Recent Activities of the AOS

Wide-Angle-Baffles, OpLevs, and Scattering Measurements

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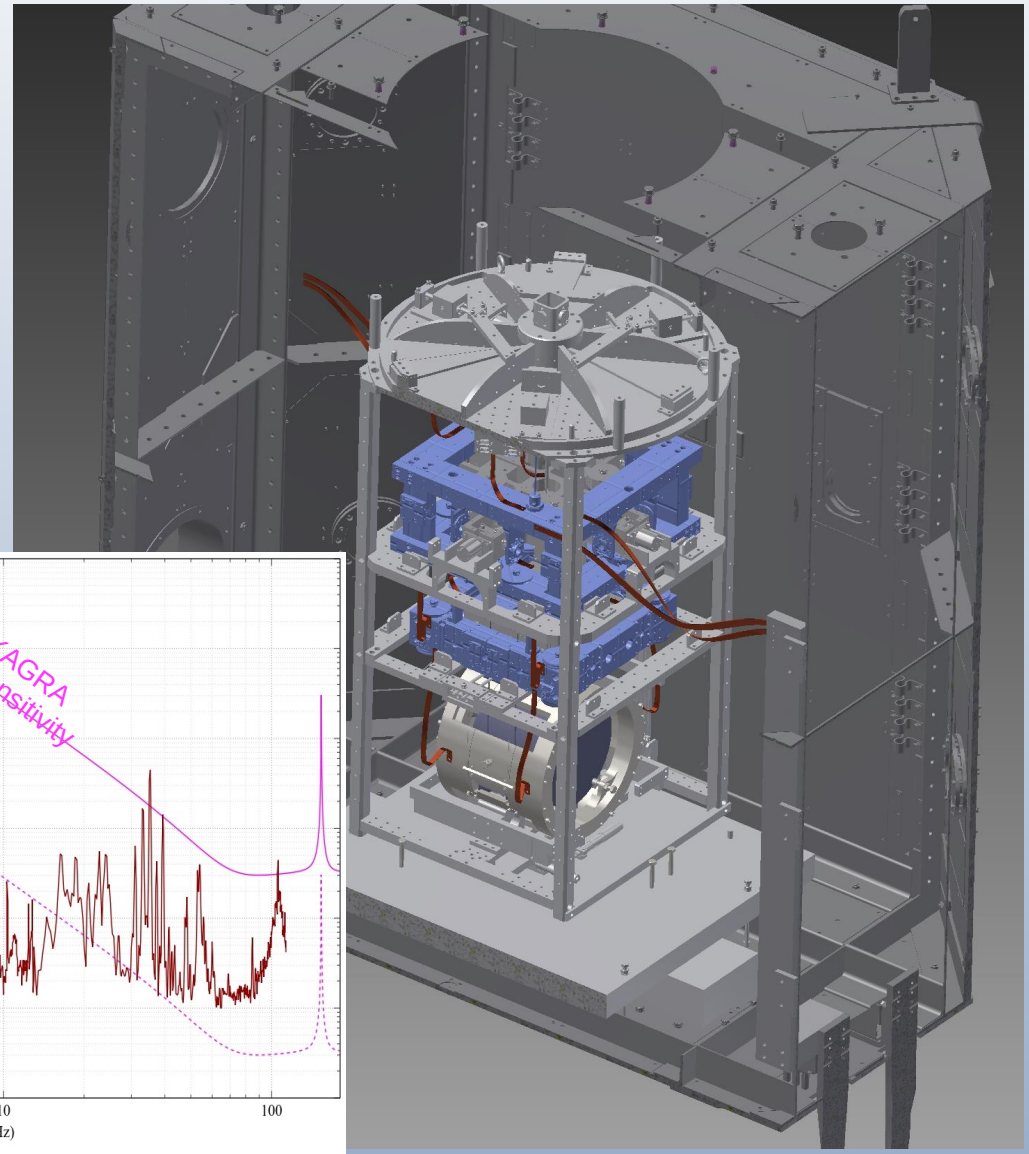
