



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:

High intensity microparticle propulsion with light

Speaker:

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Abstract:

The ability to extract forces on micro or nano scaled objects is imperative for mechanics to achieve the scalability and level integration that is common in microelectronics. Light-induced forces play a crucial role in this endeavor due to their inherent ability to peer into the micro, and even sometimes in to the nano scales. Existing approaches in that regard use either radiation pressure or thermophoresis effect to facilitate motion. The problem is that both give forces not exceeding few pico-Newtons – a fact that severely hampers progress in that important direction of research. It is clear, therefore, that if larger forces are needed, a radically different approach should be devised. In the following we discuss a new approach for affecting motion on micron-sized objects that are immersed in water that demonstrate forces up to six orders of magnitude larger than what was observed so far. The success of this new approach come from the efficiency of a phase transition in water in removing heat and transforming it to mechanical form of energy. In the presentation we will show high speed imagery of this rapid event and compare it to known models of bubble dynamics. Finally we will attempt a thermodynamic interpretation of the event based on these observations.

Tuesday, November 8, 2016, 11:00
Lecture room, Physics Building (ground floor)