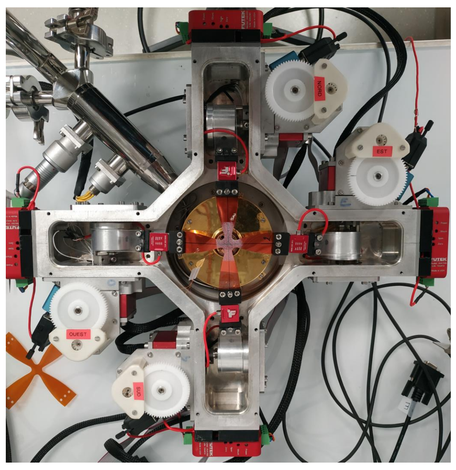
Cryogenic Biaxial Tensile Stress Device developped at LPS

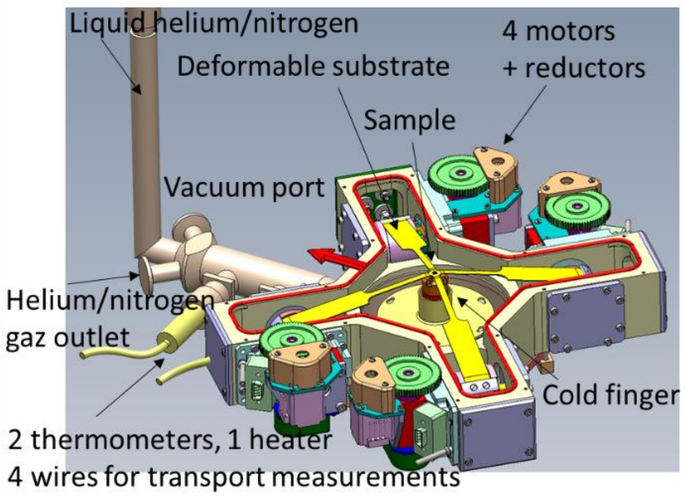
for the study of **layered materials** by

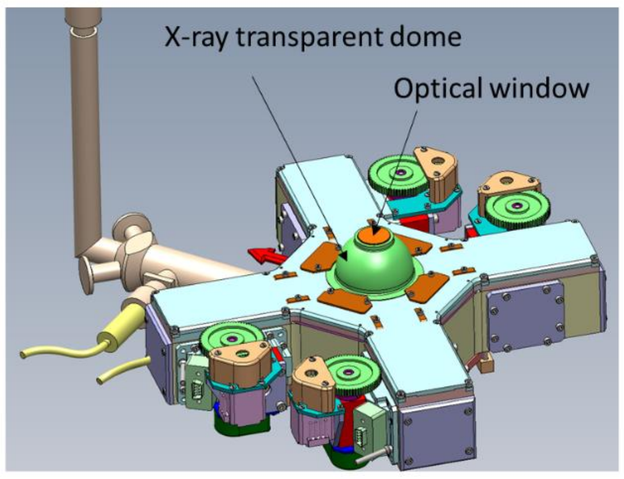
XRD - Electronic Transport - Optical measurements

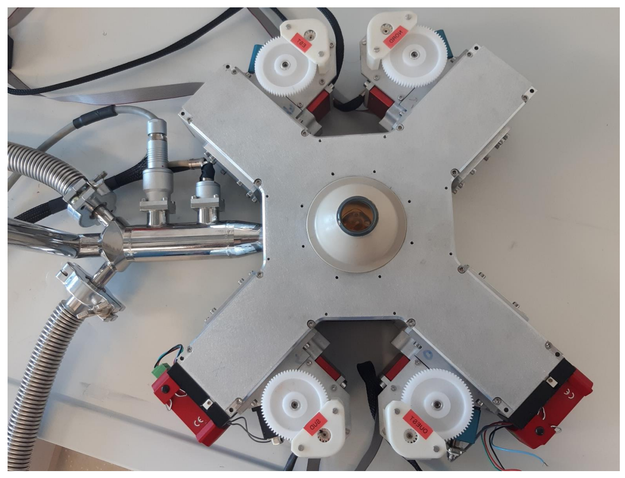
A. Gallo-Frantz, S. Cabaret, V. Klein, Y. Simon, A.A. Sinchenko, V.L.R. Jacques, D. Le Bolloc'h

Laboratoire de Physique des Solides, Université Paris-Saclay, CNRS, Bâtiment 510, 91405 Orsay Cedex, France