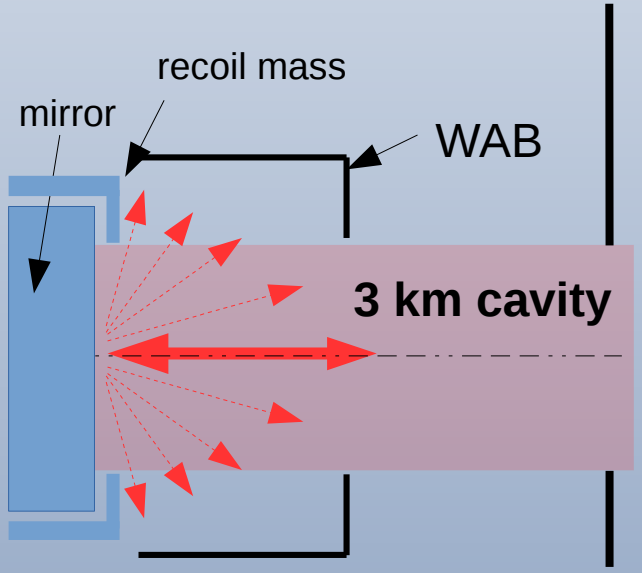
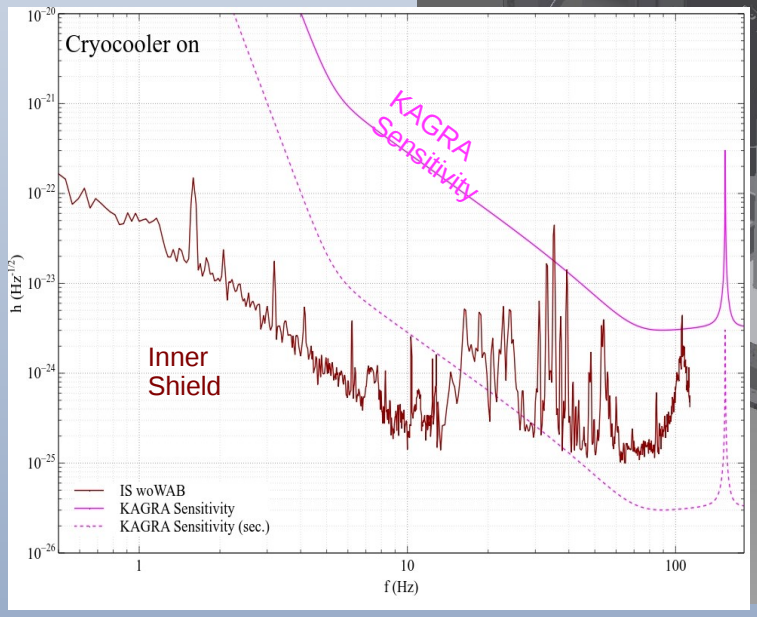
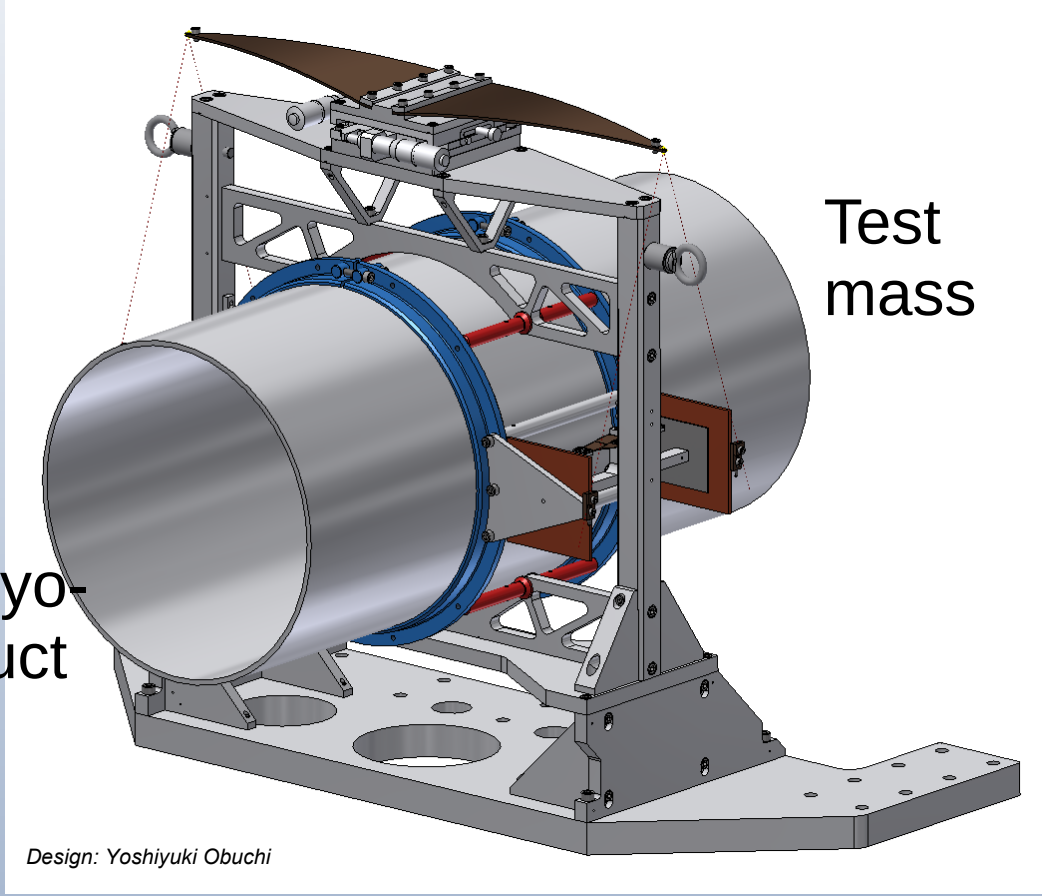
Status of Wide-Angle-Baffles (WAB)

