**Abstract for the general public**

This project focuses on creating and controlling crystal lattice vibrations—called acoustic phonons—within semiconductor nanostructures. Phonons possess extremely high frequencies, comparable to the speeds of modern computers and data transfers, and have the unique ability to interact with electrons and light. By carefully managing these vibrations as they propagate laterally, we aim to develop new methods for transferring and processing information using sound instead of electricity. To achieve this, we plan to use advanced fabrication techniques, such as Electron Beam Lithography, to create nanopatterns on the surface of semiconductor materials. These patterns will influence how light excites the material, enabling the controlled generation of the desired sound waves. Additionally, we will use specialized laser systems to pump the material at precise time intervals, ensuring that the sound waves are finely tuned to a specific frequency. Our approach builds on existing research that has primarily focused on Surface Acoustic Waves (SAW) and Bulk Acoustic Waves (BAW). By shifting the focus to lateral sound wave propagation in nanostructures, our work could lead to novel signal-processing devices with potential applications in telecommunications, high-speed computing, and even quantum technology. Overall, this project aims to develop a reliable platform for generating and managing high-frequency phonons, offering a promising pathway for next-generation signal processing and optoacoustic devices.