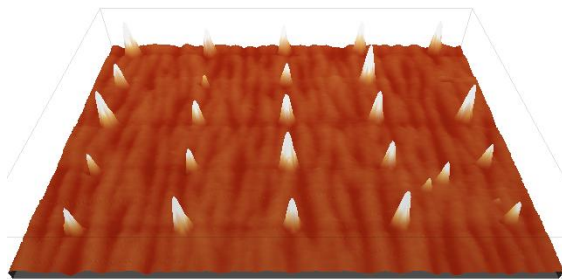


Master thesis

Pre-patterned GaAs templates for site-controlled growth of InAs quantum dots

Semiconductor quantum dots (QDs) are expected to be the building blocks for various applications such as information technology. Self-assembled QDs have excellent properties as single-photon emitters, however, there is no control over their position and they have a broad inhomogeneous wavelength distribution. For practical application, it is essential to control the lateral position of the individual QD by defining the nucleation sites. The site-controlled QDs are produced using a combination of top-down (lithography) and bottom-up approaches (epitaxy).



AFM image of site-controlled QDs grown on electron beam lithography patterned GaAs substrates

Tasks:

- Nano-patterning of GaAs substrates using lithography techniques in our clean room, which will be used as templates in molecular beam epitaxy (MBE) QDs overgrowth.
- Perform important surface cleaning before overgrowth of QDs using MBE system.
- Growth of optically active single InAs QDs by MBE on the processed GaAs surfaces and their optical characterizations.

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