

# NOMURA LAB.

## Thermal Conduction Nanoengineering and Thermoelectric Energy Harvesting



Centre for Interdisciplinary Research on Micro-Nano Methods (CIRMM)  
Department of Informatics and Electronics

Department of Electrical Engineering and Information Systems, Graduate School of Engineering

Integrated Quantum Electronics

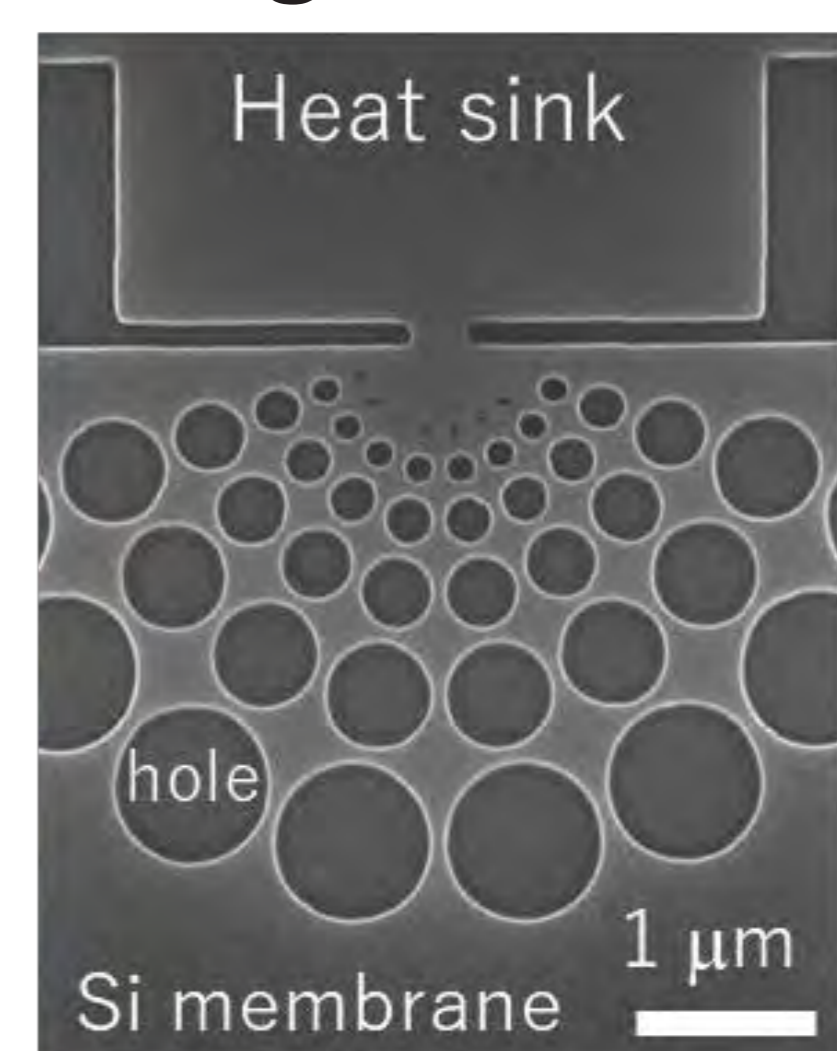
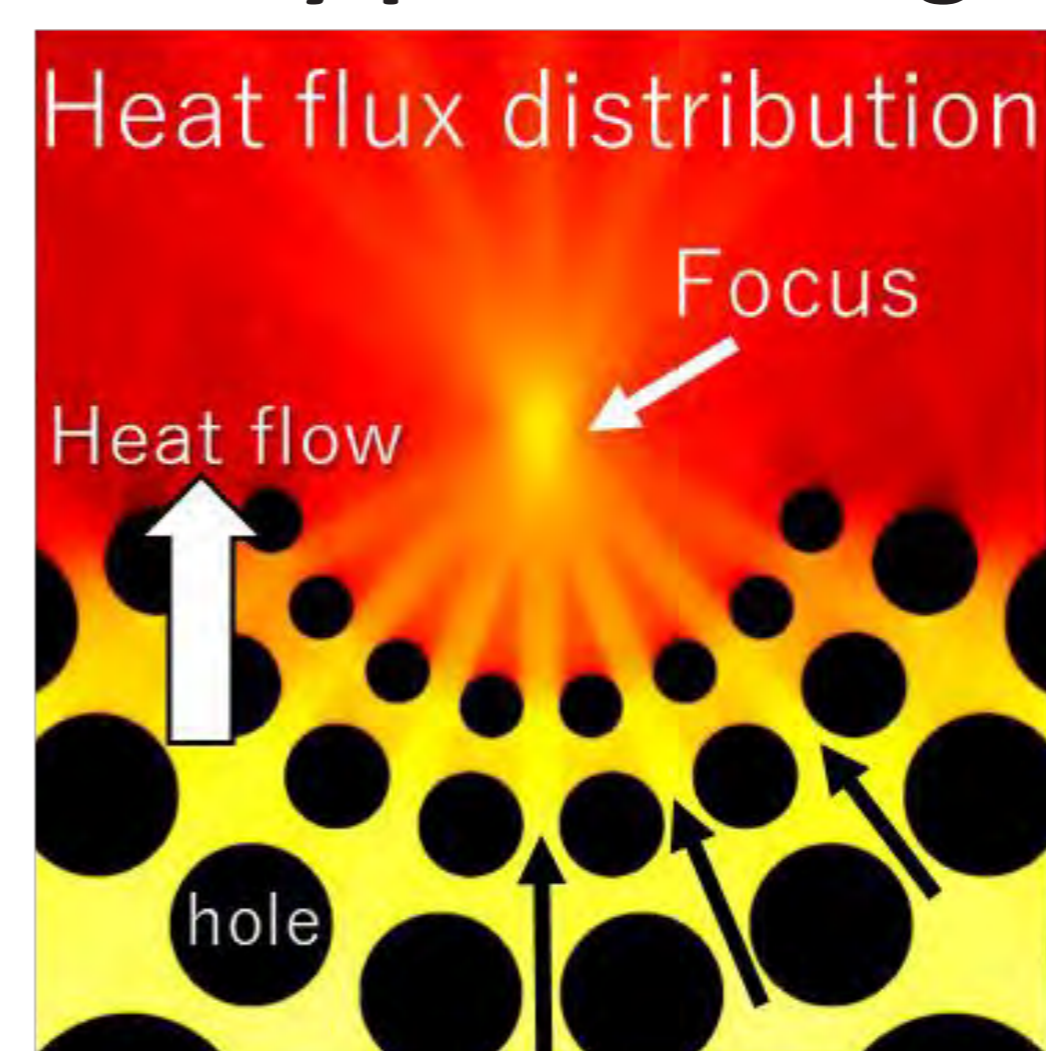
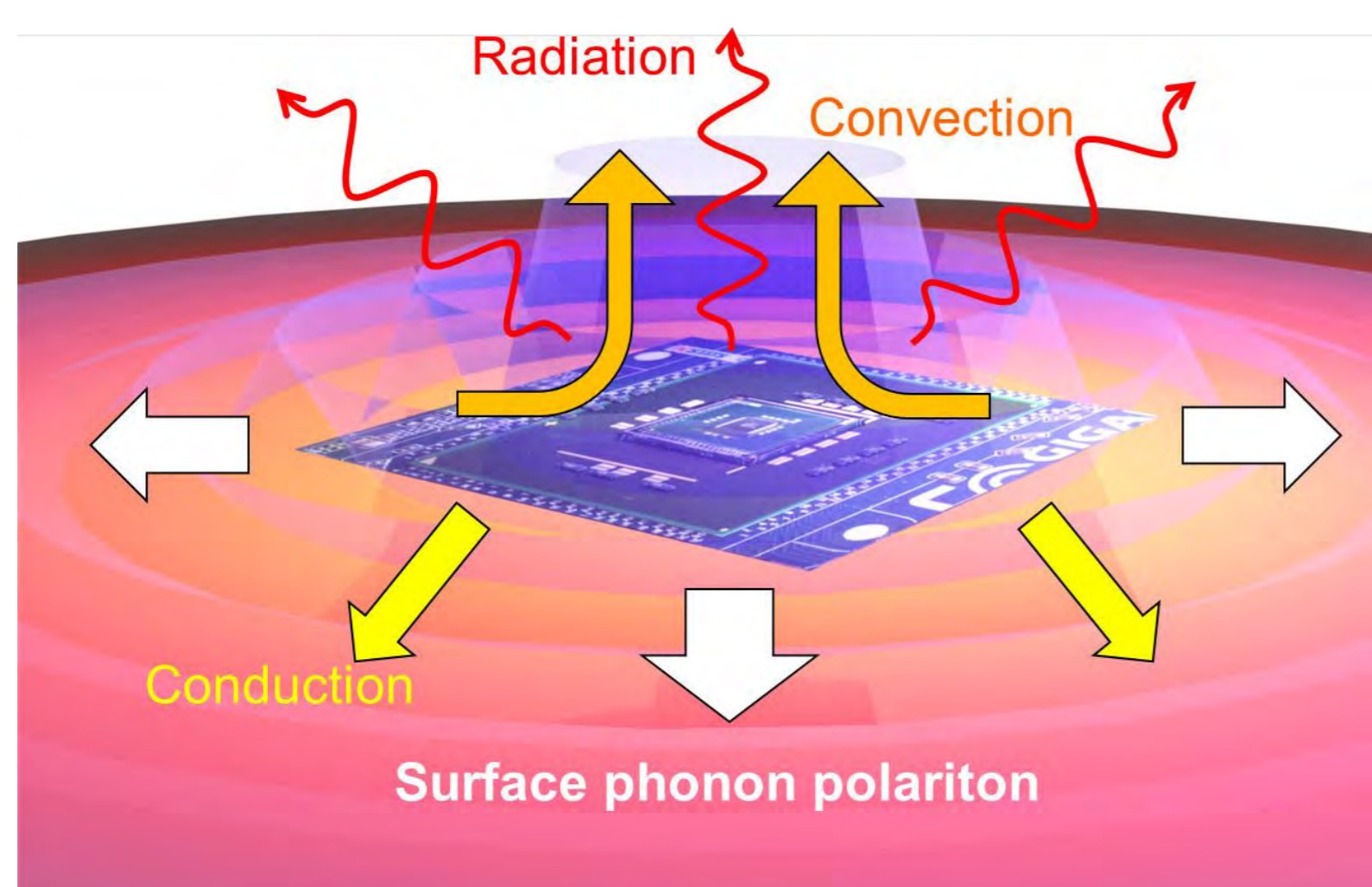
<https://www.nlab.iis.u-tokyo.ac.jp/>

## Thermal Conduction Nanoengineering and Thermoelectric Energy Harvesting

We are pioneering “phonon engineering”—the next-generation semiconductor thermal management technology made possible by semiconductor nanostructures based on deep physical understanding and design. Phonons are heat carriers, and advanced control of their transport will lead to applications such as thermal management in semiconductor devices, quantum communication networks, and thermoelectric energy harvesting. We hope that our physical exploration based on intellectual curiosity and the development of new technologies aimed at solving social problems will contribute to the construction of a knowledge society, green transformation, and carbon neutrality.

- ◆ Energy Harvesting
- ◆ Advanced semiconductor thermal management by phonon engineering
- ◆ Development of Si energy harvester and monitoring systems
- ◆ Physics of nanoscale heat conduction and heat flow control
- ◆ Phonon hybrid quantum science: Quantum network and polaritons

### Advanced thermal conduction control by phonon engineering



### Development of energy harvesters and monitoring system by industry-university cooperation