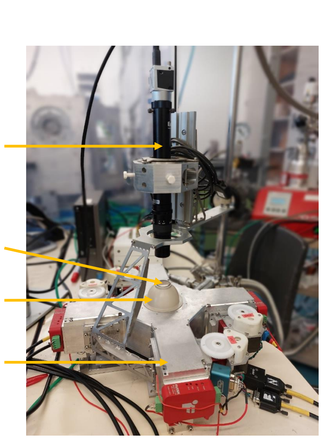


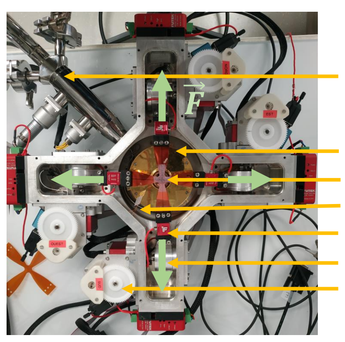




General presentation

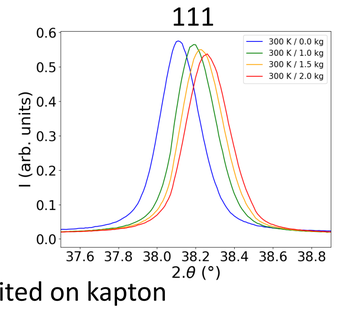
- Application to **layered materials**
- Use of a **deformable** (kapton) cross-shaped **substrate**
- **Independant** use of each of the 4 motors
- Measurements of applied force with **Load cells**
- Mounting over the **cold finger** of a He/N2 cryostat
- **Common Python interface** to drive Biaxial Tensile Machine motors / read force sensors – pilot Cryostat controller, Keithley SourceMeter and Nanovoltmeter, Basler camera



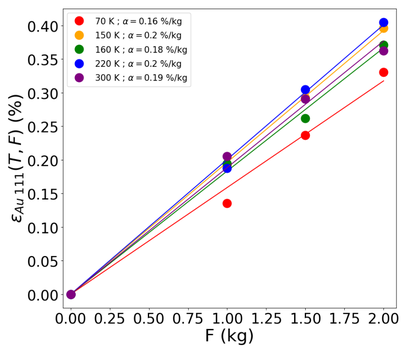


Performances

Deformation

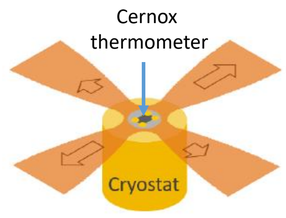


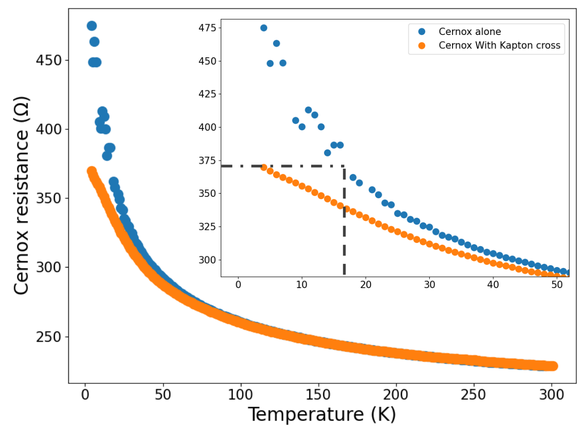
Gold 111 deposited on kapton



$0\% \leq \varepsilon \leq 0,4\%$

Temperature

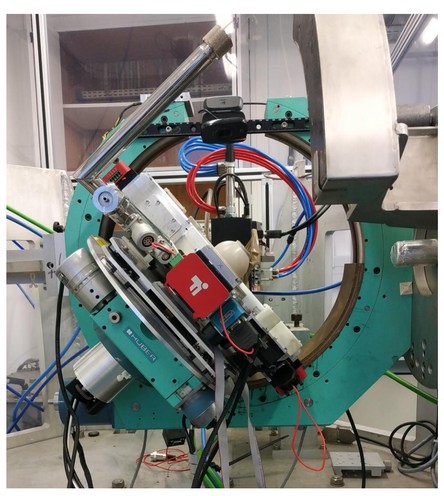




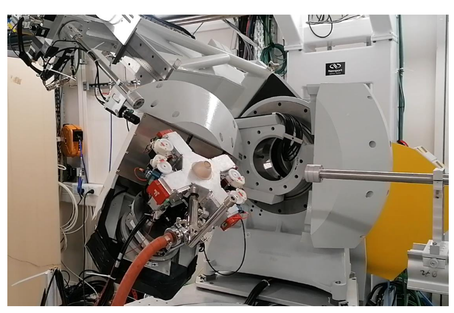
$15\ K \leq T \leq 375\ K$

X-ray diffraction :

