

E-TEST prototype status

Christophe Collette for the E-TEST consortium

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E-TEST project

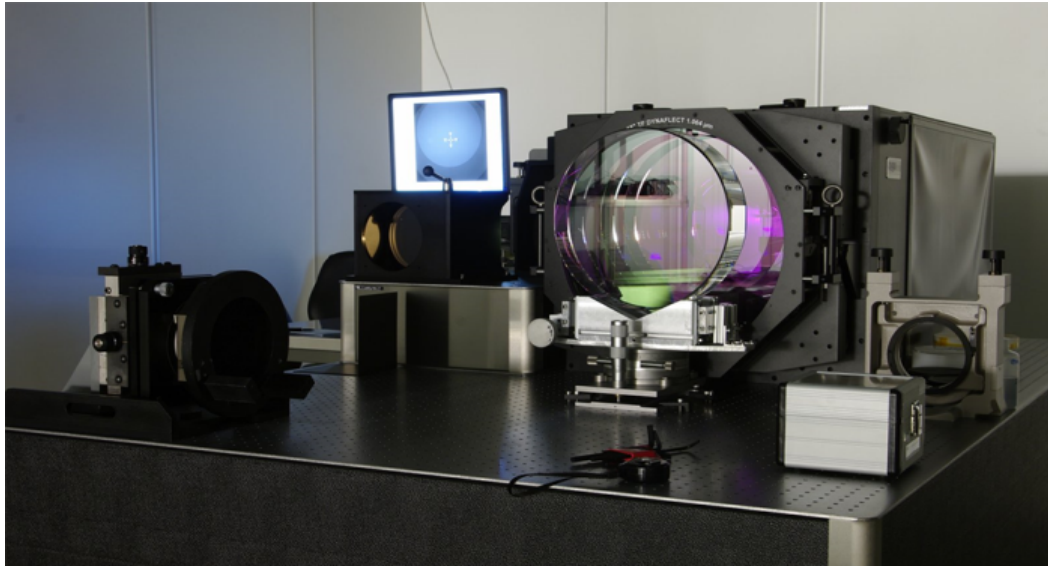
