
DTU

Agenda:

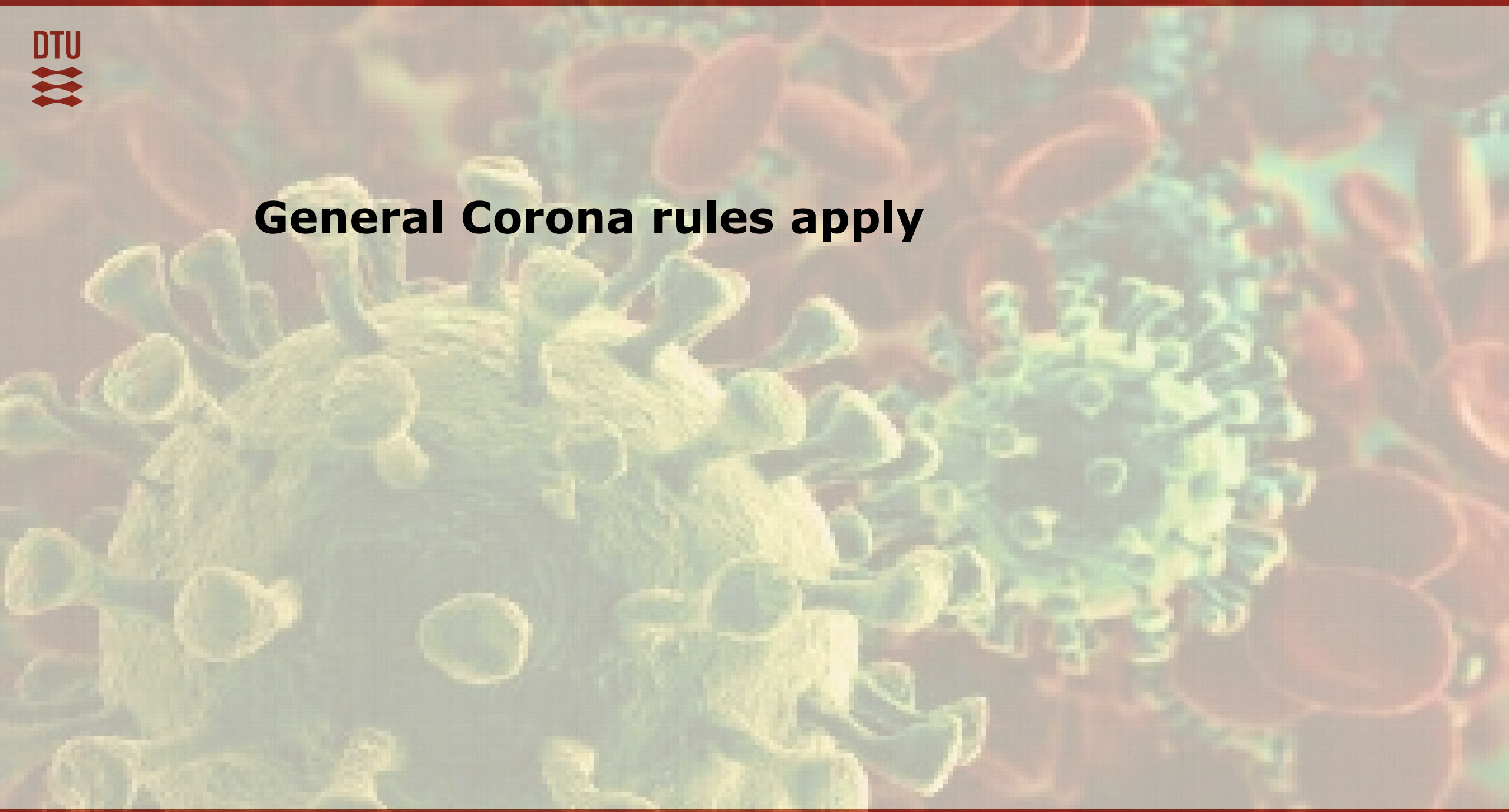
- **Nanofabrication in a time of Corona – a status**
- **UPS**
- **FFU**
- **Decomissioning of equipment**
- **Udvidelse af renrummet**
- **Cleanroom closures**

Nanolab's anti virus strategy continues:

- Minimize infection risk
- Maximize throughput
- Avoid unnecessary administration

3

General Corona rules apply



FACILITY UPDATE

Biometric Access to Labs

Biometric authentification as a tool to simplify access to Nanolab

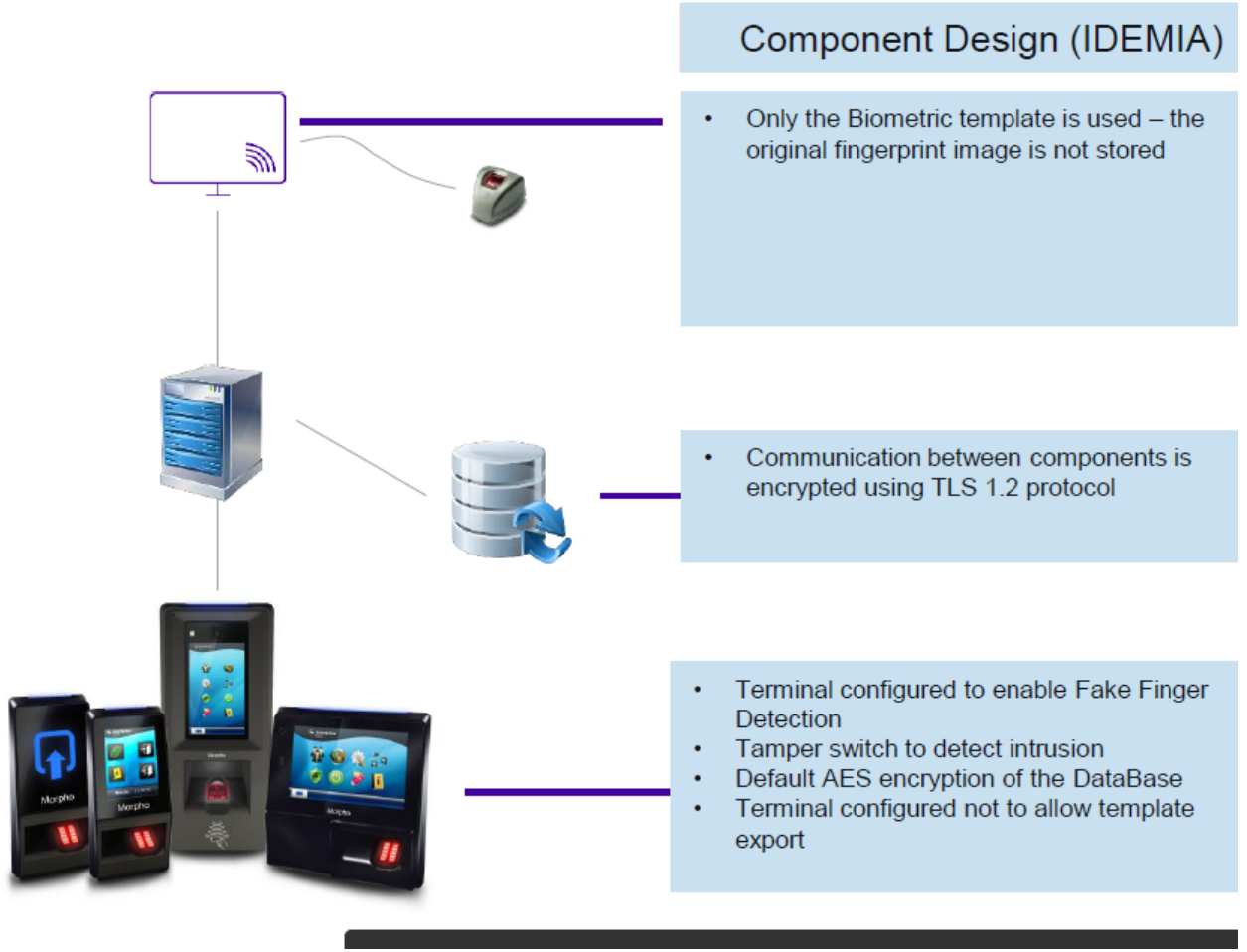
IDEMIA Morpho is our chosen solution.

Data will be handled according to DTUs GDPR procedures.