- Measure real deformation of lattice
- Track eventual structural phase transitions
- Evolution of CDW reflections under stress

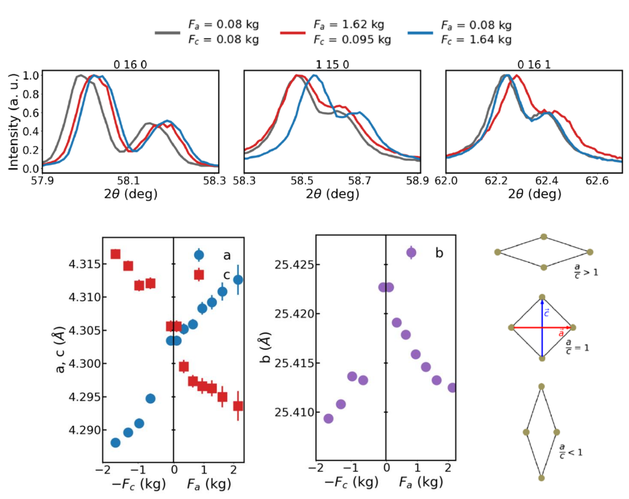


Biaxial Tensile Stress Device on eulerian 4-circle @ LPS (Orsay)

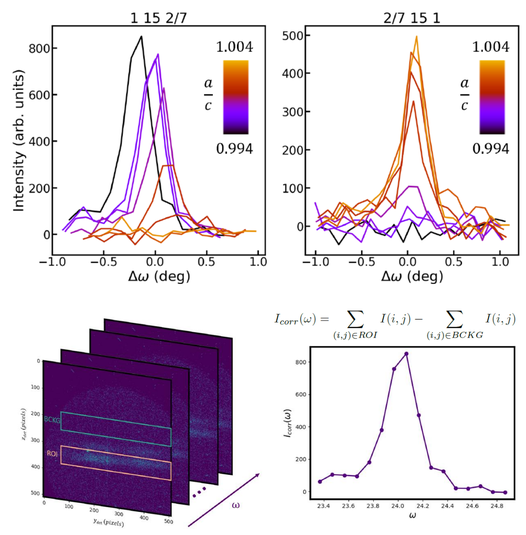


Biaxial Tensile Stress Device on kappa-6-circle @ DIFFABS (SOLEIL synchrotron)

Evolution of lattice parameters as a function of applied stress in $TbTe_3$

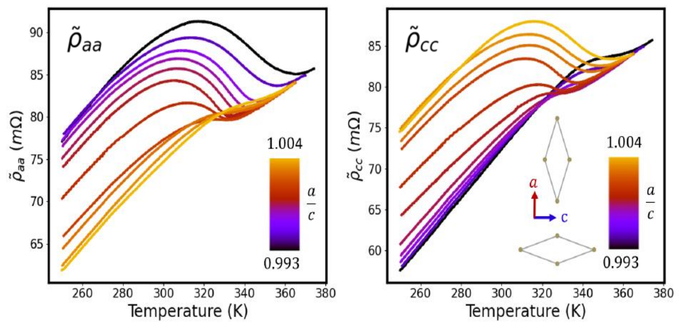


Evolution of CDW peaks with applied stress



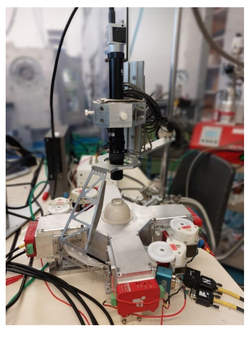
4-points transport measurements:

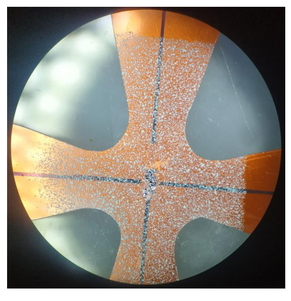
- Follow transition temperatures
- Evolution of CDW/superconductivity under stress
- Non-linear transport measurements



Optical measurements:

- Follow deformation with image correlation
- Optical spectroscopy studies (Photoluminescence, Raman)
- Possible Laser excitation through optical window (pump-probe mode)





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