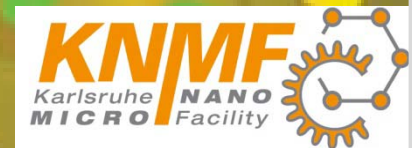
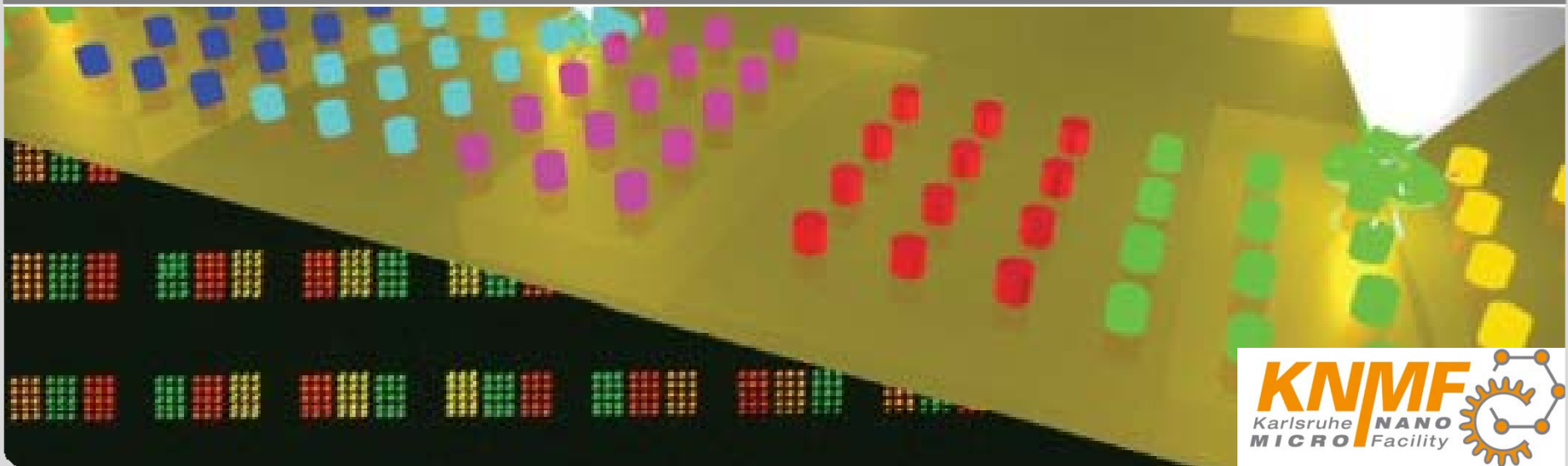


# KNMF – An Open Innovation Facility for Advanced Micro and Nanotechnologies

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# Background and Basics

## Goal

- facilitating innovation in micro and nanotechnologies (MNT)

## Current trends to stimulate novelties in MNT

- the advent of a multitude of novel functional materials
- the use of novel constructive bottom-up and ablative top-down technologies for high precision structuring
- the use of novel technologies for high resolution characterisation

# Background and Basics

## Problems

- limited availability of reliable cutting-edge equipments for structuring and characterising a multitude of functional materials at the micro and nanoscale
- inhibited transfer of scientific developments into economic products and services

## Solution

- ➔ large-scale user facility
- ➔ open access
- ➔ free of cost access
- ➔ state-of-the-art multimaterial MNT

# Karlsruhe Nano Micro Facility (KNMF)

## User facility

- worldwide open and large-scale
- covering the entire value chain of multimaterial MNT

## Open innovation

- open access
- users from industry and academia, either national or international
- free of cost access to its high-tech installations
- via proposal submission

## Technology portfolio

- stimulating the users' needs and expectations for creating new scientific knowledge by offering MNT

# Karlsruhe Nano Micro Facility (KNMF)



## Micro- & Nanostructuring

Electron beam lithography

Deep X-ray lithography

Laser material processing

Injection moulding

Hot embossing

Focussed ion beam

Dip pen nanolithography

Thin film technologies

## Microscopy & Spectroscopy

Scanning electron microscopy

Transmission electron microscopy

X-ray photoelectron spectroscopy

Auger electron spectroscopy

X-ray fluorescence spectroscopy

Electron probe micro analysis

Laser ablation ICPMS

Thin film characterisation

## Synchrotron Characterisation

Photo emission microscopy

In-situ XRD

X-ray microscopy & tomography

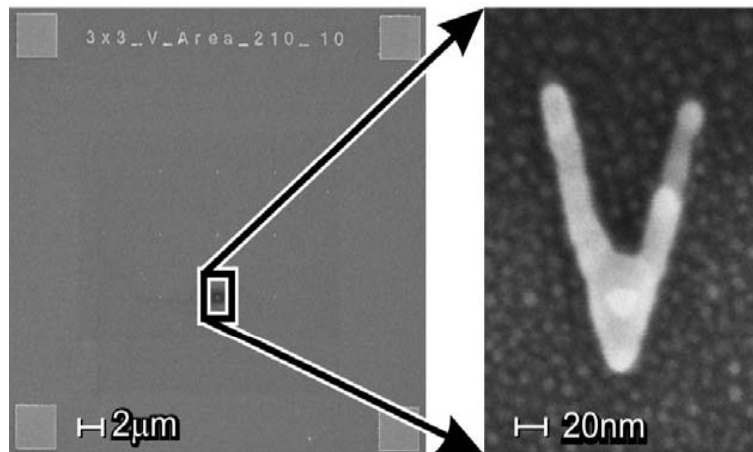
Small Angle Scattering

X-ray diffraction

In-situ powder X-ray

IR Near Field Microscopy

## Project results for E-Beam & SEM



SEM image of a 3 x 3 array of “V”-structures. “V”-structure 106 times magnified. The left and right leg width is 16 and 18 nm

## Technology overview

- **Substrates:** 4” and 6” wafer
- **Resolution:** < 1 nm
- **Aspect ratios:** up to 10 (geometry)
- **Structural details:** down to 20 nm (resist thickness < 100 nm)
- **Resist thickness:** extremely thick PMMA (3200 nm) with structural details in the submicron range (~ 200 nm)
- **Mix & match with other technologies at KNMF** (FIB, DPN, X-ray, ...)

## Status and Outlook

### KNMF

- operates as a large-scale user facility
- offers a unique and dedicated set of state-of-the-art technologies for multimaterial processing in MNT
- has a high relevance for MNT
- enhances the competitiveness of its partners and users

**You are invited to submit your proposals!**

**next deadline: June 30<sup>th</sup>, 2010**

**[www.kit.edu/knmf](http://www.kit.edu/knmf)**