Budget: € 15,0 million

Duration : 2020 – 2023

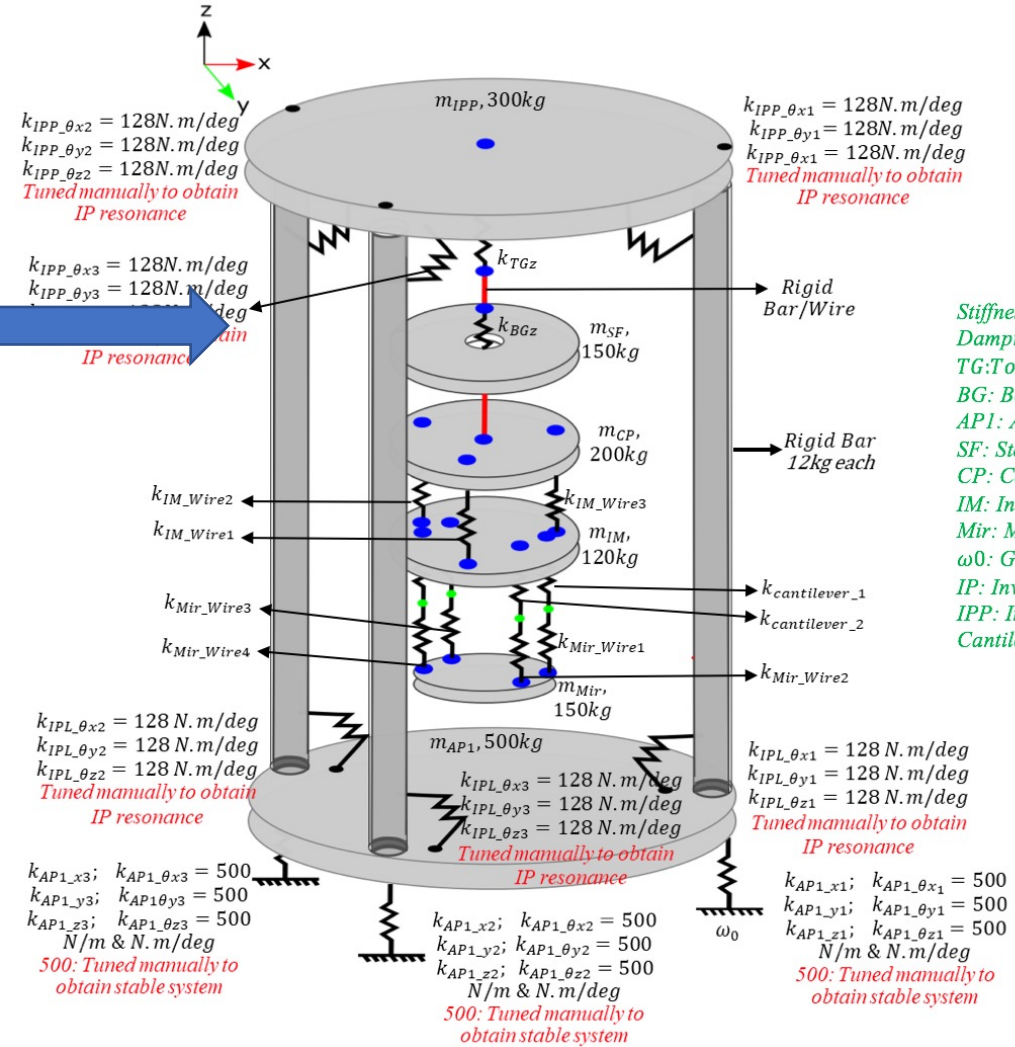
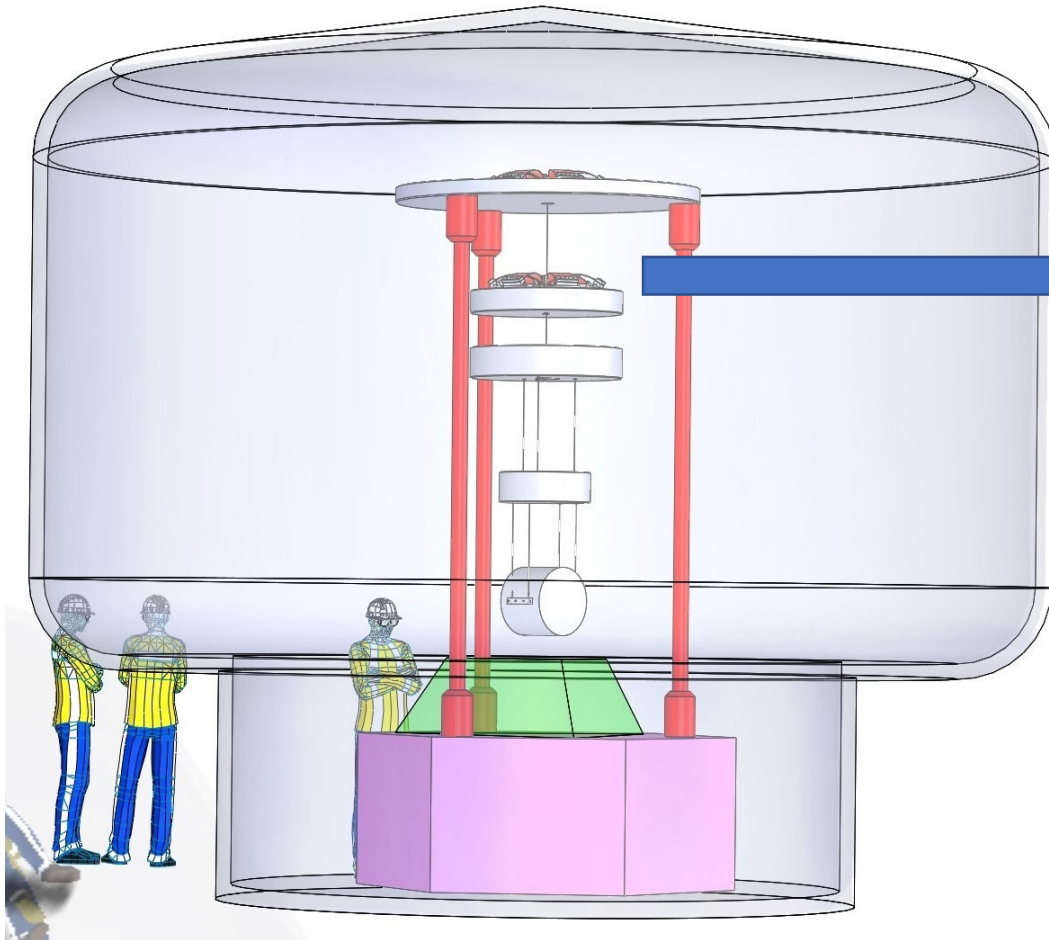
Collaborations: 11 partners

