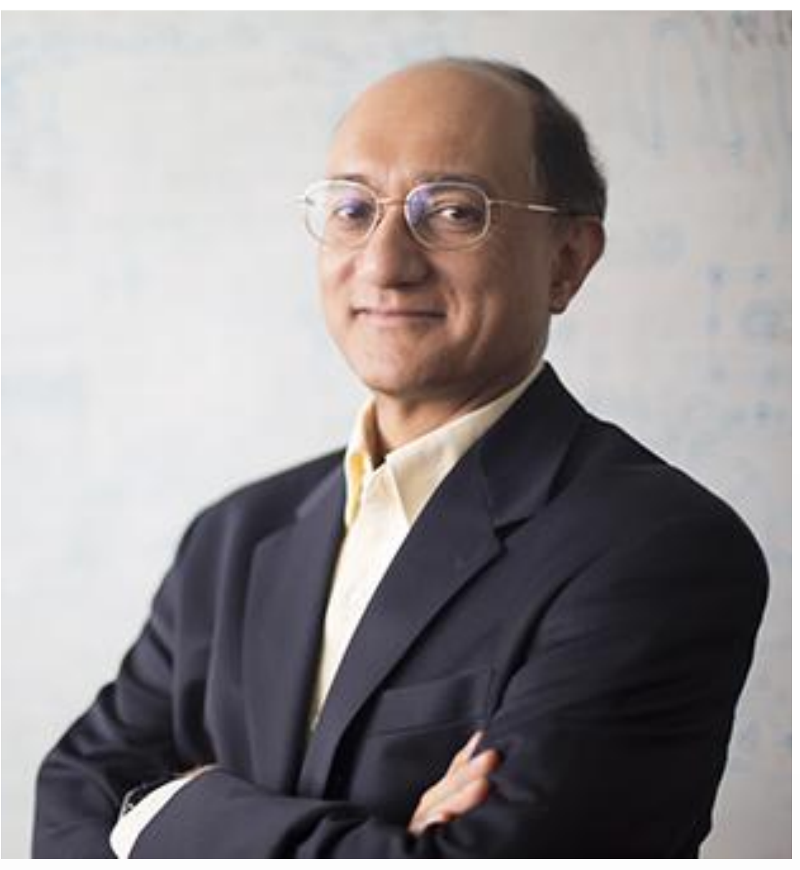
POZVÁNKA

na přednášku

Prof. Sajeev John

Photonic Crystal Light Trapping: The Key to Breaking Photovoltaic Efficiency Barriers



v pondělí, 17. 6. 2019
od 15:00 hod.
místnost T2:C3-135

The thermodynamic power conversion efficiency limit for silicon solar cells is close to 33%, while commercially available cells have efficiencies in the 17-20% range. The world record for silicon solar cells has inched upward from 25% to 26.7%, in the past twenty years, using cell thicknesses ranging from 450 microns to 165 microns. Photonic crystal architectures enable broadband light absorption beyond the longstanding Lambertian limit and allow silicon to absorb sunlight nearly as well as a direct-bandgap semiconductor. When combined with state-of-the-art electronics, a technological paradigm shift appears imminent. In this lecture, I describe how wave-interference-based solar light-trapping in realistic photonic crystals can break longstanding barriers, enabling flexible, thin-film, silicon to achieve an unprecedented, single-junction, power conversion of 31% [1, 2].

1. "Towards 30% Power Conversion Efficiency in Thin-Silicon Photonic-Crystal Solar Cells," S. Bhattacharya, I. Baydoun, Mi Lin and Sajeev John, Physical Review Applied, 11, 014005 (2019)

2. "Beyond 30% conversion efficiency in silicon solar cells" S. Bhattacharya and Sajeev John (to be published)

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