Grand Technion Energy Program

תוכנית האנרגיה ע"ש גרנד

Technion Israel Institute of Technology

תכנית האנרגיה ע"ש גרנד מתכבדת להזמינך להרצאה סמינריונית שתינתן ע"י:

דפנה גרנות

התכנית הבין-יחידתית לאנרגיה

בנושא:

Efficient tenfold up-conversion through steady-state non-thermal-equilibrium excitation

Frequency up-conversion of a few low-energy photons into a single high-energy photon contributes to imaging, light sources, and detection. However, the up-converting of many photons exhibits negligible efficiency. Up-conversion through laser heating is an efficient means to generate energetic photons, yet the spectrally broad thermal-emission and the challenge of operating at high temperatures limit its practicality. Heating specific modes can potentially generate narrow up-converted emission; however, so far such 'hot-carriers' have been observed only in down-conversion processes and as having negligible lifetime, due to fast thermalization.

In the present study, a novel up-conversion method was implemented, using a 10.6μm laser to generate 1μm narrow emission with 4% total efficiency- orders of magnitude more efficient than prior art. The aim of the study was to investigate the physical nature of this method, and show its difference from simple thermal emission. This goal was fulfilled using two different experimental methods, which indicated that the up-converted radiation far exceeds the device's possible black-body radiation and is hence based on excitation of a steady-state non-thermal-equilibrium population. This new up-conversion process opens the way for the development of new light sources with record efficiencies.

מנחה : פרופ"מ כרמל רוטשילד, הפקולטה להנדסת מכונות

במסגרת עבודת מחקר לתואר מגיסטר

ההרצאה תתקיים ביום ה' 10.9.15 בשעה 11:00, אודיטוריום 1, בניין דן-קאן, הפקולטה להנדסת מכונות.

The Nancy and Stephen Grand Technion Energy Program

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