- Block scattering coming from the Saphire test masses
- Scattering may harm goal sensitivity without WAB





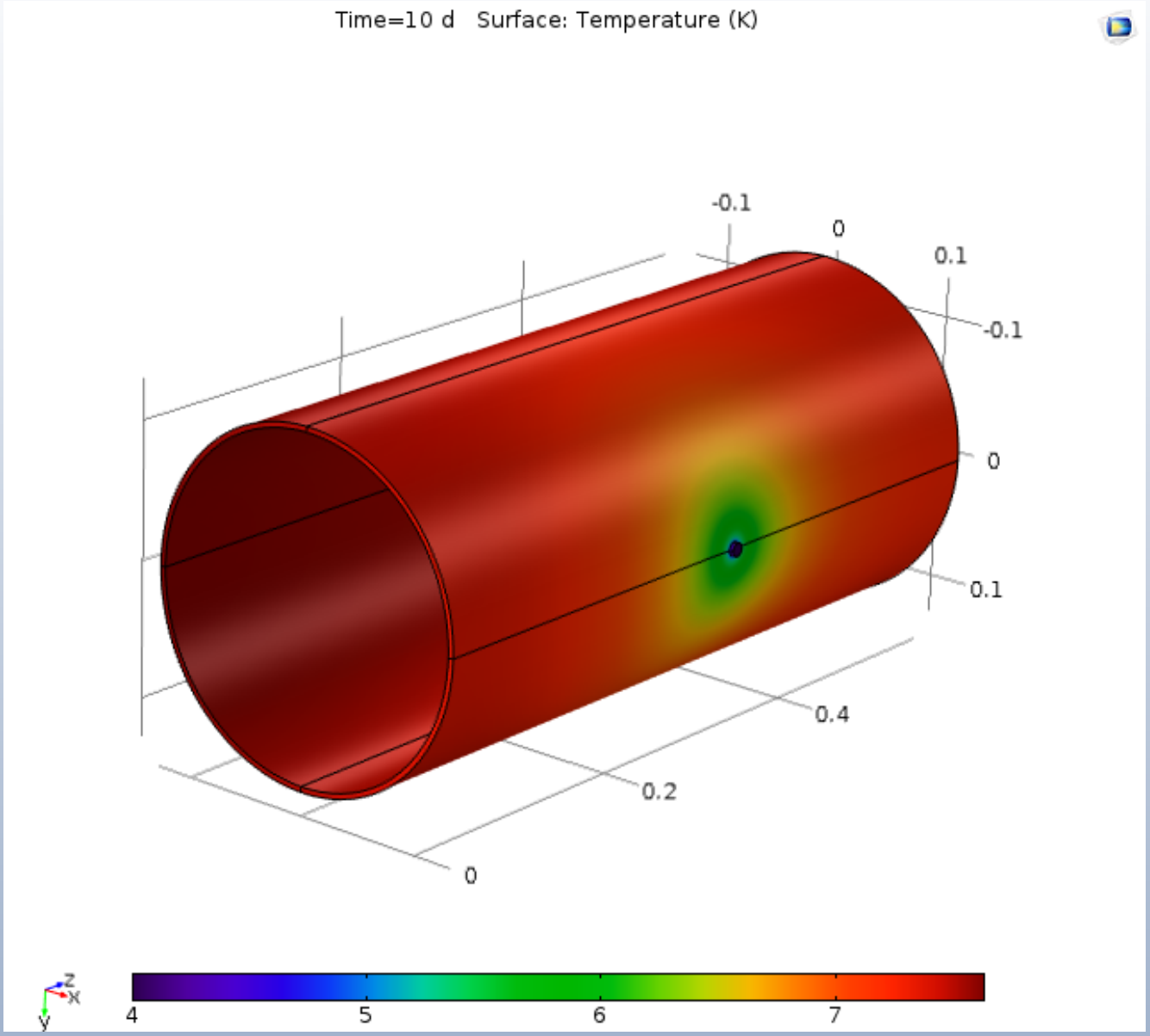




- Design (basically) fixed
- Suspension realized by Phosphor-Bronze blade springs
- Inner surface coated with Solblack
- Remaining task:
  - heat-link design
  - Cooling test in NAOJ's cryostat [*comment: not in NAOJ but in KAGRA*]
  - Installation

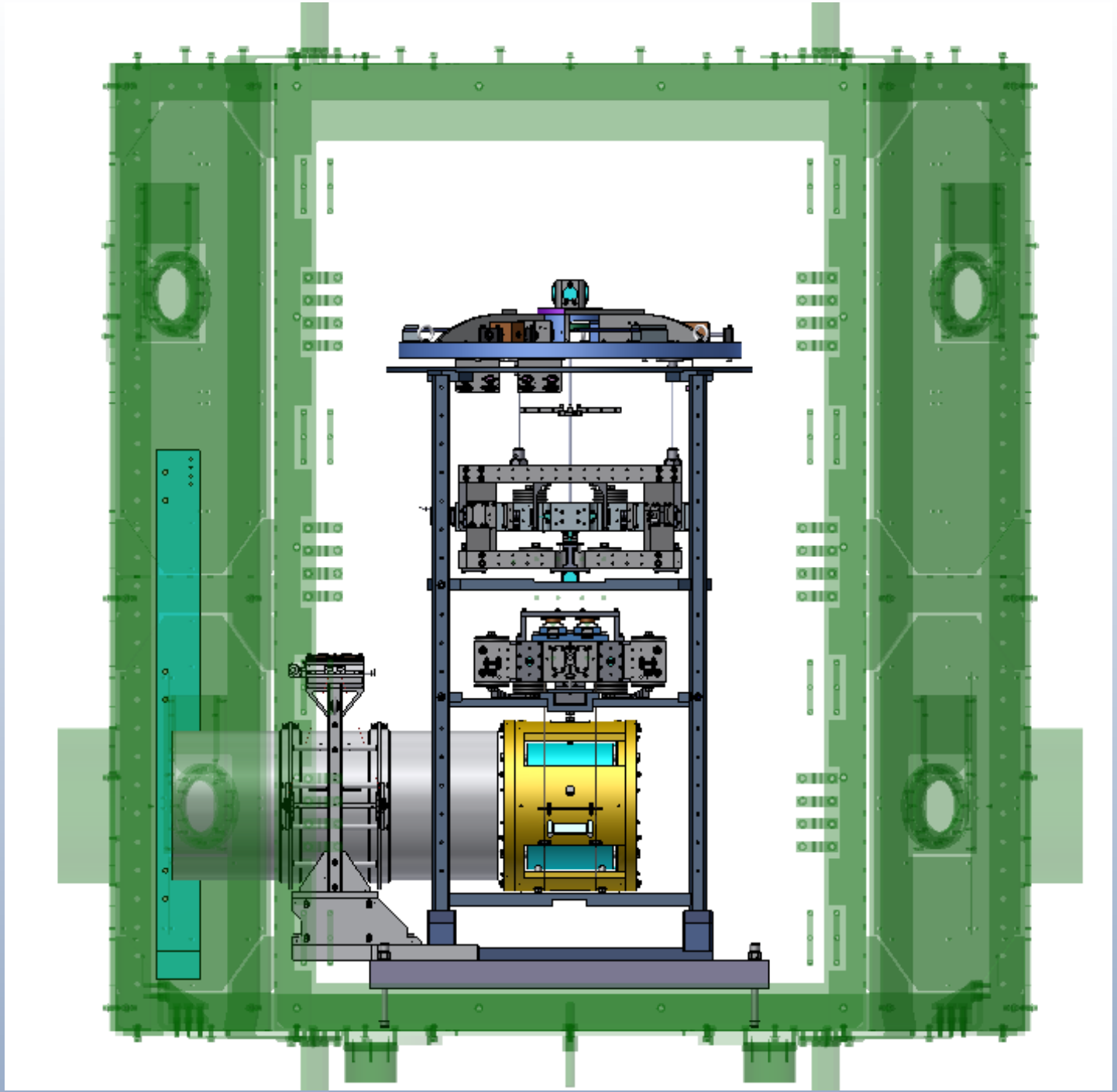
Cooling simulation with COMSOL

- One point of cooling (4K)
- Constant heat flux through the inner wall
  → 4W scattering
- Equilibrium temperature reached for 7.6K after 10 hours cooling