Until now: Packlab, chemical storage run on new terminals – Cleanroom will follow.

Terminals work with access cards at this point in time.

Responsible: Thøger thes@dtu.dk

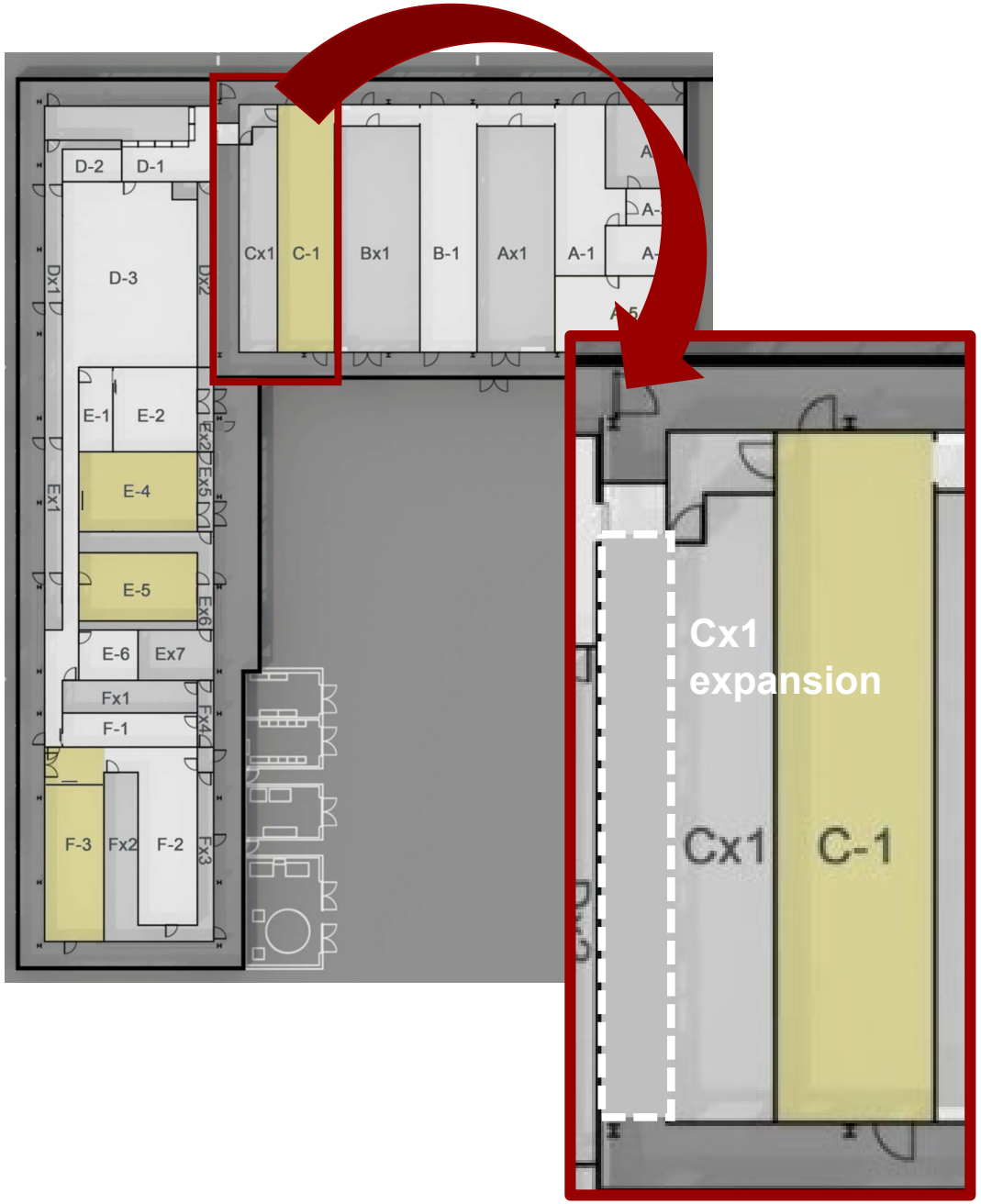


Expansion of Cx1

- We need cleanroom space
- Including ”dead end” in Cx1 can provide more service space

