

**OPERATING INSTRUCTIONS OF THE  
LABORATORY AND TECHNICAL ROOMS FOR THE  
OPERATION OF ELECTRON MICROSCOPES**



**EDITION MARCH 2023**

| <b>Building 05.2S</b> | <b>Instrument</b>                      |  | <b>Telephone</b>  |
|-----------------------|--|--|-------------------|
| Room 1000             | Corridor                               | René Borowski                            | 6700              |
| Room 1007             | FIB FEI Helios NanoLab460F1            | Max Kruth / Lidia Kibkalo                | 3605 / 3910       |
| Room 1008             | TEM Zeiss Libra 120                    | Drs. Johan Buitenhuis / Wiebke Sager     | 3146 / 4237       |
| Room 2000             | Corridor                               | René Borowski                            | 6700              |
| Room 2002             | STEM Tescan Tensor 1000                | P. Lu / Dr.J. Jo / Dr.T. Yang            | 85121/85115/85078 |
| Room 2003a            | TEM FEI Titan T                        | Drs. Andras Kovacs / Juri Barthel        | 9276 / 9277       |
| Room 2003b            | TEM FEI Titan T – Technik              | Drs. Andras Kovacs / Juri Barthel        | 9276 / 9277       |
| Room 2004a            | TEM Hitachi HF 5000                    | Drs. Paul Paciok./ Janghyun Jo           | 9338 / 85115      |
| Room 2003b            | For TEM Hitachi HF 5000 – Technik      | Drs. Paul Paciok./ Janghyun Jo           | 9338 / 85115      |
| Room 2005             | TEM FEI Titan 60-300 PICO              | Drs. Juri Barthel / Hongchu Du / Lei Jin | 9277/85176/2413   |
| Room 2006             | TEM FEI Titan 60-300 PICO – T.         | Drs. Juri Barthel / Hongchu Du / Lei Jin | 9277/85176/2413   |
| Room 2009             | TEM FEI Titan 60-300 HOLO – T.         | Drs. Amir Tavabi / Thibaud Denneulin     | 85233 / 6644      |
| Room 2010             | TEM FEI Titan 60-300 HOLO              | Drs. Amir Tavabi/ Thibaud Denneulin      | 85233 / 6644      |
| <b>Building 05.2W</b> | <b>Instrument</b>                      | <b>Instrument Officer / Deputy</b>       | <b>Telephone</b>  |
| Room 1000             | Corridor                               | René Borowski                            | 6700              |
| Room 1065             | SEM TFS Apreo VS                       | Dr. Beate Förster / S. Ehlert            | 85112/85752       |
| Room 1066             | FIB FEI Helios NanoLab 400S            | Lidia Kibkalo / Max Kruth                | 3910 / 3605       |
| Room 1067             | TEM JEOL 200 FS – Technik              | Dr. Beate Förster / S. Ehlert            | 85112/85752       |
| Room 1068             | TEM JEOL 200 FS                        | Dr. Beate Förster / S. Ehlert            | 85112/85752       |
| Room 1071             | TEM FEI Technai F20                    | Drs Marc Heggen / M.Feuerbacher          | 9479 / 2409       |
| Room 1072             | TEM FEI Technai F20 – Technik          | Drs. Marc Heggen / M. Feuerbacher        | 9479 / 2409       |
| Room 1074             | TEM Philips CM200 (Ausstellung)        | Dr. M.Feuerbacher / René Borowski        | 2409 /6700        |
| Room 2084a            | TEM FEI Titan 80-200 ChemiSTEM         | Drs. Kovacs / P.Lu /R.Schierholz         | 9276/85121/1686   |
| Room 2084b            | TEM FEI Titan 80-200 ChemiSTEM–Technik | Drs. Kovacs / P.Lu/R.Schierholz          | 9276/85121/1686   |
| Room 2000             | Corridor                               | René Borowski                            | 6700              |
| Room 2087a            | TEM FEI Spectra 300                    | Drs. Juri Barthel / Lei Jin              | 9277 / 2413       |
| Room 2087b            | TEM FEI Spectra 300 - Technik          | Drs. Juri Barthel / Lei Jin              | 9277 / 2413       |
| Room 2092b            | TEM FEI Krios G4 – Technik             | Dr. Thomas Heidler                       | 6691              |
| Room 2092c            | TEM FEI Krios G4                       | Dr. Thomas Heidler                       | 6691              |
| Room 2092e            | TEM FEI Titan 80-300 STEM              | Drs. Marc Heggen / Ashok Vayyala         | 9479 / 85199      |

|            |                                   |   |                |
|------------|-----------------------------------|---|----------------|
| Room 2090a | TEM TFS Talos 200 Arctica         | Dr. Thomas Heidler                      | 6691           |
| Room 2090b | TEM TFS Talos 200 Arctica-Technik | Dr. Thomas Heidler                      | 6691           |
| Room 2091a | FIB FEI Helios NanoLab Aquilos    | Pia Sundermeyer /<br>Dr. Thomas Heidler | 6691 /<br>6691 |
| Room 2093c | TEM TFS Talos 120                 | Pia Sundermeyer / Dr. Thomas Heidler    | 6691 / 6691    |

**Area Representative**

René Borowski

**Telephone**  
6700

**HAZARDS FOR PEOPLE AND THE ENVIRONMENT**



- Contact with high-voltage components.
- Improper handling when filling liquid nitrogen.
- Leakage or creep loss of SF<sub>6</sub> from the high-voltage tanks of electron microscopes.
- Handling of chemicals, sample materials and nanoparticles.
- Improper handling of ladders or stepladders.