Aluminum

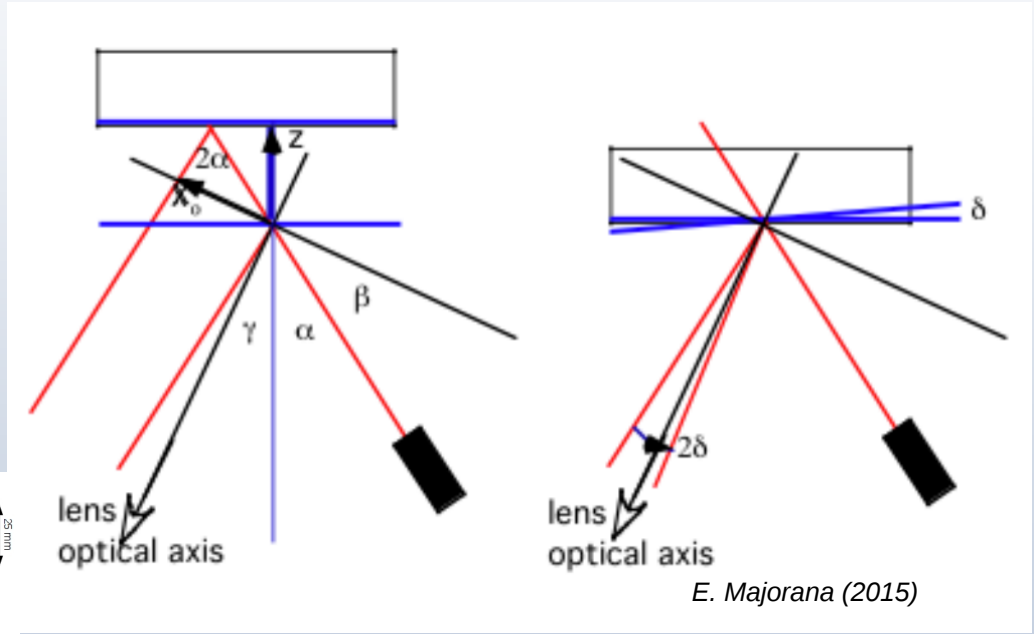
$\kappa = 238\, W \cdot m^{-1} \cdot K^{-1}$



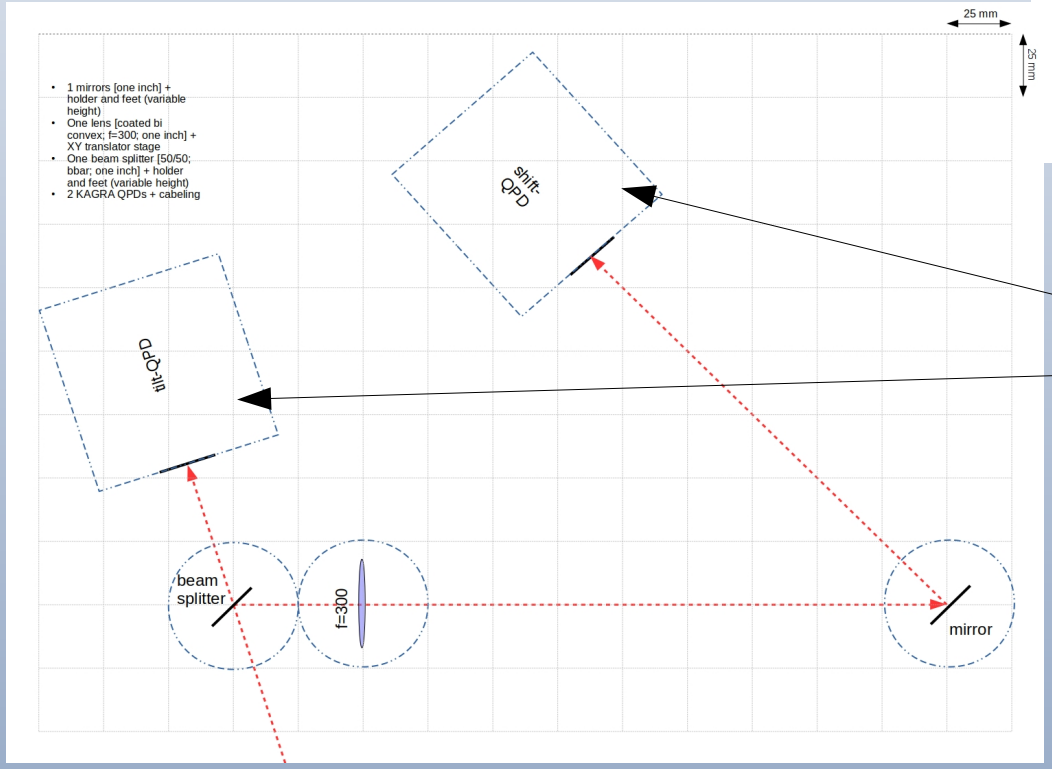
OpLevs

- Two kinds of OpLevs (“optical lever”)
  → tilt-sensing (“regular”)
  → length-sensing (“LS”)
- Measuring the tilt and the horizontal movement of the mirrors

