

# Nonlinear optical *phononics*: Harnessing stimulated Brillouin scattering in nanoscale circuits

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## Abstract

I will review our recent progress in developing nanoscale optical–phononic circuits that use nonlinear optical effects to efficiently interact phonons (sound) with photons (light), creating a new paradigm in information processing. The innovation is to exploit stimulated Brillouin scattering, the strongest nonlinearity for parametric coupling of light and sound, in highly nonlinear nanoscale circuits, in which electrostriction efficiently couples photons and phonons. The new level of control over the interaction between light and sound will result in optical–phononic circuits in which light can be spectrally controlled, amplified and processed in ways currently unachievable.

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