

Non-reciprocal heat conduction/thermal diode and High efficient Solid state cooling

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Venue: Faculty of Engineering Bldg. 2, Room 31A

Abstract:

Since the introduction of thermal diode in 2004 (PRL 93, 184301), many experimental and theoretical studies, both in micro scale and macro scale, have been done to validate its feasibility and to explore its potential applications in thermal management and phononic computing. This concept has inspired researchers in many fields to propose acoustic diode, elastic diode, radiation photon diode, electronic thermal diode etc.

In this talk, I will discuss a new application of thermal diode, namely, application in solid state cooling via an example of elastocaloric cooling. It will be shown that the introduction of thermal diode will not only boost the cooling efficiency but also reduce the device size significantly.

Bio:

Professor Li is currently a chair professor jointly appointed by Department of Physics and Department of Materials Science and Engineering, Southern University of Science and Technology (SUSTech), Shenzhen, China. Prior to SUSTech, he had been endowed Professor in the Department of Mechanical Engineering and Department of Physics at University of Colorado Boulder, USA since 2015-2023, Professor at Department of Physics, National University of Singapore (NUS) (2000-2015).

He has been a pioneer in the research of micro and nano scale heat conduction and the field of Phononics. His group at NUS has invented thermal diode, thermal transistor, thermal logic gates and thermal memory etc. He has published over 400 papers including 3 in Review of Modern Physics, 30 in Phys. Rev. Lett. His works have been cited more than 33,000 and with H-index=97.

He has been an elected member of Academia Europaea, Fellow of American Physical Society, and recipient of numerous awards such as 2005 Singapore National Science Award, 2005 OCPA AAA award, 2014/2015 R S Springer visiting professor at UC Berkeley, 2017 Brillouin Medal from International Phononic Society. He has supervised over 100 Ph.Ds and Postdocs.



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