Kavli Nanolab Delft
Enabling nanodevice fabrication

Dear cleanroom user,

This is the 25th edition of **Kavli Nanolab News**. In this issue you can find news on plans, new procedures and investments.

Welcome to Kavli Nanolab – Roald van der Kolk

Hi, I am Roald van der Kolk, I'll be joining the thin film team at the Kavli Nanolab. I am very passioned by nanotechnology and have done two internships in that field, one at the Kavli Nanolab and one at the Gröblacher lab. Some of you might also remember me as a student assistant. After that I worked for 2 years at TNO, working on large complex vacuum systems such as EBL2 and many smaller plasma related machines.

In my spare time I enjoy climbing in any form, such as alpinism and bouldering. I enjoy reading ; Very old classics (Edda, Sun tzu, Papyrus of Ani) and philosophy. Finally Music; I play many instruments and like to sing.

As to which machines I'll be working with; For now the wafer bonder, likely high temperature vacuum machines and probably some more in the future. I have experience with a great deal of the machines here so I hope to be of service to as many people as possible.

I'm honored to have gained this position and look forward to working with you and these wonderful machines.

New Equipment

ICP chlorine etcher

To replace our 30+ year old GIR 300 chlorine etcher, we invested in an advanced Oxford ICP etcher. With this system we will be able to etch Silicon, diamond and III/V materials at elevated temperatures. Together with our other ICP chlorine etcher we will have the option to do high substrate temperature etching on the new system and the standard chlorine etching on our older ICP chlorine etcher.

System specifications: 300W RF generator as substrate Bias, 3KW ICP source, Substrate table heater up to 400C, wafer clamping with adjustable clamping force and helium backside cooling, Adixen ATH 1600MT turbo, loadlock, variable wavelength Verity SD1024GH optical endpoint detection which allow us to stop etching at complex endpoint conditions.

With this system we will have an option to do isotropic diamond under etching and GaAs etching of photonic crystals. The system is expected to arrive June/July this year.

ICP PECVD system

Also in June we will receive our new PlasmaPro 100 ICP PECVD system. With this system we will take away some of the workload of our PECVD system and we will also gain improved process possibilities.

Main advantages of this system:

- SiO2 deposition at 20 degrees Celsius (up to 300 degrees Celsius).
- Higher quality films at lower deposition temperatures. For instance oxide quality (optical properties/BHF etch rate etc.) deposited with ICP PECVD at 70 degrees Celsius is comparable with 300 degrees Celsius deposited PECVD oxide. (data from Oxford instruments).
- Interleave cleaning: right after wafer unload into the load lock the chamber will run a short chamber cleaning process. This will improve deposition rate reproducibility, will cause lower particle generation and reduces the need of less mechanical cleaning of the system.

New reservation software: NanoLab Information System (NLIS)

NLIS is a cleanroom management system for equipment reservation, data logging, equipment training etc. It will replace Phoenix reservation Living Database (LDB) somewhere this year. NLIS will be the new cleanroom management system for all cleanrooms within Nanolab NL.

The database is hosted on Surfnet, login via NetID. The final goal is to share knowledge and training material between the labs, giving users more flexibility to do fabrication in multiple cleanrooms depending on the availability of equipment.

Kavli Nanolab staff is testing the software now, and they supply the development team with comments to implement needed features with the goal to arrange a smooth transistion between LDB and NLIS.

In January already two institutes started using the NLIS: AMOLF (Amsterdam) and RUG (Groningen). They are quite happy with the software at this moment.

Although the software looks a bit different, it is quite intuitive and easy to learn. Coming period we will transfer our LDB database to the new software, which will be quite challenging…To get a smooth transition for you as a user we will do some instruction sessions with the users. More information about these sessions will follow.

Cleanroom suits

As you know, you are not allowed to enter the cleanroom without a suit reservation. Below you find the possible ways to arrange a cleanroom suit.
Please avoid using to many disposables. Gloves, mouth masks and other disposables are difficult to order, have long delivery times and are expensive.
The cleanroom is open at working days from 7:00 till 20:00. (Due to curfew)
8:00-17:00 are the normal working hours, when high risk work is allowed and medium risk work is allowed to be performed without a buddy.