Objectives:

- Development of a prototype of large suspended cryogenic mirror
- Geological exploration of the EMR and determination of the optimal ET location.



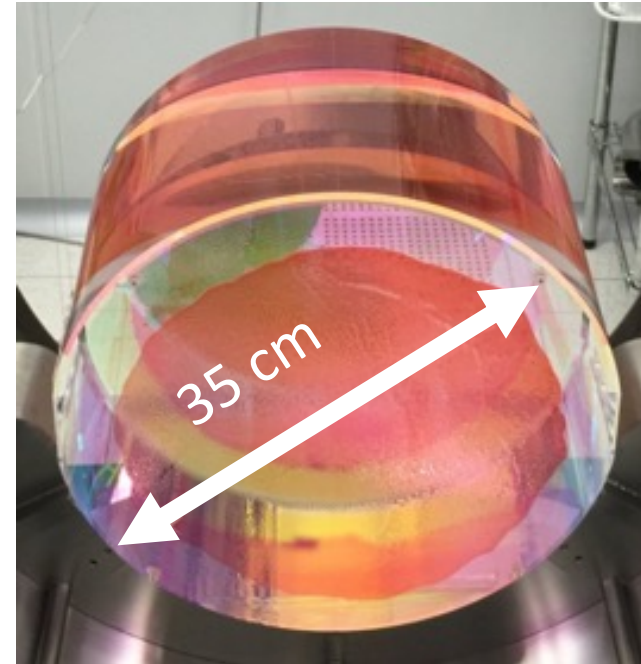
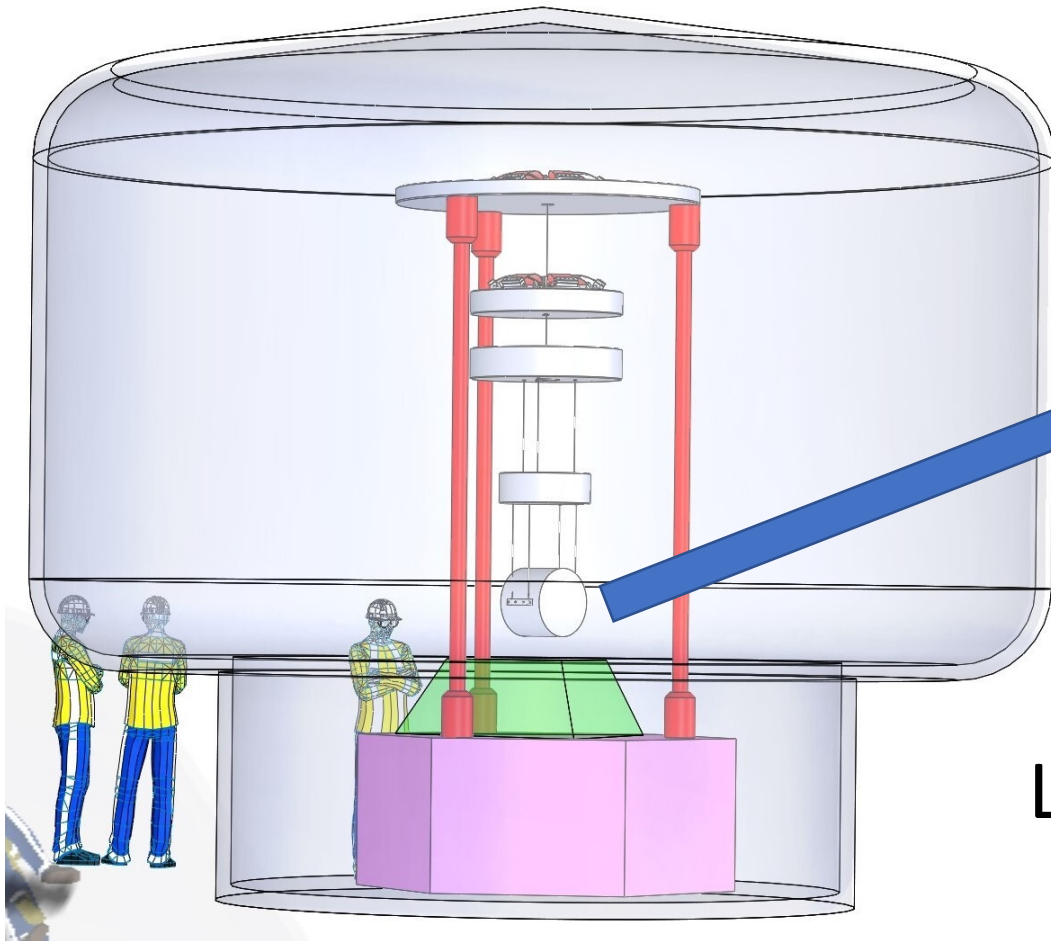
Full scale compact seismic isolation



