**Commissioning of T-sensors for the XFEL AMTF**

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### XFEL AMTF

- **Client:** Desy - Germany
- **Project:** Test Facility for Accelerator Modules
- **Type:** Vacuum Insulated Valve Box
- **Fluid:** Helium (gas and liquid)

**Temperature measurement:**
- **80K+:** Heraeus Pt1000 sensor
- **4K+:** TVO sensor

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### Design and performance of the composite TVO Sensors

**MoTiVE design:** to avoid errors due to mounting of temperature sensors in vacuum environment (outside installation)

- **Sensitivity curve of typical TVO**

**Radiation characteristics**

Temperature shifts due to fast neutron and gamma irradiation at 77.3 K

**Calibration**

Calibration in set-up which is identical to MoTiVe mounting system

**Commissioning**

- Functionality check during acceptance test of AMTF
- 1-point check of sensors in LHe with known pressure

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### Conclusions

- No TVO sensors lost during installation
- No TVO sensors lost during manufacturing due to:
  - Welding (electromagnetic induction)
  - Heating
- Readouts accurate as expected
- TVO sensors are a cost-effective solution for 1.5K-300K temperature measurement
- TVO sensors are an attractive option for future projects

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