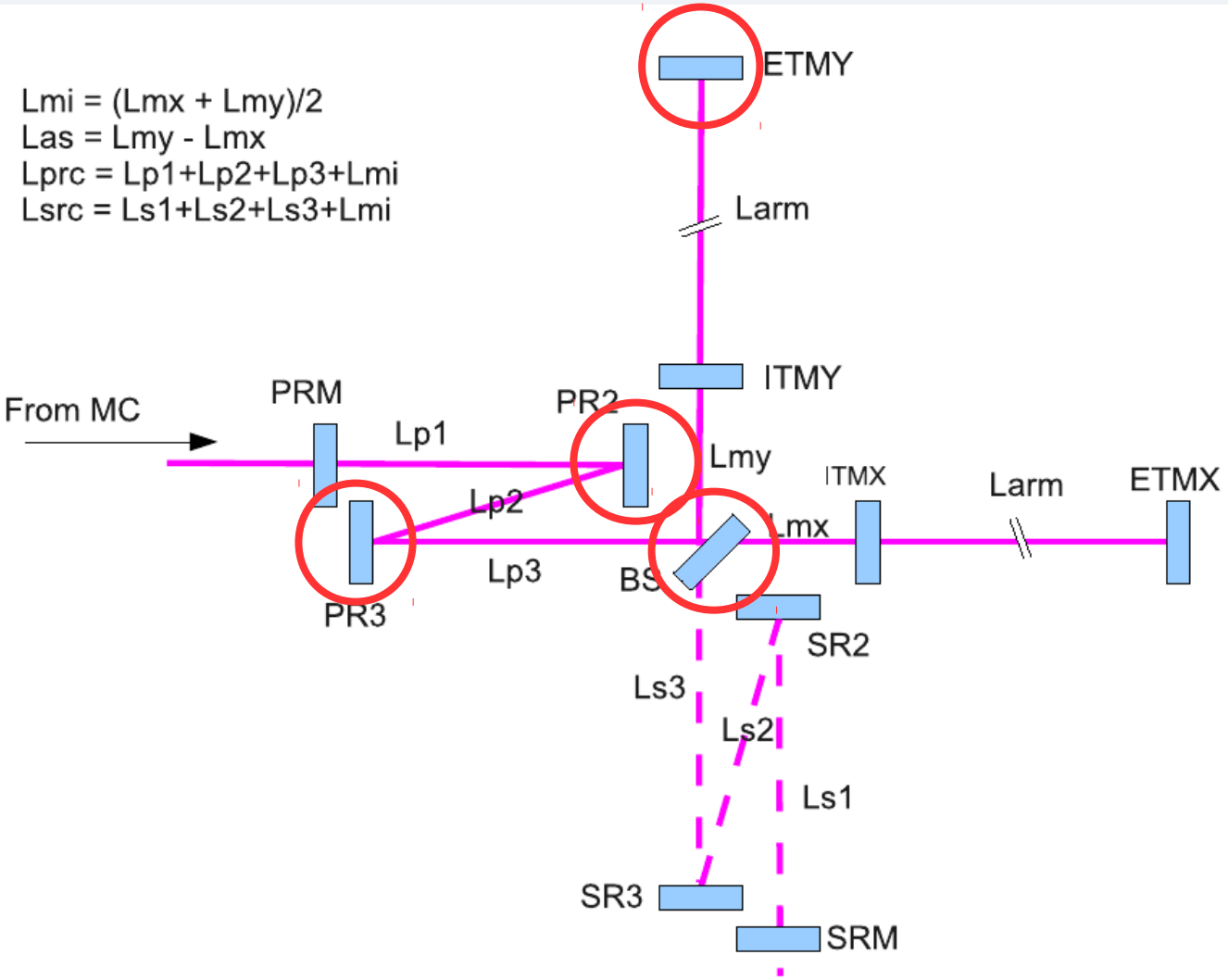
[Comment: D-sub cables too thick?]



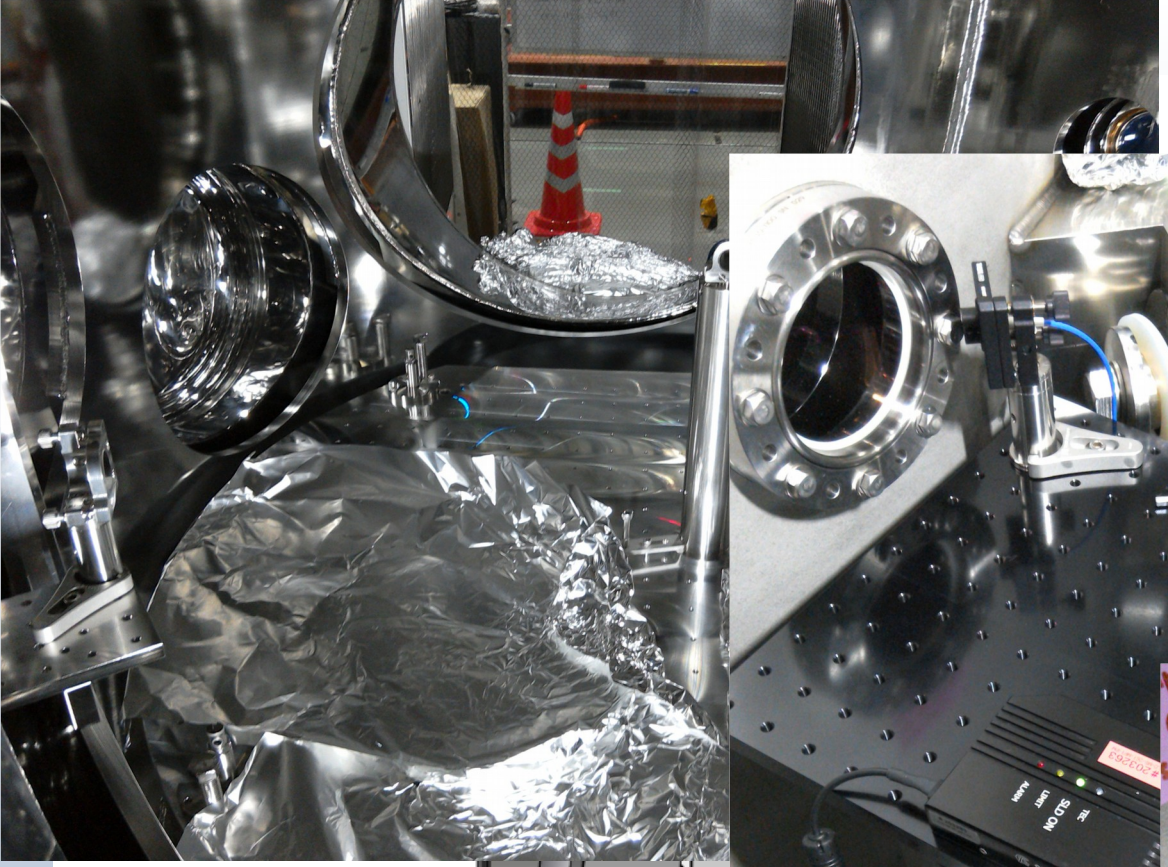
E. Majorana (2015)

