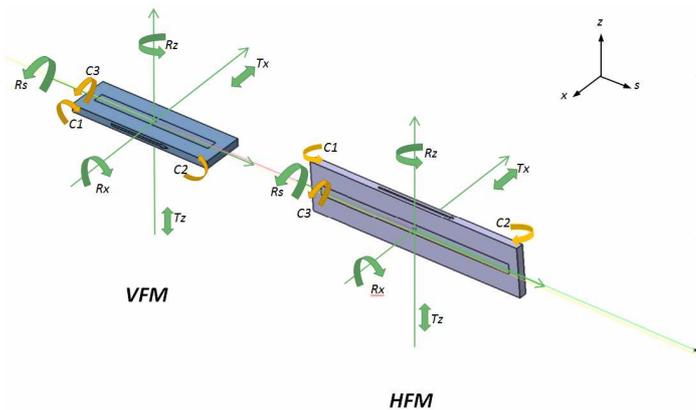


A special design for Kirkpatrick-Baez mirrors for hard x-ray

The PSICHÉ beamline (Pression Structure Imagerie par Contraste à Haute Énergie) is dedicated to x-ray diffraction under extreme conditions (pressure-temperature) and to tomography by absorption contrast at high energy (20-50 keV). The PSICHÉ beamline is installed on a short straight section of SOLEIL (2.2 meters). The source is an In-Vacuum multi-pole wiggler (2.1 T) which delivers a white beam with a large photon energy range (15-100keV). For focused monochromatic mode (angular dispersive x-ray diffraction), a Kirkpatrick-Baez mirror device with specific optical qualities was installed. Precision mirrors with slope errors below $0.5 \mu\text{rad}$ RMS are now possible on flat substrates. To avoid degrading the quality of the mirrors we have preferred to study a mechanical mirror gripping system with the possibility of correcting transverse slope errors rather than making hard mechanical components. This correction is made while installing mirrors in the fixing system. This adjustment is done using an optical profiler (LTP : Long Trace Profiler).

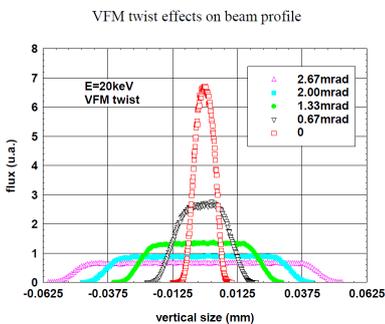
Both bendable mirrors are arranged in Kirkpatrick-Baez configuration



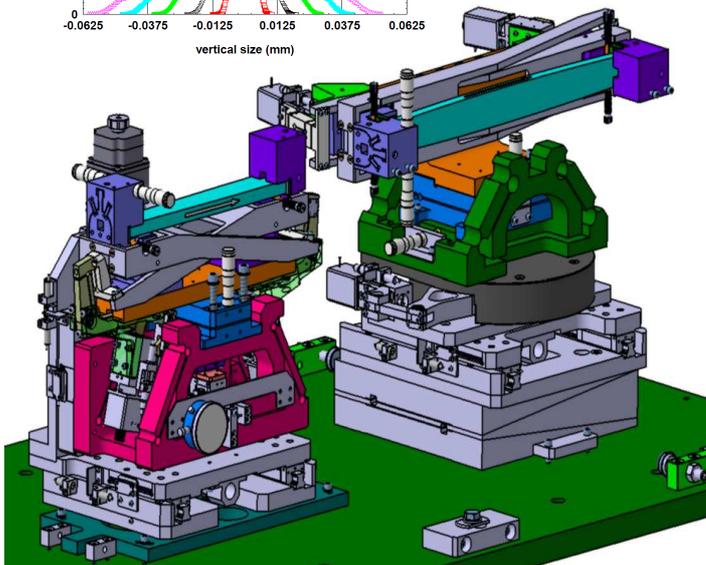
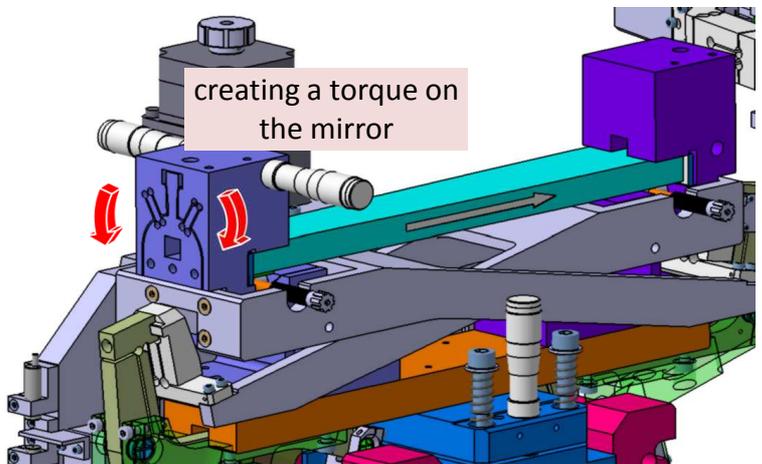
VFM : A vertically focusing mirror with Ir/B4C coating is operated at 0.4 deg incidence angle, Length = 285 mm; width = 40 mm, Thickness = 15mm

HFM : A horizontally focusing mirror with Ir/B4C coating is operated at 0.4 deg incidence angle, Length = 440 mm; width = 40 mm, Thickness = 15mm

The twist is the angular displacement between the two active areas near the ends.



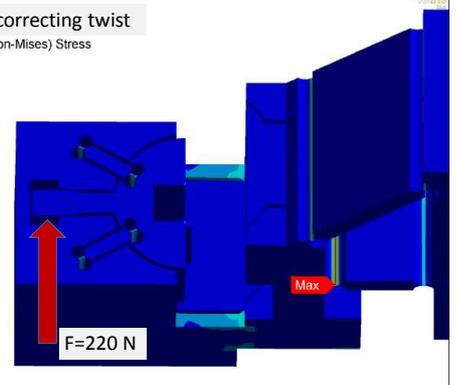
how to ensure a twist near zero ?



the effect of correcting twist

Type: Equivalent (von-Mises) Stress
Unit: MPa
Time: 1
23/03/2012 15:08

140,67 Max
124,96
109,34
93,716
78,097
62,478
46,858
31,239
15,619
4,0201e-5 Min



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