

Dear cleanroom user,

We are pleased to present the first combined newsletter of Else Kooij Laboratory and Kavli Nanolab. In this newsletter, we will keep you informed about all activities within the shared TU Delft cleanroom infrastructure, including updates on new equipment, procedures, introductions to new colleagues, and other exciting developments.

We hope you enjoy reading it!

On behalf of the EKL and Kavli Team,

Pieter Telleman, Bruno Morana, and Marc Zuiddam

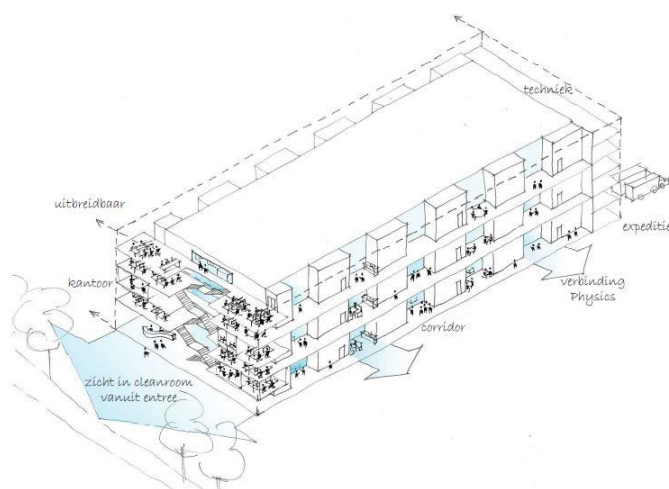


New website, update EKL website

The website of EKL is undergoing an update; Please take a look at [Else Kooij Lab \(tudelft.nl\)](https://tudelft.nl). Moreover, we are constructing a new website for the new Campus baseline Lab (CBL), where all users of both cleanrooms can find information about the TU Delft cleanroom equipment, staff members, intake procedures and much more. At a certain moment this website will replace the individual websites of Kavli and EKL. In the next newsletter we will share the link with you to have a look!

New cleanroom

In the last few months progress has been made to come to a combined cleanroom infrastructure at the southern part of the TU Delft campus. Goal is to locate all cleanroom activities of the TU Delft in a single cleanroom. The program of requirements is being made together with an overview of all available equipment which will have to be moved to the new cleanroom. The architect and other parties that are required to design the new cleanroom have been selected. To fit all desired functions and requirements in the available plot, a multi floor cleanroom is being considered. A first kick off information meeting was held and more will follow during the process. First impression of the building:



TU Delft
OPDRACHTGEVER

Aronsohn
PROJECTMANAGEMENT

Pieters
BOUWTECHNIEK
ADVISEUR CONSTRUCTIES

Deerns
ADVISEUR CLEANROOM, INSTALLATIES,
BOUWFYSICA, BRAND, AKOESTIEK, BREEAM

PEUTZ
ADVISEUR TRILLEN/BEI, EMC

dGm^R
ADVISEUR DUURZAAMHEID

broekbakema
ARCHITECT

New equipment delivered and waiting for delivery

Delivery times of new equipment are in the range 10-14 months nowadays. Although we ordered a substantial number of pieces of equipment in 2023, the delivery is expected to happen during 2024.

The new oxide etcher with batch loader has been delivered (@EKL) and installation is ongoing. On site acceptance is scheduled within a few weeks from now. We expect the system to be available in December.

The new 2000 °C tube furnace (for small diamond samples) is going to be delivered on October 31st (@Kavli). We expect the new Tempress furnace stacks to arrive in November and December this year (@EKL). In collaboration with Tempress phased removal of the old furnace stacks and installation of the new furnace stacks is being planned for Q4 2023 and Q1 2024. Removal of the furnace of Kavli is planned in Q1 of 2024. New EBPG is expected in Q1 2024 (@Kavli), laser writer in Q3 2024 (@Kavli), and Rapid Thermal anneal furnace Q2 2024 (@EKL).



