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Heat and Light at the Nanoscale: Fundamentals and Applications

Guest Editor:

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Message from the Guest Editor

Dear Colleagues,

In recent years, there have been great advances in controlling heat and light using micro- and nanostructures both related to fundamentals and in applications. The strong light–matter interaction at the nanoscale provides versatile ways for tailoring heat and light, with applications ranging from energy conversion, thermal management, communication, and to sensing. Novel control of thermal radiation has been achieved using innovative materials and mechanisms, such as meta-surfaces, 2D materials, quantum materials, epsilon-near-zero (ENZ) materials, phase-change materials, and topological effects as well as machine learning. Numerous breakthroughs have also occurred in the field of near-field radiative heat transfer. There is significant interest in exploring the cold outer space as a thermodynamic resource through radiative cooling. The marriage of optoelectronic devices and nanophotonics points to emerging thermodynamic machines such as thermophotovoltaics and photonic refrigeration. Developing nonreciprocal emitters points to a fundamental pathway for improving energy conversion processes.

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Message from the Editor-in-Chief

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