

# Testing and analytical equipment

The Materials Technology Laboratory is undergoing expansion, with the addition of new lab space, equipment and staff. These new capabilities are allowing us to develop techniques and materials data to inform the design and construction of future fusion reactors.



Below is a summary of our equipment and the capabilities we have:

- THOR – universal testing machine with a 5kN hydraulic load frame operating in tension or compression. Inert environmental chamber, offering heating up to 700°C.
- ODIN (shown right) – universal testing machine with a 7.5kN hydraulic load frame operating in tension or compression. Offers either argon or moderate vacuum environments with heating up to 1000°C. A pyrometer allows surface temperature measurements of the sample to be collected, and a high temperature extensometer allows accurate strain measurements to be made.
- HEIMDALL – a LaVision micro digital image correlation (DIC) system allowing micron-sized tracking of sample movement. This allows images at different stages of a mechanical test to be compared, producing strain maps. These strain maps can be produced in real-time during tensile, creep and fatigue testing with dog-bone and cylindrical specimens. Elevated temperature DIC pattern tracking is also available.
- Portable DIC system – a LaVision system which can be used on standard and large-scale specimens.
- FREYJA – a Frontics AIS3000HD instrument indenter tester. Allows macroscopic mechanical properties to be measured using indentation.
- LECO LM 100AT microhardness tester.
- Sample preparation and furnace facilities (up to 1300°C) – we can prepare samples and carry out heat treatments in-house.
- Zeiss Evo 10 SEM + EBSD and EDS capability (SEM shown below)
- Instron uniaxial 10kN load frame with DIC compatible environmental chamber for Instron rigs offering a wide temperature range (-150°C to 600°C) and an argon atmosphere.
- Hot mounting press with 25mm and 40mm mounting sizes.
- Struers Accutom-100 automated cut-off saw.
- Auto-polisher and grinder, Vibro-Polisher, wire saw, cold mounting press and other sample preparation equipment.

## New equipment

We are expanding our range of capabilities and are adding new equipment to our labs, including:

- DIC compatible multi-axial fatigue testing rig offering, argon atmosphere, high-temperature (800°C) and high-vacuum ( $10^{-6}$  mbar).
- Instron uniaxial 5KN load frame.
- Cryogenic universal testing machine with 50kN load frame.