Stiffness units in N/m & N.m/deg.
Damping units in N/(m/s) & N.m/(deg/s)
TG: Top GAS Filter (vertical Direction only)
BG: Bottom GAS Filter (vertical Direction only).
AP1: Active Control stage ("6 DOF")
SF: Steering Filter.
CP: Cold Platform.
IM: Intermediate Mass.
Mir: Mirror Mass.
 ω_0 : Ground Motion.
IP: Inverted Pendulum.
IPP: Inverted Pendulum Platform.
Cantilever spring (vertical direction only).

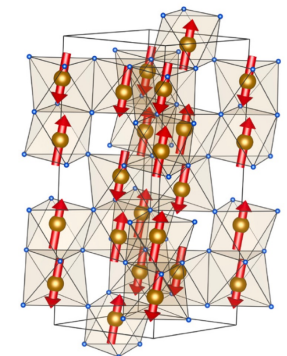
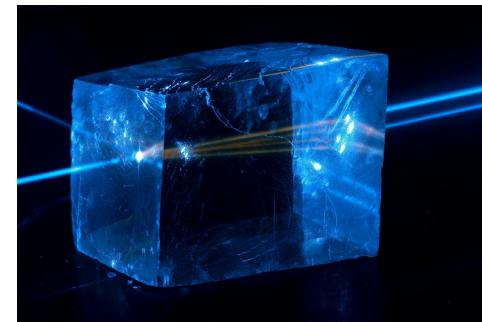
Combine active and passive suspension

