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## PhD fellowship on Thermal Circuit Elements with Nanowires

### Topic Area:

Condensed Matter Physics, Nanophysics, Nanophononics, Phonon engineering, Raman scattering, nanowire superlattice.

### Project context:

A fellowship for an experimental PhD thesis work is now available in the Nanophononics group in the Department of Physics of the University of Basel, Switzerland ([nanophononics.physik.unibas.ch](http://nanophononics.physik.unibas.ch)). The Nanophononics group is interested in the investigation of fundamental processes in tailored nanostructures. In particular, we want to investigate and manipulate lattice dynamics and phonon transport at nanoscale level. We aim at exploring new regimes of lattice vibrations for which conventional phonon concepts are rendered invalid. Apart from the fundamental interest, these studies can provide new pathways and systems for thermal management.

### Project description:

In the last decades, the power to control photons and electrons paved the way for extraordinary technological developments in electronic and optoelectronic applications. A similar degree of control is still lacking with quantized lattice vibrations, i.e. phonons, which are responsible for the transmission of sound and heat. The progress in nanofabrication enables the design and fabrication of nanostructures that can control heat transport by means of interference effects, achieving coherent phonon transport, and allowing exciting experiments (see e.g. Nature **503**, 209 (2013)).

Logic operations and circuitry can be realized with the manipulation of phonons both in their coherent and incoherent form in order to switch, amplify, and route signals, and to store information. We aim at realizing a phononic integrated circuit.

We will realize thermal diodes and thermal transistor using nanowires heterostructures as building block elements, engineering and investigating their phononic properties.

### What we are looking for:

We are looking for a highly motivated and skilled student who is eager to work in a multidisciplinary environment and has hands-on experience in experimental physics. You will perform thermal transport experiments of different nanowire based heterostructures. Some of the duties will involve fabrication and testing of thermal devices.

**Start of the project:** now, duration 3-4 years.

### To Apply:

Please email a short curriculum vitae including names and contacts of your referees, scanned copies of grades and a statement explaining why you would like to work on this project. Email directly to: [ilaria.zardo@unibas.ch](mailto:ilaria.zardo@unibas.ch).

This project is funded by the European Research Council (see [erc.europa.eu](http://erc.europa.eu)) under the framework of the ERC Starting Grant.

### Selection procedure:

Review of submitted applications starts immediately.