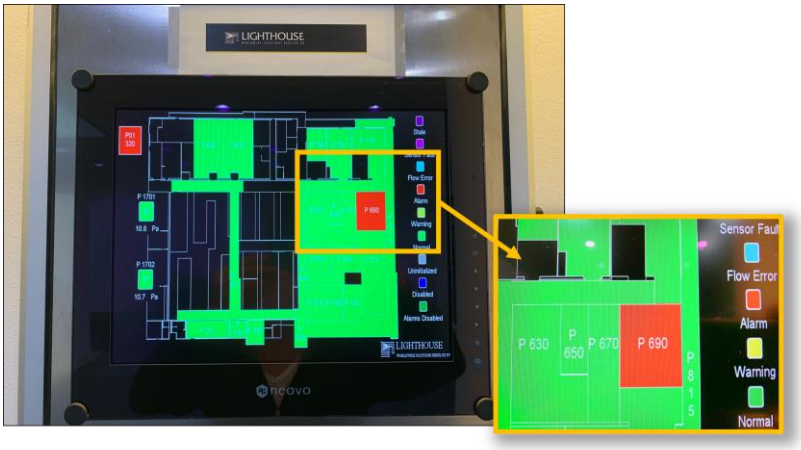
	Reservation	Suit type:	Suit storage location
One day suit	Via LDB *One "One day suit" or "Few day suit" allowed every 7 days!*	Disposable	Entrance, cabinet left and hang it on the reserved hanger
Few days suit	LDB, for 2 days minimum/3 days maximum. *One "One day suit" or "Few day suit" allowed every 7 days!*	Fabric suit	Take an fabric suit and hang it on the reserved hanger
Week suit	Granted via group/faculty Ask your supervisor	Fabric suit	Take an fabric suit and hang it on the reserved hanger

Please:

- Use the suit you claim. When you are not able to use the reserved suit, remove the reservation in the LDB.
- Everybody who has done the safety intro is allowed to make a reservation.
- All reservation are strictly personal.
- You are only allowed to make ONE suit reservation each 7 days. Last day of your reservation is the starting point to count the following 7 days.

New panel at the entrance of the gowning room

You may have noticed the new panel, at the entrance of the gowning room.
The cleanroom conditions are monitored 24/7 for temperature, relative humidity, air pressure differences and particles.
When one of the threshold values is exceeded, the color of the area concerned changes from green to red and a SMS message is sent to the responsible staff member.
This panel is for informative purposes only, it is not a control panel and not connected to the safety management system of the building, it does not generate alarms.



example of conditions that are out-of-spec for room P.00.69

AFM probes in stock (indication)

We have replenished our AFM probe stock. AFM users can order scanning probes by sending an email with their 'project code' to the machine owner.
Below is an indication of probe types, that are usually in stock. One box contains 10 probes. Contact the machine owner for other probes.

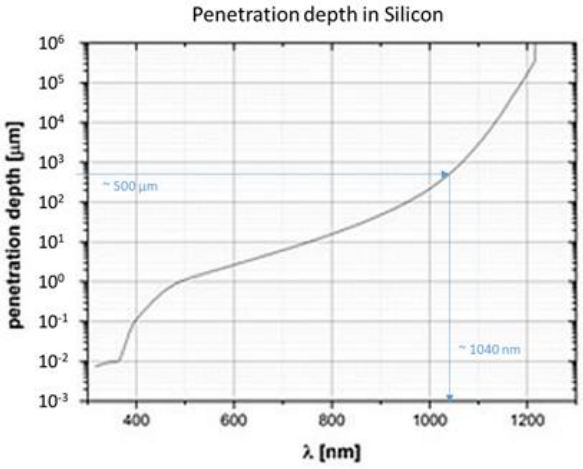
Product	# AVAILABLE	(Non) conductive	k nom [N/m]	f nom [kHz]	Geometry	Medium	tip radius nom [nm]	BS coating	Price [10 probes per box]
FASTSCAN-A	27	non conductive	18	1400	Rotated	Air	12	Al	590
SCANASYST-AIR-HPI	26	non conductive	0,25	55	Rotated	Air	12	Al	310
SCANASYST-AIR	18	non conductive	0,4	70		Air	12	Al	260
VTESPA-300	16	non conductive	42	300	Visible apex	Air	5	Al	290
MFMV	7	Conductive	2,8	75	Standard		40	CoCr	240
FASTSCAN-D	5	non conductive	0,25	110	Rotated	Fluid	5	Yes	590
RTESPA-150	5	non conductive	5	150		Air	12	Al	320
SCANASYST-FLUID+	5	non conductive	0,7	150	Rotated	Fluid	12	Au	280
VTESPA-70	5	non conductive	2,9	70	Visible apex	Air	5	Al	290
MESP-V2	4	Conductive	3	75	Rotated		35	CoCr	530
RTESPA-525	4	non conductive	200	525		Air	12	Al	320
CONTV-PT	3	Conductive	0,2	16		Air	25	PtIr	240
RFESPA-75	3	non conductive	3	75		Air	8	Al	330
RFESP-75	2	non conductive	3	75		Air	8	-	330
SNL-10	2	non conductive	0,06-0,35	18-65		Fluid	2	Ti/Au	240
AD-40-SS	1	Conductive	40	180		Air	4	Au	2300
CONTV-A	1	non conductive	0,2	13	Standard	Air	8	Al	200
FASTSCAN-C	1	non conductive	0,8	300		Fluid	5	Ti/Au	590
NCHV	1	non conductive	40	320		Air	8	-	210
NCHV-A	1	non conductive	40	320		Air	8	Al	200
tap525A	1	non conductive	200	525		Air	12	Al	320