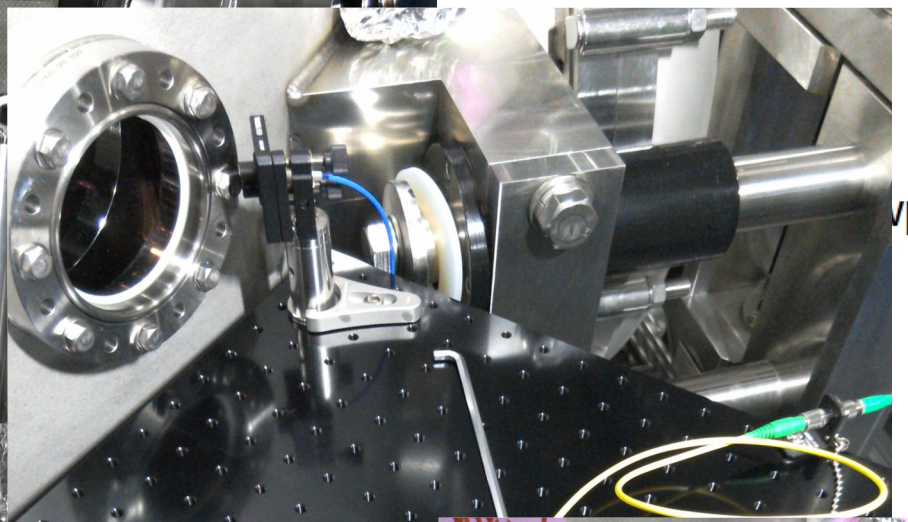


QPD stage

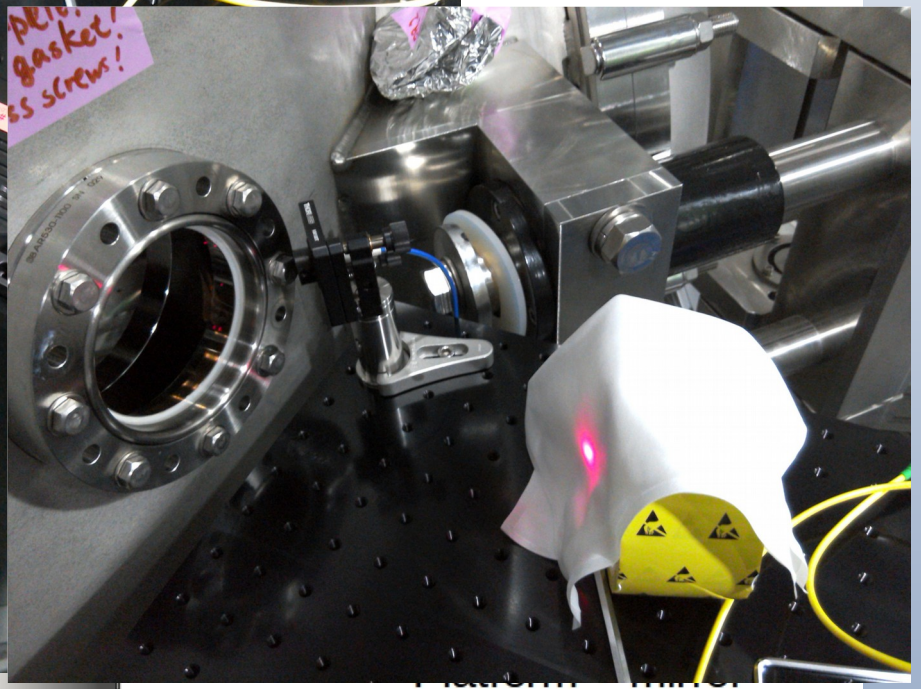


- Regular and length-sensing OpLevs installed for PR2, PR3, (BS), and ETMY
- Additionally in IMMT
- Special case: PR2