- Timeline
  - From 5 July to ca. September 2021

- Affected equipment
  - Probe station – new position inside cleanroom
  - Vacuum packer – new position inside cleanroom
  - BCB oven – new position inside cleanroom
  - Lifetime measurement – out of cleanroom
  - Inclined UV – might be moved



B346 UPS

- Entire B346 will be protected against power glitches < 2 min from end of 2021.
- Should minimize tool downtime

- B346 closed Saturday 26 June to Tuesday 29 June
  - Entire building is closed – including all labs
  - ALL power off in old cleanroom
  - All tools off in old cleanroom
  - Long tool recovery time expected

New electrical panels

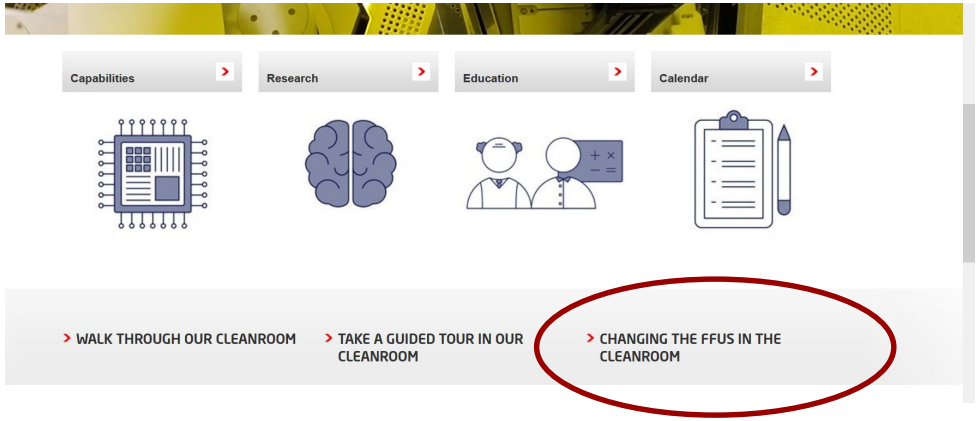
FFU exchange

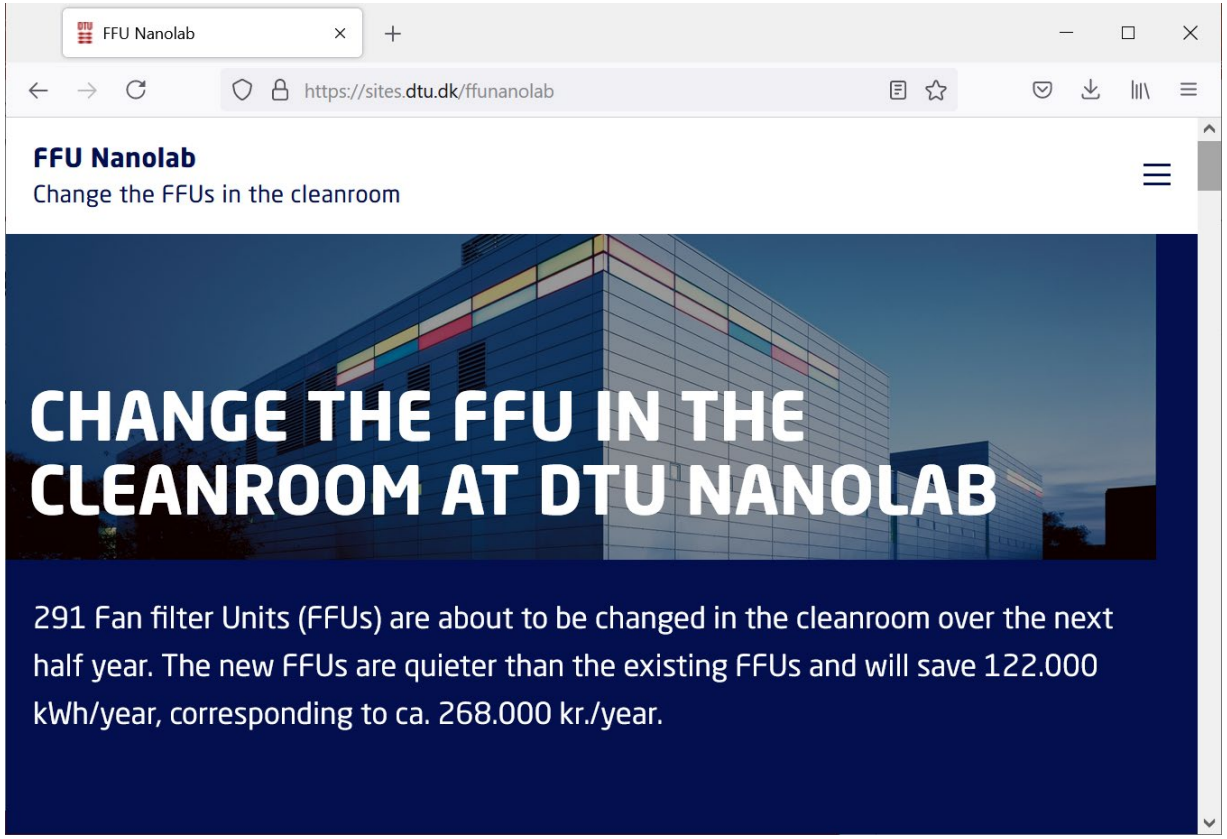
- Custom FFU
  - Ca. 53 dBA (lower than old FFUs)
  - Will save 122,000 kWh/yr
- Installation in E-1 (e-beam control room) complete
- Testing almost finished
- Gradual change from 8 August to 31 December 2021
- Only new parts of cleanroom (sections D, E and F)
- One room at a time
- Ca. 2-3 weeks per room
- **The biggest perturbation on cleanroom operations in many years**

