

Bachelor thesis

Image evaluation program for large-area growth studies of SiGe islands

Silicon-germanium (SiGe) islands are highly interesting nanostructures for photonic applications due to their compatibility with the advanced Si technology and their emission wavelength in the telecommunication regime around $1.5 \mu\text{m}$. SiGe islands are grown by molecular beam epitaxy and form due to strain in a self assembling process. Their nucleation site can be pre-defined by etching holes into the growth substrate. We use UV nanoimprint lithography (UV-NIL) for nano-structuring 4 inch Si wafers. By establishing a gradient in the amount of deposited Ge, different evolution stages of the SiGe islands can be observed across the wafer.

In this thesis, you will write a software for automatic parameter extraction from atomic-force microscopy images of the islands taken along the Ge gradient. A typical image is shown below. The number of images to be analyzed is in the range of 40000-60000. The parameters of interest are the islands' base diameter, height and the volume in dependence of the position on the 4 inch wafer.

If you are interested or want to obtain more detailed information, please feel free to contact us or just visit us in the semiconductor building, ground floor, office 017!

Duration: 6 weeks

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Typical image to be evaluated automatically. The parameters of interest are indicated