**PROTECTIVE MEASURES AND RULES OF BEHAVIOUR**



- The operating instructions for all unit components and accessories must be observed. These are available in the laboratory room either in printed or electronic form, e.g. in the form of "online" manuals accessible via the software of the associated control computers.
- Electron microscopes are strong sources of X-ray radiation; they are equipped with radiation protection devices and are only type-approved for operation with these as interference sources. The X-ray radiation shielding must not be removed. This applies in particular to test operation during repair or service.
- The charges stored or supplied in capacitors, in the voltage generation and transformation system as well as in other high-voltage components in electron microscopes can have a lethal effect. Work on high-voltage cables or high-voltage components is therefore strictly prohibited.
- Switchgear and electronics cabinets must always be kept locked. Only authorized personnel are permitted to open the switchgear and electronics cabinets. This also applies to all peripheral equipment in the laboratory room.
- Components containing beryllium are installed in electron microscopes. This applies to the X-ray analysis system, in particular the X-ray detector, and the object retainer of the specimen holder. Gloves must be worn when handling these components. Due to the toxicity of beryllium dust, mechanical handling of the surfaces of the aforementioned components is prohibited without exception.
- Opening the instrument and peripheral equipment, e.g. for fault diagnosis and repair, is not permitted.
- Any modifications of a technical nature to the electron microscopes may only be carried out with the consent of the person responsible for the room and the departmental representative and the managing director of ER-C.
- In the event of a failure of the accelerating voltage of an electron microscope, the SF6 pressure of the high-voltage tank must be checked immediately. If the SF6 pressure is below the minimum value marked on the pressure gauge (between 2.5 and 5.0 bar, depending on the equipment), there is a theoretical health hazard due to leakage or creep of SF6 gas in the microscope room and in the basement rooms below. In this case, the person responsible for the equipment (see above) or the area representative (see above) must be informed immediately.
- In the event of accidental mechanical stress on peripheral equipment, coolant leaks in the vicinity of electrical equipment, tripping over electrical equipment, etc., the building must be evacuated.
- In the event of accidental mechanical stress on peripheral equipment, coolant leaks in the vicinity of electrical installations, tripping over electrical cables or other incidents of a similar nature, a high hazard potential may arise due to damage and effects that may not be directly recognizable. If necessary, inform the person responsible for the unit (see above) or the area representative (see above) and disconnect the unit from the mains in his presence.
- Safety goggles must be worn when handling transportable nitrogen dewars and when decanting liquid nitrogen in general. Transferring larger quantities of nitro-

gen (more than 10 litres) is prohibited in the microscope rooms.

- Against the background of potential nanoparticle-induced health and environmental risks, action guidelines for handling nanomaterials, which are deposited at:[www.baua.de/de/Themen-von-A-Z/Gefahrstoffe/Nanotechnologie/Links-Beispiele.html](http://www.baua.de/de/Themen-von-A-Z/Gefahrstoffe/Nanotechnologie/Links-Beispiele.html), must be considered.
- Keep the instrument clean and tidy.
- Eating and drinking is prohibited in the electron microscopy laboratories.
- When using ladders or stepladders, ensure that they are stable.
- The general operating instructions of Forschungszentrum Jülich GmbH for handling power-operated work equipment must be observed.
- Report any safety deficiencies you notice to the person responsible for the equipment (see above) or the area representative (see above).

## BEHAVIOR IN THE EVENT OF MALFUNCTIONS

- Switch off the system in the presence of a second person, ideally the person responsible for the equipment (see above) or the area representative (see above).
- Leave the laboratory immediately.
- Report any malfunction to the person responsible for the equipment (see above) or the area representative (see above).

## CONDUCT IN THE EVENT OF AN ACCIDENT OR FIRST AID



**Emergency: 77**

- Press the "Emergency stop" switch.
- Remove injured persons from the danger area.
- Give first aid and call in the company physician **EMERGENCY CALL 77**
- Report accident to the safety center **EMERGENCY CALL 77**
- Inform the person responsible for the equipment (see above) or the area representative (see above).

## MAINTENANCE OR DISPOSAL

- Keep the electron microscope including peripheral equipment in a clear condition.
- Clear supply cables and hoses from the path of traffic.
- Secure unnecessary objects lying around or, ideally, store them in laboratory cabinets.
- Immediately report any faults in the equipment to the person responsible for the equipment (see above).
- Maintenance and extension work may only be carried out by persons authorized to do so.

## CONSEQUENCES OF NON-COMPLIANCE