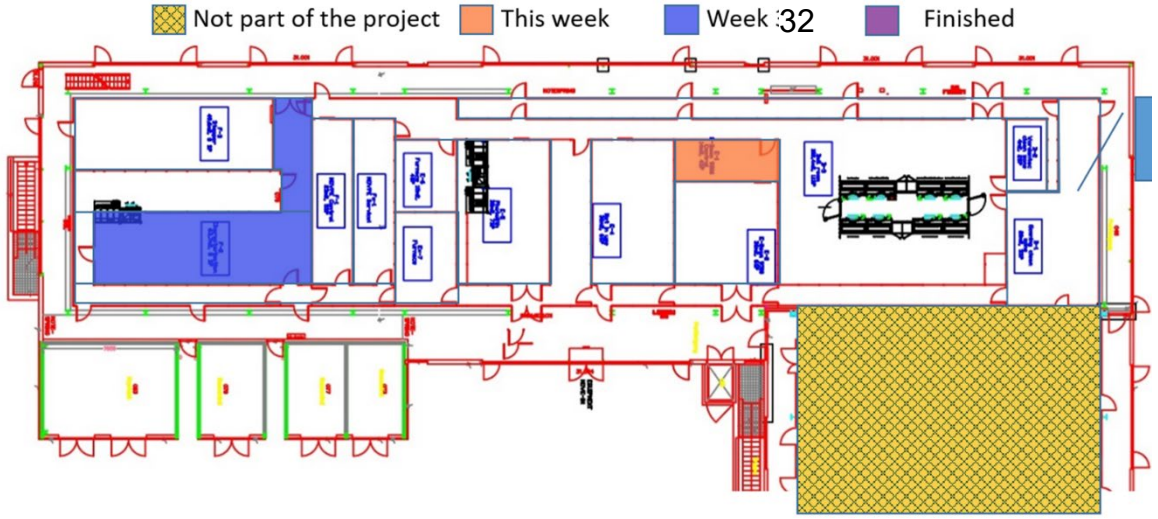
FFU exchange – Moving characterization tools out of F-2

- Why: To make space for FFU tools etc.
- What:
  - Sensofar
  - Tencor P-17
  - …
- When: June to August 2021
- Where to: Relocates to C-1 and other cleanroom sections

