



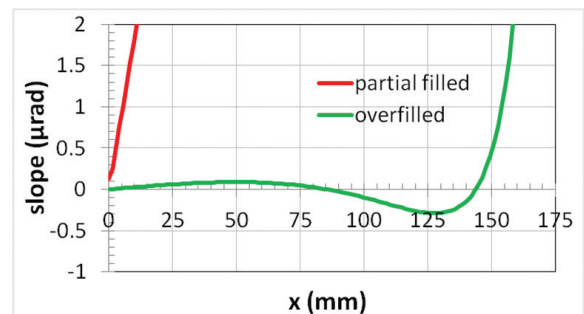
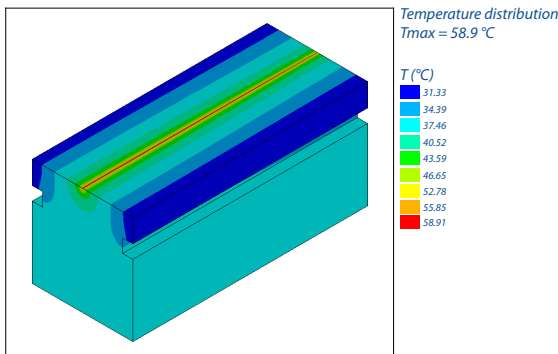
Expertise in modelling

ESRF has acquired considerable expertise in modelling and simulation, conceiving and building hundreds of X-ray instruments during its 20 years of operation. ANSYS and COSMOS are routinely used at the ESRF to optimise water- and cryo-cooled high-power optics such as multilayer or crystal monochromators, white beam mirrors and precise mechanical devices.

- ◆ Customised modelling
- ◆ Linear and non-linear processes

Thermo-mechanical modelling

Example: UPBL01 study of a high-power water-cooled mirror

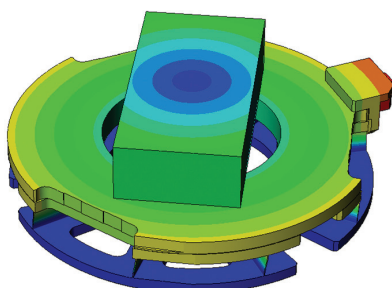


Temperature distribution is in degrees and local slope of the reflecting surface in micro-rad :

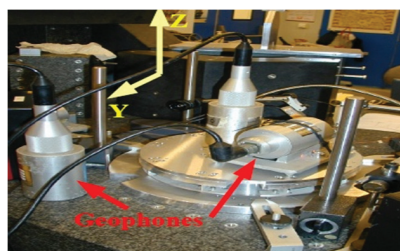
- Partial filling with 24 mrad X-ray beam incidence
- Overfilling with 14.9 mrad incidence

Dynamical mechanical modelling

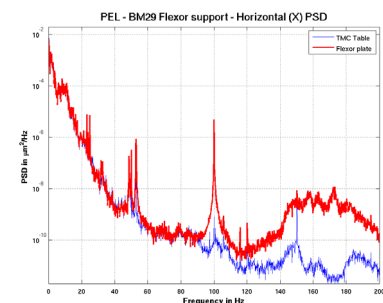
Modelling applied to a fine rotation flexure stage for white beam mirrors and multilayer monochromators.



Simulation shows first vibration mode at 118Hz (load of 11kg)



Test bench and vibration measurement results of the BM29 multilayer monochromator flexure



First mode at 100Hz (load of 5kg)