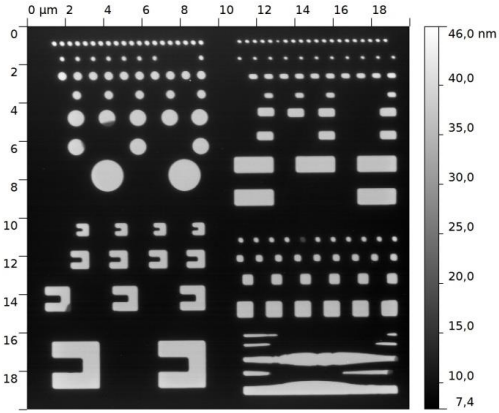
Bachelor Thesis Overview

Field-Coupled Logic: Fabrication of magnetic nanostructures by shadow mask technique

Abstract

Nanomagnetic Logic is promising to complement CMOS-Logic using both logic and memory functions. The magnetic layer is a Cobalt/Platinum multilayer with perpendicular magnetisation. The input structure of the magnetic circuit must produce a strong magnetic field to switch the input-dot into the correct position. A promising effective generation of this field is done by permalloy-structures. This thesis investigates the fabrication of these permalloy structures by evaporating through a nano-shadow-mask.



The substrate for the shadow masks is an 85nm thick, stress-free siliconnitride membrane. 10nm Platinum are sputtered on both sides of the membrane preventing charging in the FIB. Afterwards structured holes are physically etched into the membrane by a FIB-device.

It is possible to fabricate 100x200nm small structures by evaporating through this mask on a substrate. By this fabrication technique, the substrate is not in contact with any other materials, causing remainders.

Number One Result

Producing small structures up to 100x200nm by shadow-mask-lithography. (see SEM-image)

Supervisors:

Dipl.-Ing. Josef Kiermaier

Prof. Dr. rer. nat. Doris Schmitt-Landsiedel