FFU exchange information







Approximate time schedule

- F-2 (ALD room): Week 32-34
- F-1 (MOVPE room)
- F-3 (Stepper room)
- …

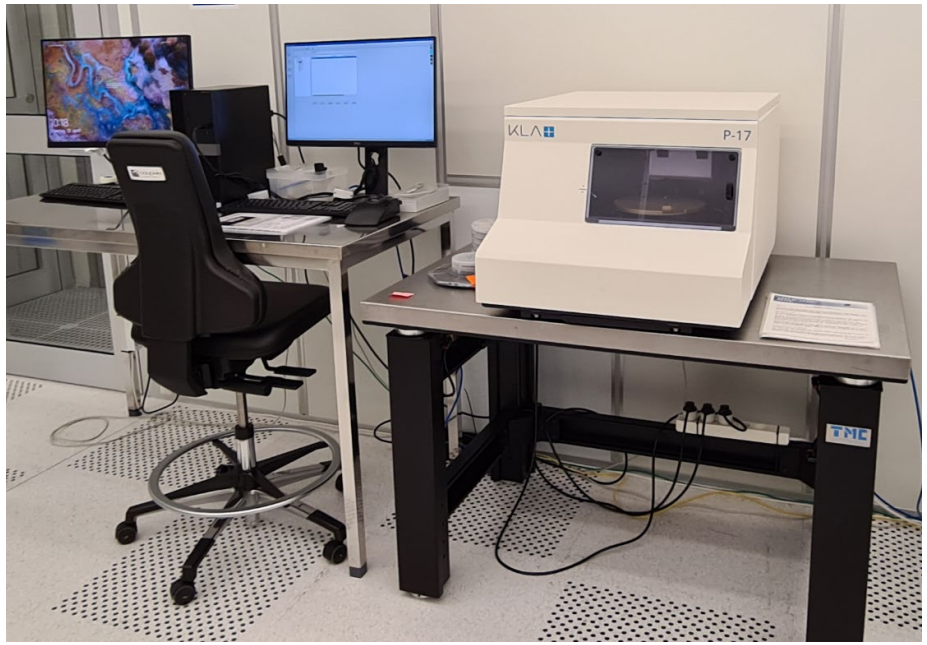
EQUIPMENT

Dicing saw

- Dicer Disco DAD 3241 purchased
  - for wafers up to 200 mm
  - Silicon, Glass/quartz, …
- Wafer cleaner Disco DCS 1441 (cleaning after dicing)
  - High pressure and Atomizing Nozzle water cleaning
- Various accessories
  - Tape mounter
  - UV tape release

- Install in Dicer room (346/157) in July– together with old dicer (tight space)
- Expected ready for use in Q3 2021

Tencor P-17, Dektak-8 replacement



Selected features

200 mm scan length without stitching (“true 8”)

Extended z-range: Dynamic range of 1000 μm

3D-stress mapping: multiple line scans (automatic rotation)

Automatic measurement sequence

Pattern recognition deskew alignment

3D map visualization

Please write to Thin Film (thinfilm@nanolab.dtu.dk) for questions

Standard RTP system: Jipelec JetFirst 200C (ECM)

Purpose/specs:

Replacing current Jipelec system

- Cold-wall system (water cooled stainless steel)
- Temp range: ambient to 1000 C (1200 C for 1 min)
- Temperature control: TC & Pyrometer
- 3 gas lines (MFCs) + purge line
- Dry pump (nXDS6i scroll)

Status: Installed in A-5 – accepted, process development on-going

(same room as present Jipelec-RTP)

CRAIC MSP 20/30 PV, advanced optical measurements

Selected features

MSP (MicroSpectroPhotometer)
Reflection/transmission/absorbance/polarization measurement
Wavelength range: 200 nm to 1700 nm
Minimum aperture size: 1.5 µm by 1.5 µm
Calibrated system with standards
Colormetric/mapping functions
Possibility for Raman/fluorescence/photoluminescence add-on

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200 mm Oxidation Furnace - retrofit

Purpose:

- Furnace tube for 200/150/100 mm dry-wet oxidation
- Retrofit in E-stack (one vacant slot)
- Process specs & qualification included (dry & wet)
- Expected ready Q1-2022

Transfer of processes: Physimeca=>Wordentec

Background:

Control system on **Physimeca** incl. hardware components

needs to be upgraded/replaced

- very costly & time consuming

Process transfer of ”**metal-stacks**”:

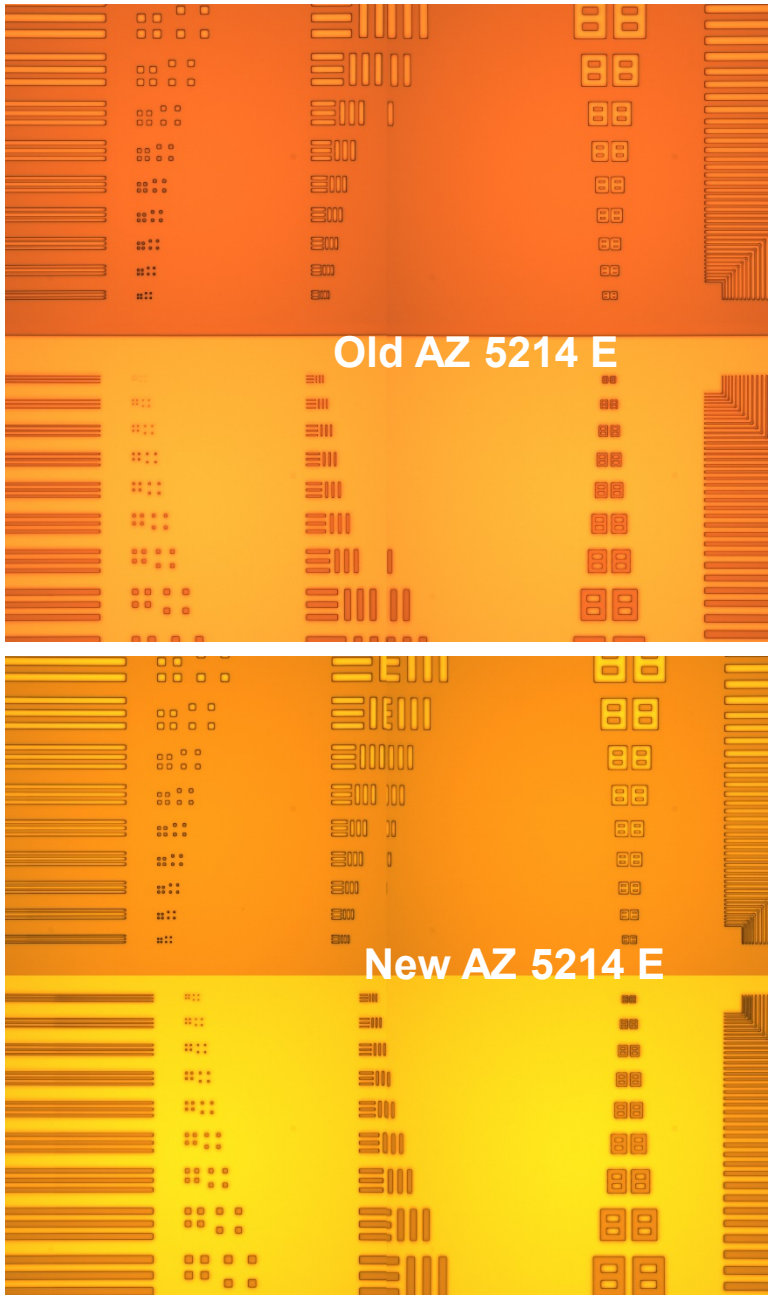
Physimeca => Wordentec

For now:

- Ni/Ge/Au
- Ti/Pt/Au
- Pd/Ge/Ti/Pt

Photoresist changes

- AZ resist production moves from Germany to Japan
  - AZ 5214E
  - AZ 4562
  - AZ MIR 701
- Merck: *"Performance is similar but not identical"*
- Nanolab test on AZ 5214E pilot batch:
  - Dose-to-clear almost identical (on MLA3)
  - Viscosity slightly different
- Etch selectivity etc. has not been tested
- *Spin Coater: Gamma e-beam & UV* will get new AZ 5214E resist.
- Users can then perform own tests
- No more old AZ 5214E in 4-5 months
- Awaiting test of AZ MIR 701



Tools leaving the cleanroom

- Black Magic (moves to B309)
- Physimeca (looking for replacement)
- Jipelec RTP (decommission after new Jipelec runs properly)
- C-1 fume hood
- Hardness tester (moves to basement)
- Sinton minority carrier lifetime measurement

CHARACTERIZATION (307/314)