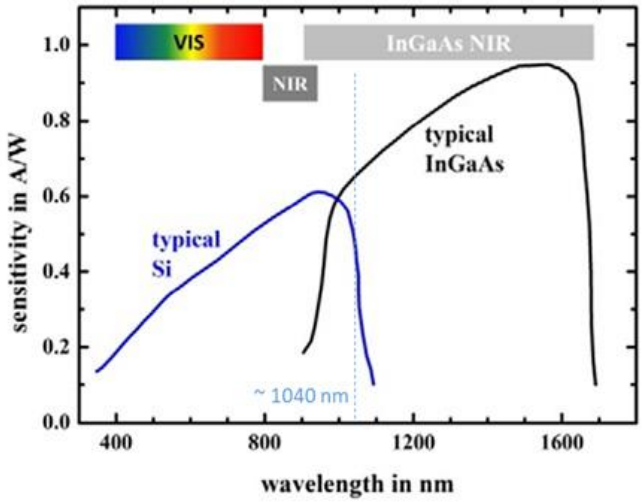
Maintenance week VLL/ Lab closed/

Good Friday and Easter Monday the lab will be closed. Due to this, the scheduling of “week suits” will be adapted. Instead of the standard “suit week” schedule from April 1st- April 7th , the suit period will be extended by one week till April 14th ! (so April 1st-April 14th)
The facility maintenance week will be in week 26. This means that the cleanroom will be closed for processing from 28-06-2021 07:00 till 02-07-2021 17:00.

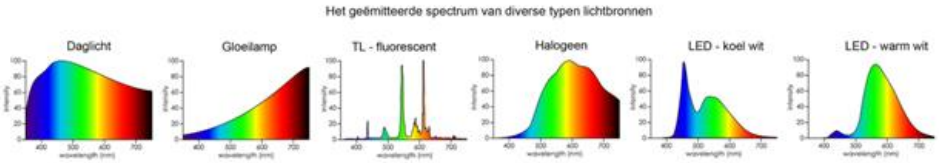
New Hamamatsu SWIR camera, for wafer transmission microscopy

For imaging through a wafer in transmission, one needs a lightsource and sensor for wavelengths higher than ~1040 nm. This means that a camera needs to be equipped with an InGaAs sensor.





And the lightsource needs to be something that emits heat.



Typical InGaAs camera manufacturers are Hamamatsu, Xenix, AlliedVision, FLIR, Zephir.

Our ‘hofleverancier’ Olympus (loosely translated as ‘purveyor to the court’) provided us with a -more than reasonable- quote and service for a Hamamatsu C12741-03 SWIR camera, to be mounted on our Leica Ergolux 2 stereo microscope.

Leica Ergolux

InGaAs camera C12741-03

The SWIR camera with PC and software license, have an estimated value of about €25k. The camera sensor is extremely sensitive and efforts have been made to protect it from accidental damage. In transmission mode, the light source intensity is dimmed by the sample. But when you remove the sample, the light intensity is too high for the camera sensor.

Therefore, this optical microscope necessarily requires an intro to be provided by the machine owner. It is also indicated on the equipment card.

Of course, at any time, if you do not know how to use an instrument, or have never used a specific instrument before, or have any question about a machine: ASK THE MACHINE OWNER. It is our job, we are happy to help.