



第181回GMSI公開セミナー

**Phonon interference in atomic-scale metamirrors,
phonon nanocapacitors and in heat transfer through crystal interfaces**

Professor Yuriy Kosevich

ロシア科学アカデミー

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場所: 東京大学工学部2号館 3F 31B会議室

要旨

In this Seminar, we will discuss the three-dimensional atomic-scale models of metamaterials, in which destructive interference of thermal waves allows one to control the thermal conductance of the nanosystem. We will discuss the possibility of a total resonant reflection or total absorption of a phonon by a two-dimensional lattice defect, the effective thickness of which is much smaller than the phonon wavelength. The unusual effect of reduction of the thermal conductance of the nanosystem by increasing the number of conducting channels for heat waves will be described. On the basis of such metamaterials, highly sensitive atomic-scale metamirrors for heat waves can be created. Highly sensitive hypersonic metamirrors can be used to build phonon nanocapacitors for the storage and emission (lasing) of coherent Terahertz lattice waves. Destructive interference of heat waves will be compared with the two-photon quantum interference in optics. Quasi-one-dimensional lattice models for facilitation of analytical modeling and understanding of the working mechanisms in three-dimensional phononic metamaterials will also be discussed.

主催: 東京大学大学院工学系研究科「機械システム・イノベーション」プログラム (GMSI)
「最先端融合科学イノベーション教育研究コンソーシアム」(CIAiS)
本件連絡先: 東京大学大学院工学系研究科機械工学専攻 准教授 塩見 淳一郎
GMSIプログラム事務局 E-mail: office@gmsi.t.u-tokyo.ac.jp Phone: 03-5841-0696