Editorial

In the past decade, with the rapid developments of high-quality-factor optical and mechanical resonators and nanofabrication techniques, optomechanics has emerged as a novel research field in extremely fast progress, which explores the coupling between the optical field and mechanical resonator. This attributes to the important applications for optomechanics: on the one hand, optomechanics promises to manipulate mechanical motion in the quantum regime and create nonclassical states of light and mechanical motion, on the other hand, there is the highly sensitive optical detection of very small forces, displacements, masses, and so on.

In recent years, many research groups working in China have devoted their efforts to the studies of optomechanics. In view of these facts, *SCIENCE CHINA Physics, Mechanics & Astronomy* editorial board has invited a number of theoretical and experimental physicists in the research field of optomechanics to contribute to this special topic. However, due to the page limitation, this special topic on “optomechanics” presents just a fraction of the domestic progress in this field, and consists of 3 reviews and 6 original papers (3 theoretical papers and 3 experimental works). The 3 review papers review the progresses of the all-optical scheme for detecting the possible Majorana signature based on quantum dot and nanomechanical resonator systems [1], of the nonlinear interaction in optomechanics [2], and of the hybrid optomechanical systems with nitrogen-vacancy centers [3]. In the 3 theoretical papers of this special topic, the studies of the optomechanically-induced-transparency ground-state cooling of mechanical resonator in optomechanical systems [4], the entanglement generation [5], and the entanglement concentration [6] have been presented. The 3 experimental papers report the domestic progresses of switching a mechanical resonator between its optomechanical bistable states [7], the radiation-pressure-driven mechanical oscillations in optomechanical systems [8], and the interconversion of photon-phonon [9].

In summary, optomechanics is a novel, significant and rapidly developing research field. We believe that more important progresses will be made in the near future. This special topic will be a common platform to promote researches in this field in China.

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