Shaping Nanosound: Architectures for Controlling Sound at the Nanoscale

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At nanometer wavelengths, sound becomes a powerful and designable resource. Nanosound in the GHz-THz range can be confined, guided, and manipulated using tailored architectures, opening new opportunities across photonics, electronics, and quantum-inspired technologies.

In this talk, I will present nanophononic semiconductor nanostructures that control sound in both space and time- from optophononic resonators that localize light and vibration, to waveguides that transport acoustic energy over extended regions at room temperature. I will also highlight emerging platforms based on self-assembled nanospheres and mesoporous thin films, pointing to scalable and versatile approaches.

These results position sound as a new functional degree of freedom for nanoscale and hybrid systems.