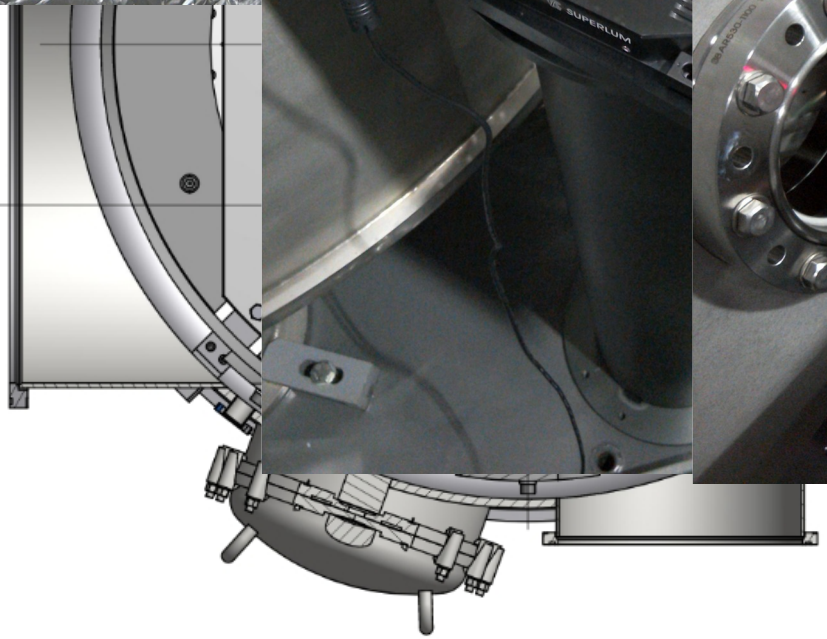




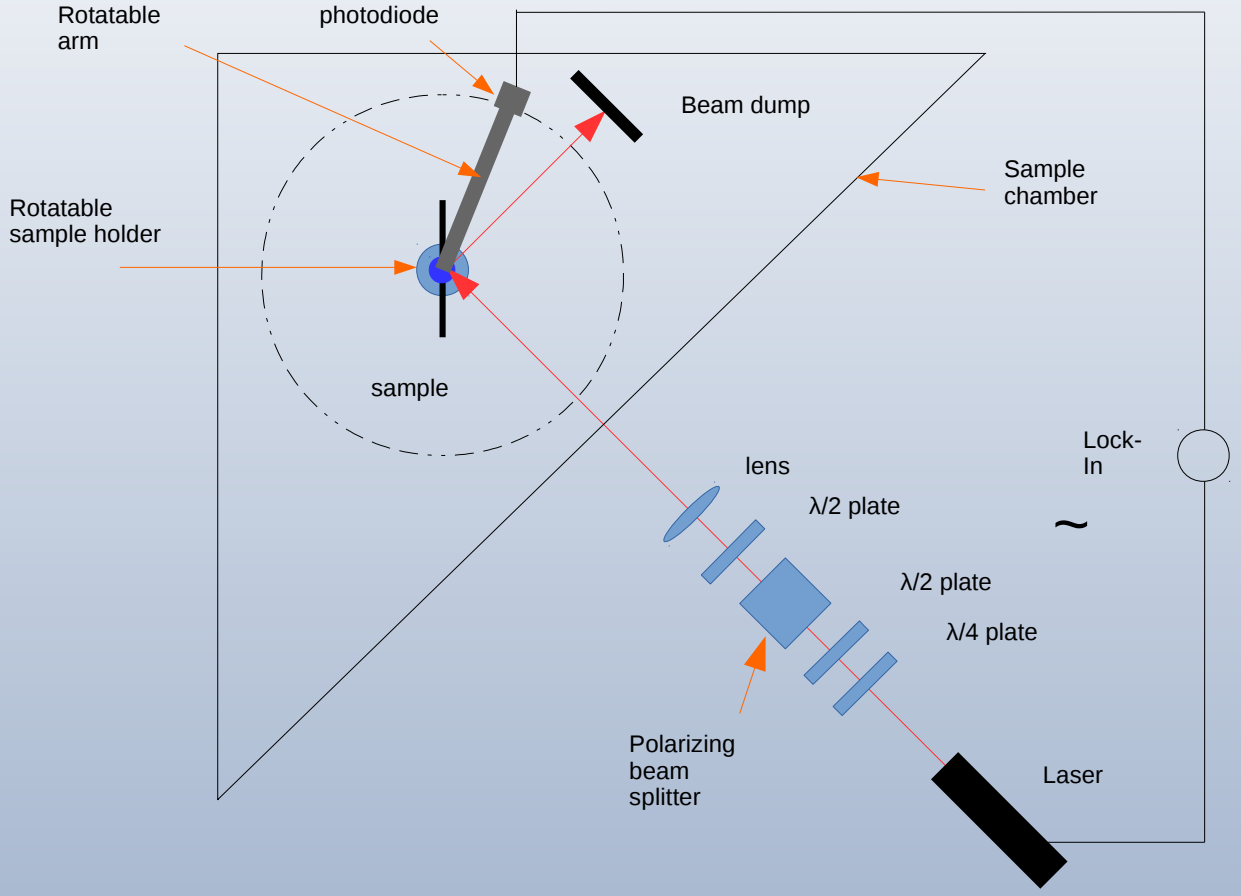
vport



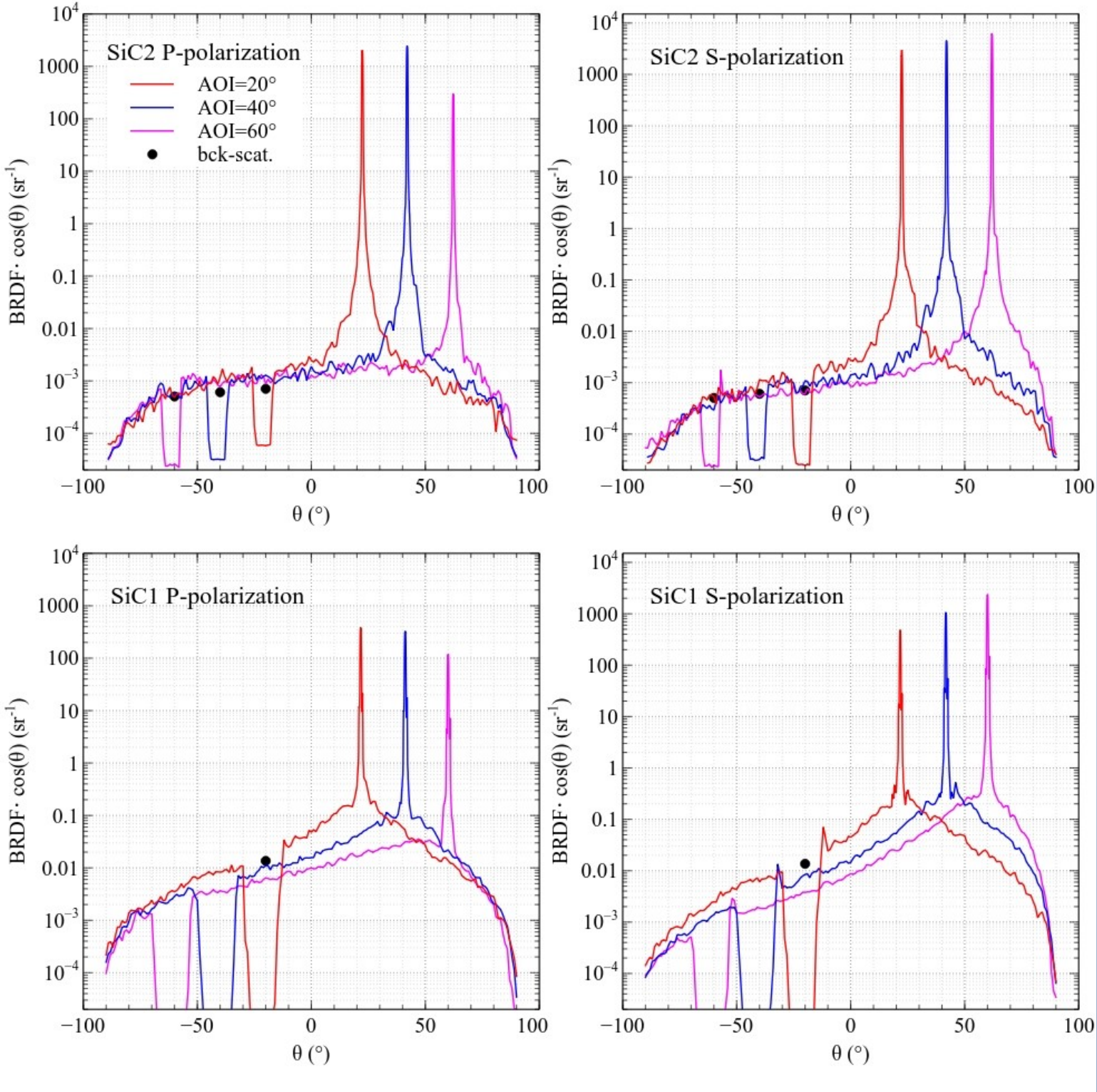
光軸

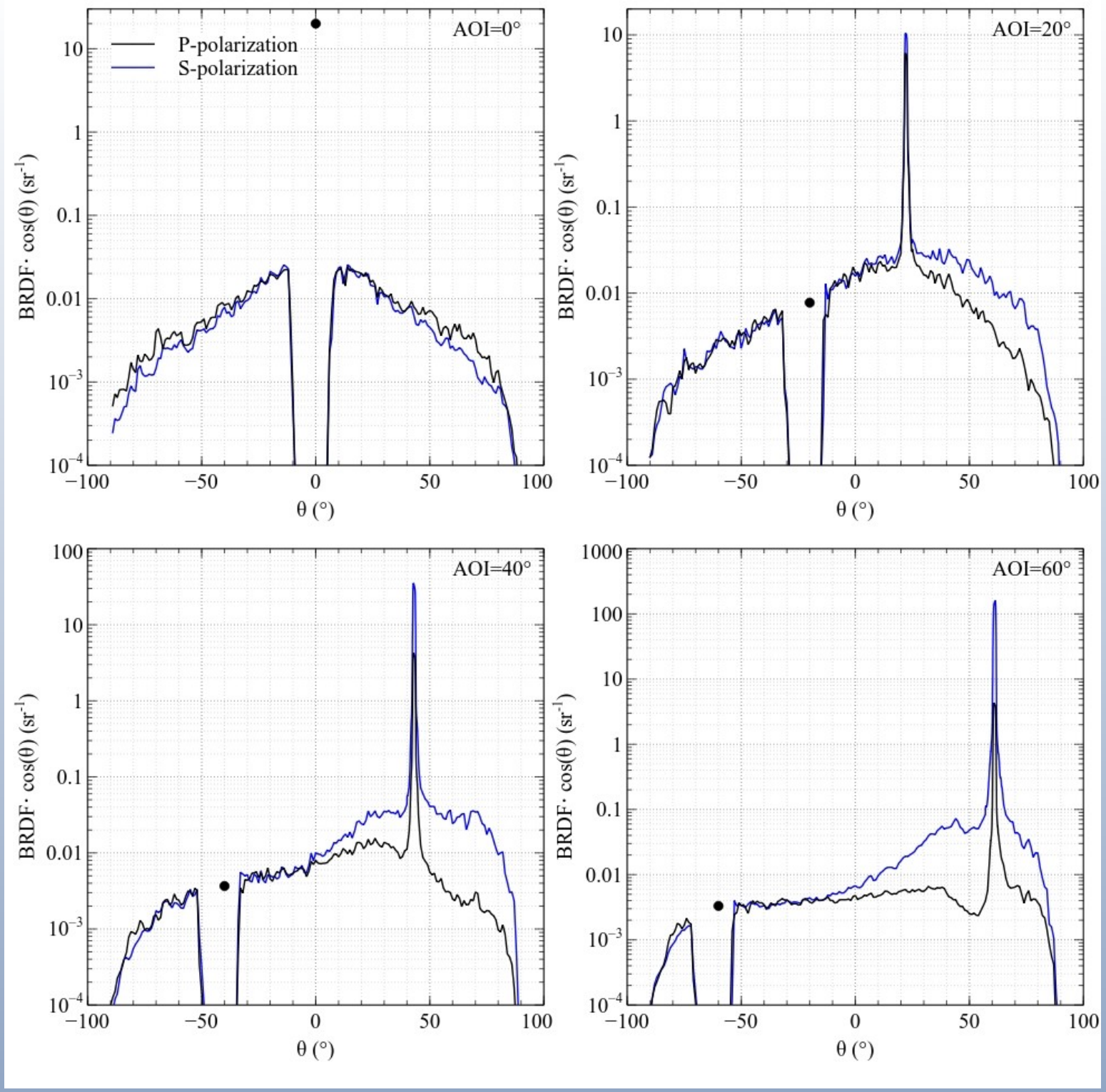


Scattering Measurements



- Recent upgrade of the scatterometer at NAOJ let us measure the scattering around the specular reflection peak with higher accuracy
- Application: SiC and Solblack


SiC2 P-polarization
AOI=20°
AOI=40°
AOI=60°
bck-scat.
SiC2 S-polarization
SiC1 P-polarization
SiC1 S-polarization
BRDF · cos(θ) (sr⁻¹)
θ (°)


P-polarization
S-polarization
AOI=0°
AOI=20°
AOI=40°
AOI=60°
BRDF· cos(θ) (sr-1)
θ (°)

Summary

WAB:

- Design almost finished
- Need cryo test
- Installation may be an issue as the WAB is very close to the test mass

OpLev:

- Work is ongoing
- Whenever a mirror is being hung, we will install OpLevs

Scattering Measurements:

- Updated instrument with 0.01° angular resolution
- Recent measurements of SiC and SolBlack have very good agreement with reflection measurements
- Paper is currently being written (to be submitted within this year, hopefully...)

Thank you for your attention!