

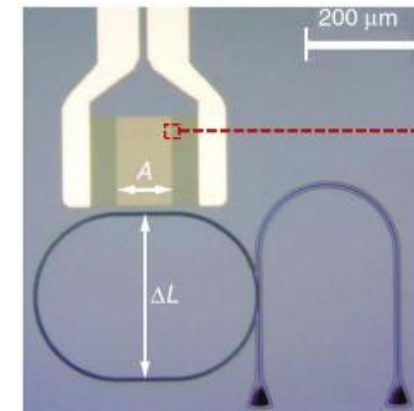
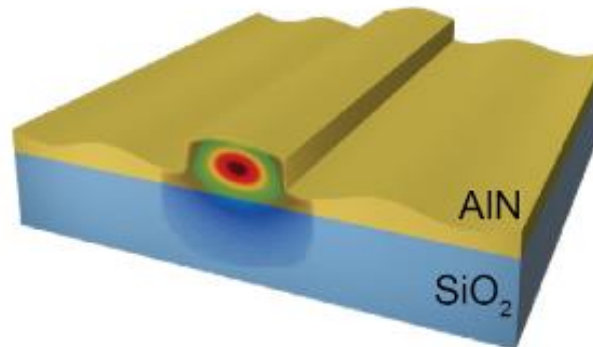
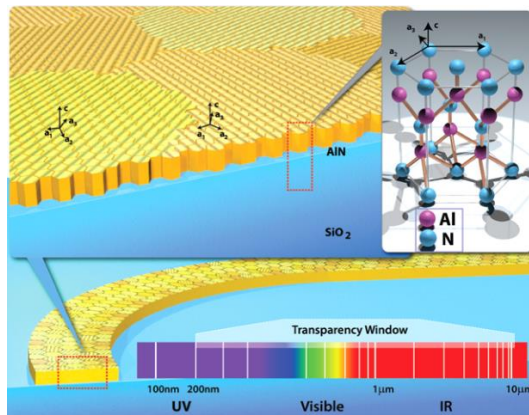
## Master Thesis: Tuning integrated photonic circuitry with surface acoustic wave

Thanks to its high refractive index, non-linear properties and a large electronic bandgap, aluminum nitride is a very interesting material for on-chip photonics. It is known that the mechanical and piezoelectric properties of this material can be exploited to realize devices which functionality is based on light-sound interaction. Surface acoustic waves can be in fact generated on an integrated platform and overlap with on-chip waveguide optical modes, to achieve extremely efficient acousto-optic modulation. Such devices are fundamental building blocks in on chip quantum photonics and sensing systems.

The **project** comprises: simulation, design, material analysis, realization and characterization of acousto-optic modulators and phase shifters.

During **your activity** in our group you will be introduced to the simulation software Comsol Multiphysics, our circuitry design software, our state-of-art optical fibers setup for the characterization of the integrated circuitry, our new cleanroom environment and all the nanofabrication tools you will need for realizing and testing your devices.

English language and basic Python programming skills are desirable, but we mainly ask you to **share with us your curiosity and passion** for an interesting topic.



### References:

Nature Communications 5, 5402 (2014)

<https://conservancy.umn.edu/handle/11299/178975>

For further information, please, contact:

Simone Ferrari [simone.ferrari@uni-muenster.de](mailto:simone.ferrari@uni-muenster.de)

or Prof. Dr. Wolfram Pernice [wolfram.pernice@uni-muenster.de](mailto:wolfram.pernice@uni-muenster.de)

<https://www.uni-muenster.de/Physik.PI/Pernice/>

<https://www.uni-muenster.de/MNF/>