Large silicon mirror $m = 100 \text{ kg}$

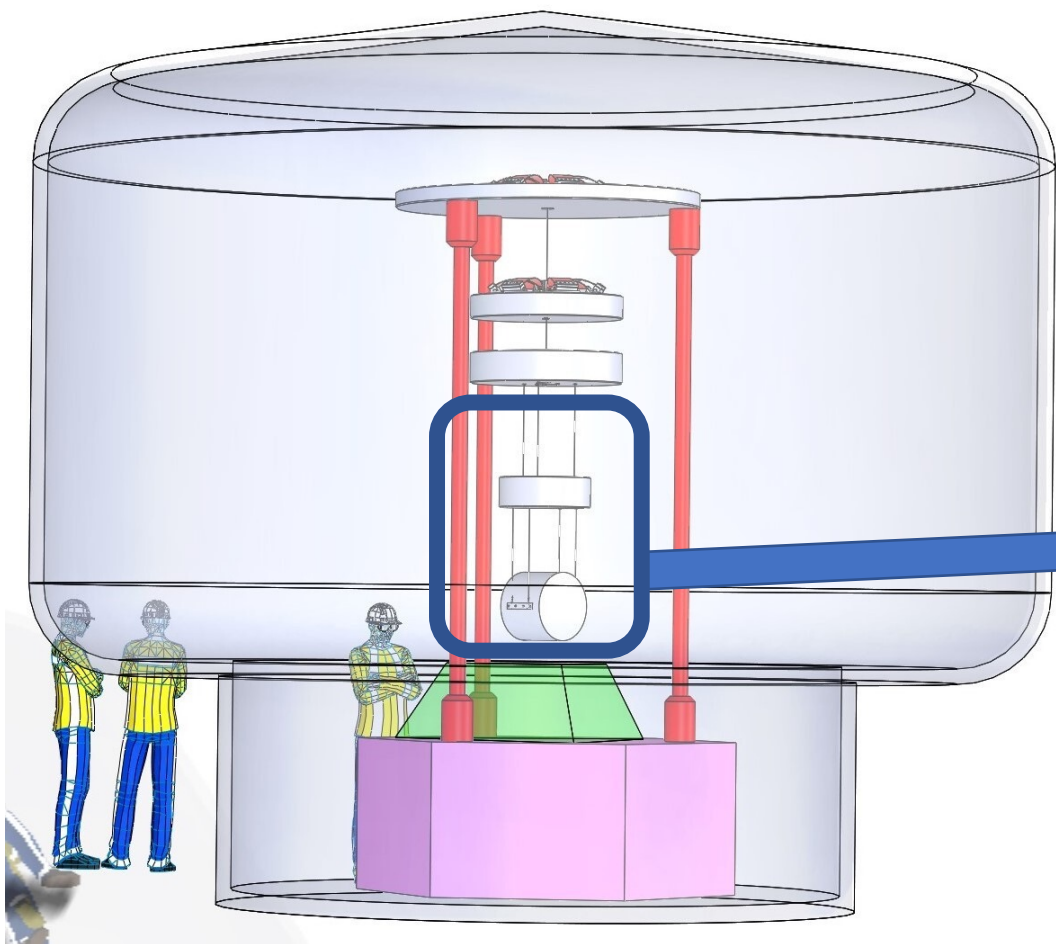


Low noise coating technology

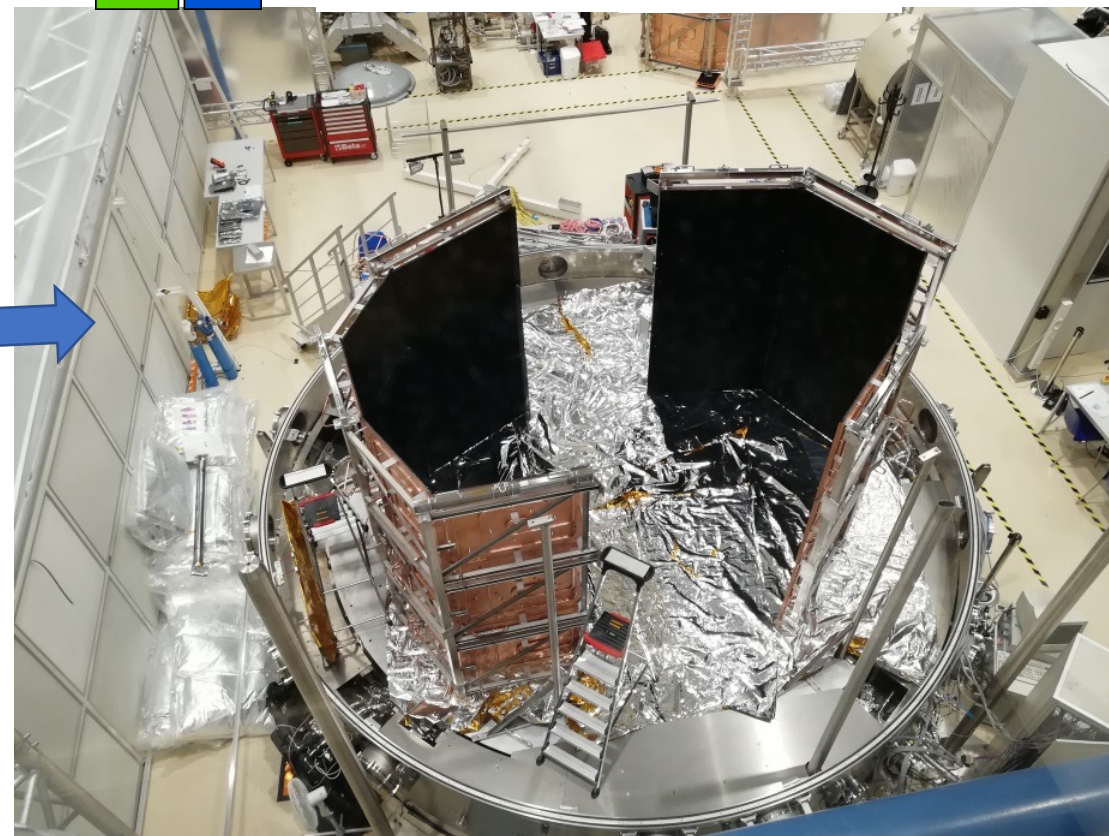
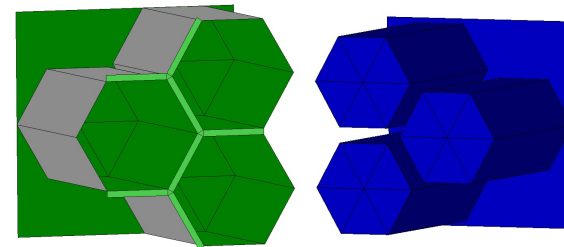
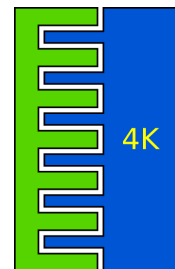
KU LEUVEN