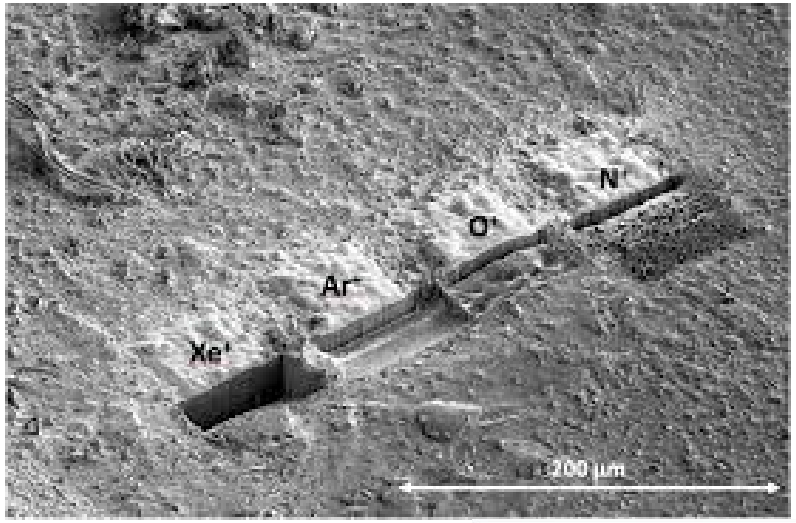
NEW Dual Beam Helios Hydra G5

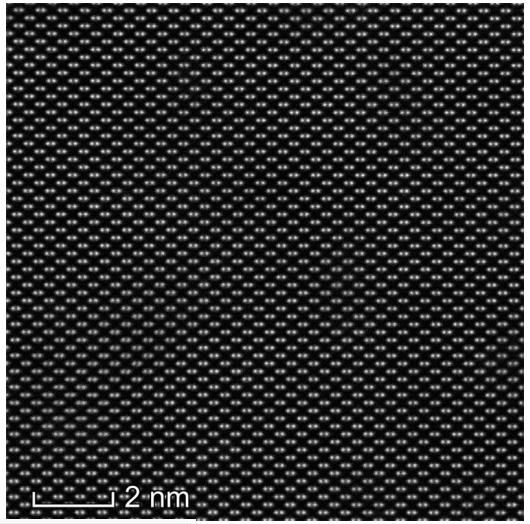
Purpose/specs:

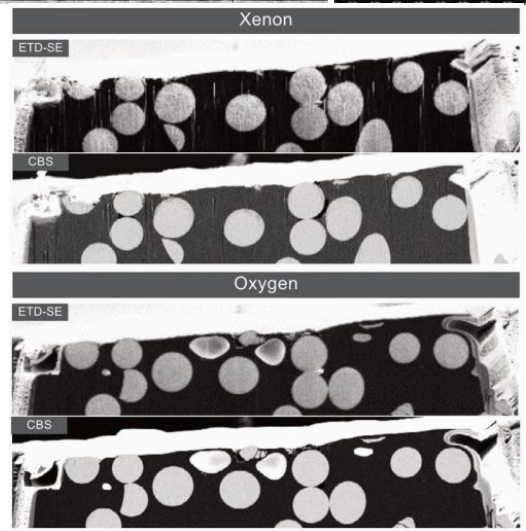
Replacing current Helios G1

- Multi Gas Plasma FIB (XE,N,O and AR)
- Automated TEM Lamella Prep
- Automated Atom Probe Tomography
- Monochramated E Beam for sub nm resolution down down to 500ev

Status: Instrument installed SAT begins next week (expected release October 2021)







B307 basement Soft Matter Lab Sketch

- Soft Matter lab for:
  - Sample preparation
  - Cryo SEM and TEM
  - No Cell Growth
- Key requirements include:
  - Temperature stability 1^{o}C P-P/24hrs
  - Low vibration levels
- Lab area >100m^2
- Awaiting reconstruction permission from building authorities

END OF PRESENTATION

- Running full capacity, restrictions confined to gowning
- Biometric access pilot
- New FIB SEM
- Several restructuring projects: soft matter lab, packlab
- **Major facility upgrades/replacements cause closures and inconveniences, FFU, UPS**