New equipment under Tender

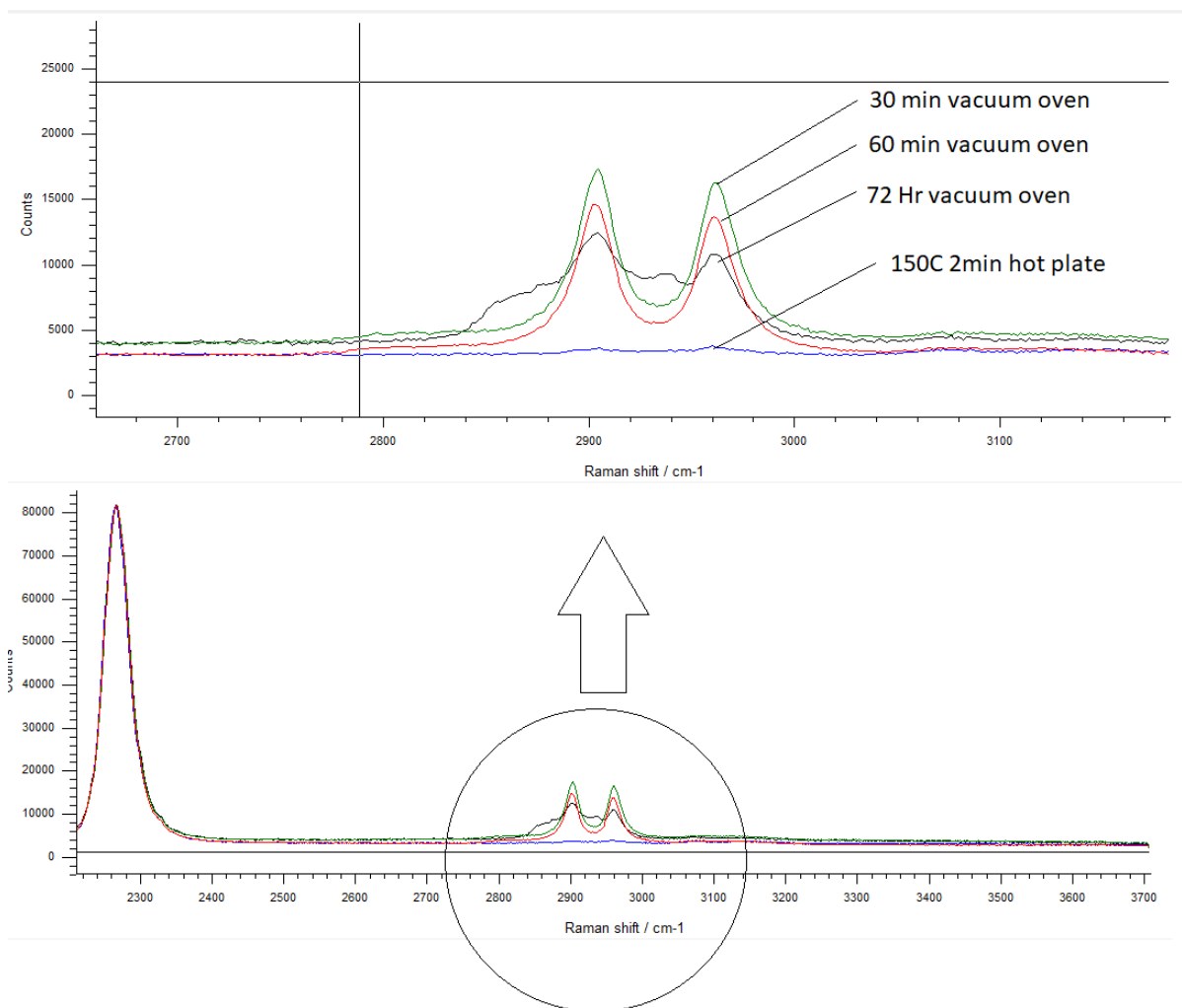
A new superconductor sputter cluster tool is under Tender now. First week of November we will finish the tender and we can start the ordering process. The desired outcome is a cutting-edge three-chamber setup equipped with a wafer handler and a cassette loading load-lock. This upgraded system will serve the purpose of depositing various types of superconductors, offering the flexibility to adjust the composition of the film's elements over a wide temperature range. Additionally, this investment is intended to increase the amount of samples that can be processed during a day.

