BPU 12 Congress

Report of Contributions

Contribution ID: **4** Type: **Oral Presentations**

Theoretical Insight into Strongly Suppressed Thermal Conduction in Fully Dense Crystalline Solids

The thermal properties of materials are important for the development of various modern technologies. In particular, thermoelectric energy conversion and thermal barrier require materials with ultra-low thermal conductivity. Lattice vibration dominates heat transport in insulating solids; recent theoretical studies suggested that both propagation and diffuson-like behaviors of phonons can play a critical role when the phonon mean free path is close to the atomic distance. In this presentation, I will discuss abnormal thermal transport behaviors in complex argyrodite compounds and our theoretical insight into the phenomena. Based on the more in-depth understanding, we propose alternative principles to explore fully dense crystalline solids with ultra-low thermal conductivities. We performed our research based on the thermal transport unified theory, first-principles calculations of anharmonic lattice dynamics, and machine-learned interatomic potentials. This presentation will focus on discussing nonconventional phonon transport mechanisms in technologically important solids.

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Contribution ID: **5** Type: **Poster**

The effects of red/infrared light treatment on the total protein concentration in lymphocytes

The effectiveness of red light therapy (RLT) on cellular activity is important in determining if its usage is suitable for the treatment of various health conditions.
In order to better understand the molecular and metabolic mechanisms related to RLT, our preliminary study of the effect of LED light sources 660 nm and 850 nm on the proliferation of human lymphocyte cells was further extended to analyze its effect on the synthesis of cellular enzymes.
Using the Bradford method, the total concentration of proteins in lymphocytes was monitored for different time parameters and conditions of exposure and in relation to the untreated (non-irradiated) control cells.
Our results show a higher protein concentration for all irradiated samples when compared to the unirradiated samples and it was especially increased for multiple exposures to red/infrared light.
Since the used method cannot answer whether the increased protein concentration has positive or negative connotations, it is important to continue the research and include additional methods that test oxidative stress and the structure of chromosomes on a larger number of samples in order to gain additional understanding of the beneficial impact of RLT on lymphocyte cells.

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Contribution ID: **6** Type: **Oral Presentations**

Chaos in physics

We study some mathematical models with chaotic behavior

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