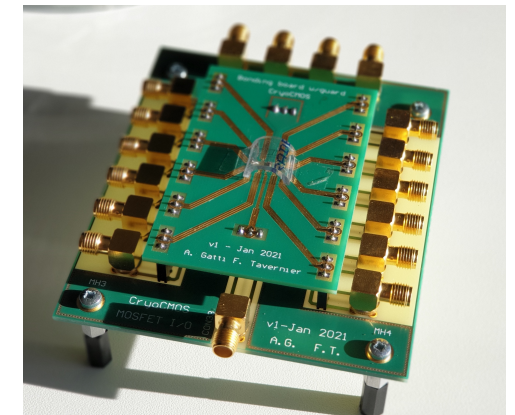
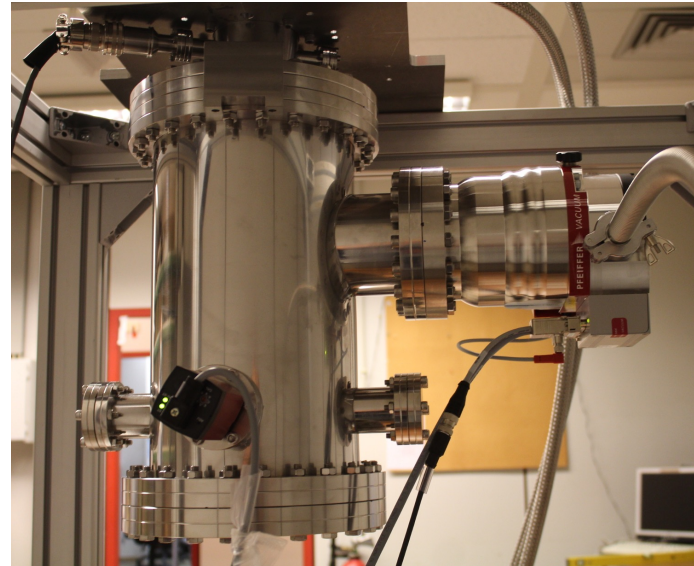