We are also starting a tender process for a new epi tool. We aim for a single wafer production tool (max 150mm wafers), atmospheric and reduced pressure compatible for SiGe processes.

Other equipment under tender or under investigation are a laser cutter, a research evaporator (with Load lock and double e-gun source for research activities) and a replacement for the spray coater.

Analysis of Fox-25

Raman data for Fox-25 spun at 4000 RPM. The two peaks seen in the encircled area are attributed to ketones belonging to the solvent MIBK, which is present in HSQ. The problem is that MIBK outgassing can cause damage to SEM and e-beam equipment. Therefore, for now, **the usage of Fox-25 for 30 and 60 minutes is prohibited**. The 72-hour usage is allowed (but this might change in the future if an alternative is found). Investigation of 85°C as an alternative is underway. Normal hotplate baking is effective. Raman investigations of other resists will also be conducted to optimize processes and tool quality. For any further questions, ideas, or remarks, please contact Roald and Brian.



FFU replacement Kavli, extension lifetime EKL

In both cleanrooms, lifetime extension activities are being done. To allow EKL to operate at least until 2030 when operations are expected to have moved to the new cleanroom on campus south, major refurbishment is being planned. The plans include participation of CRE, van Dorp and a broad range of third parties. More detailed information will be shared predominantly through NIS. We are trying to keep down-time as minimal as possible, but considering overhaul of some of the core infrastructure down-time is inevitable.

At Kavli, the FFU units are being replaced. This will have a severe impact on the availability of the equipment. Via Nanolab information system (NIS) we will keep you updated about the availability of the equipment during the replacement process. The replacement action will take place from November 2023 till March 2024.

Maintenance weeks

At EKL, the maintenance weeks just finished. Besides the regular maintenance of the facilities some important work in the framework of the lifetime extension of EKL have been carried out:

- Phase B of the restoration of the ducts feeding the air into EKL has been performed. This regarded the second half of the main air duct feeding the single air handling units. The action consisted in the removal of the rust present in the inside walls of the duct and in the application of a protective coating.



- As testcase for the future floor of the whole EKL CR space, a new floor has been applied in the chemical room of EKL.

At Kavli, **week 48** will be the scheduled maintenance week. Main scheduled activities are the extension and repair of the process cooling water circuit, verification of the laser interlock system and the alarm systems.

During the maintenance week, cleanrooms are closed for users. Access is only available with permission from the manager of the cleanroom.

Wetbenches CR10K EKL

Starting from July 2023 extensive maintenance and refurbishment has been and still is being done for the wetbenches of CR10K. This with the aim of achieving wetbenches that are safe and with improved functionalities. The work performed included: new lighting, new Hepa filters, extensive maintenance of the air extraction units, several air flow velocity measurement campaigns and refurbishment of the benches. This last action is still ongoing and it is expected to be completed before the end of 2023. The certification of the wetbenches is expected in January 2024.

Merge of introduction courses

Currently, access to the EKL cleanroom requires a different training program than the training program for Kavli. Keeping efficiency and effectiveness in mind we are in the process of streamlining access to either cleanroom. To achieve this we are in the process of aligning and consolidating specific courses. By implementing this change, our goal is to establish a single comprehensive training program that grants access to both cleanrooms. Such a comprehensive course program is needed anyhow considering the move to a single cleanroom on campus south in the future. More detailed information will be provided in the first and second quarters of 2024.

Outside office hours regime between Christmas and new year

In both cleanrooms, an out-of-office hours schedule will be in effect during the first week of the Christmas holiday. Depending on the availability of first aid personnel (an investigation is currently underway), this period may be extended through the first week of January. Please stay updated by monitoring communications on NIS.