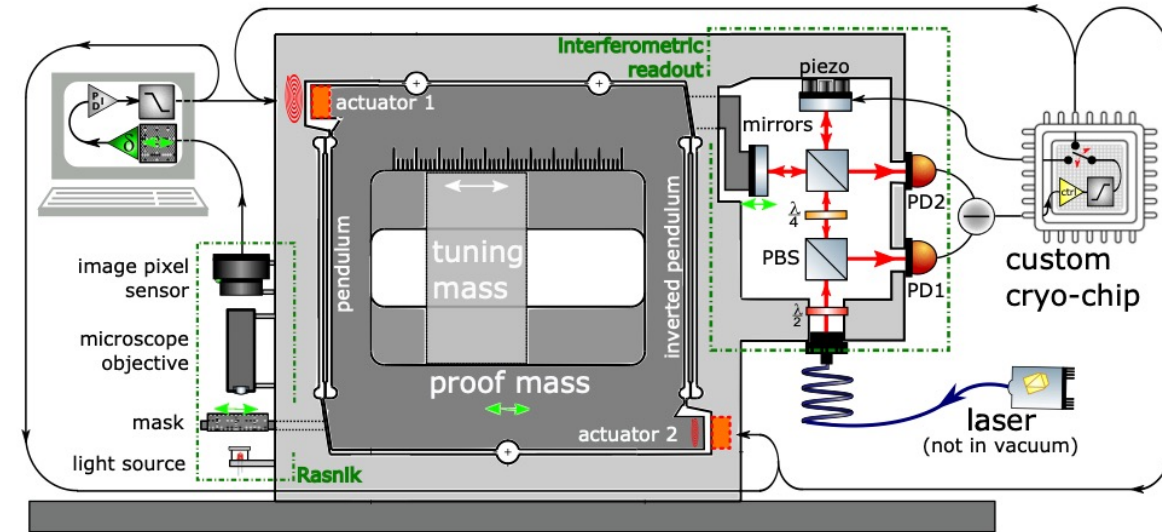
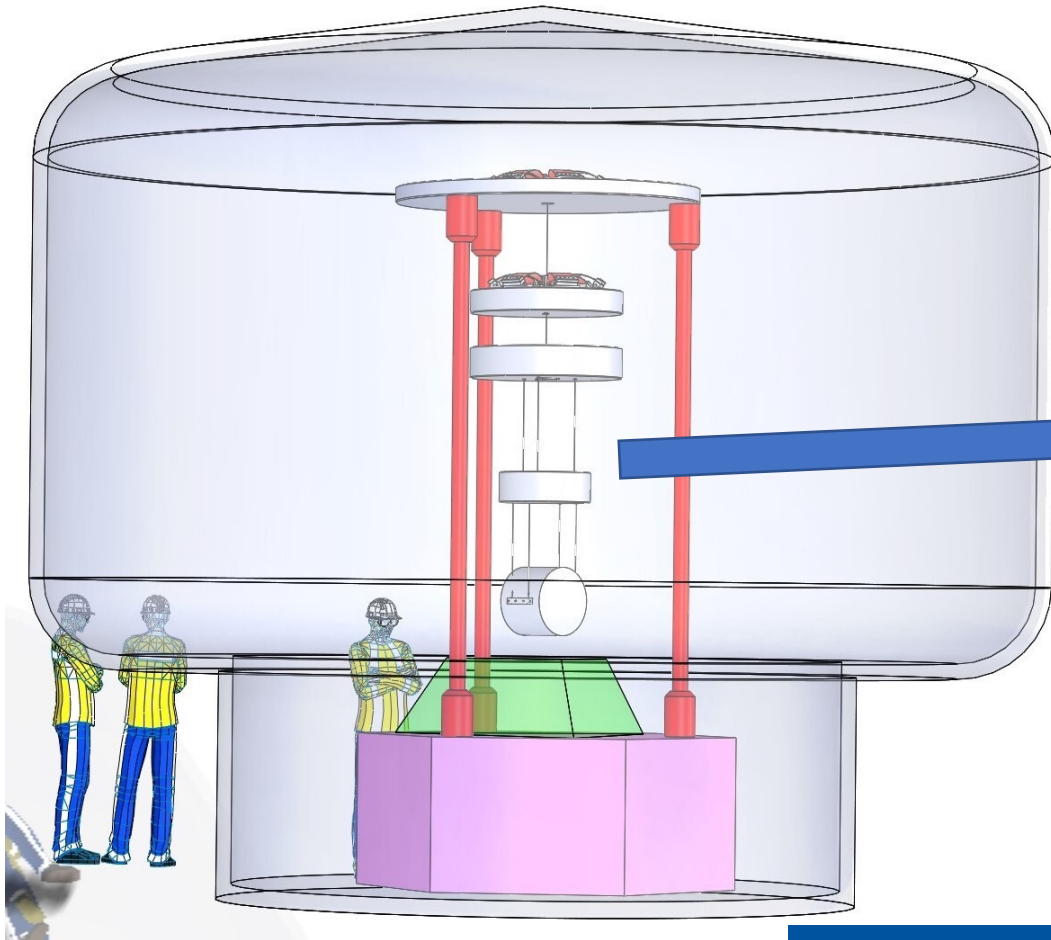


Radiative cooling

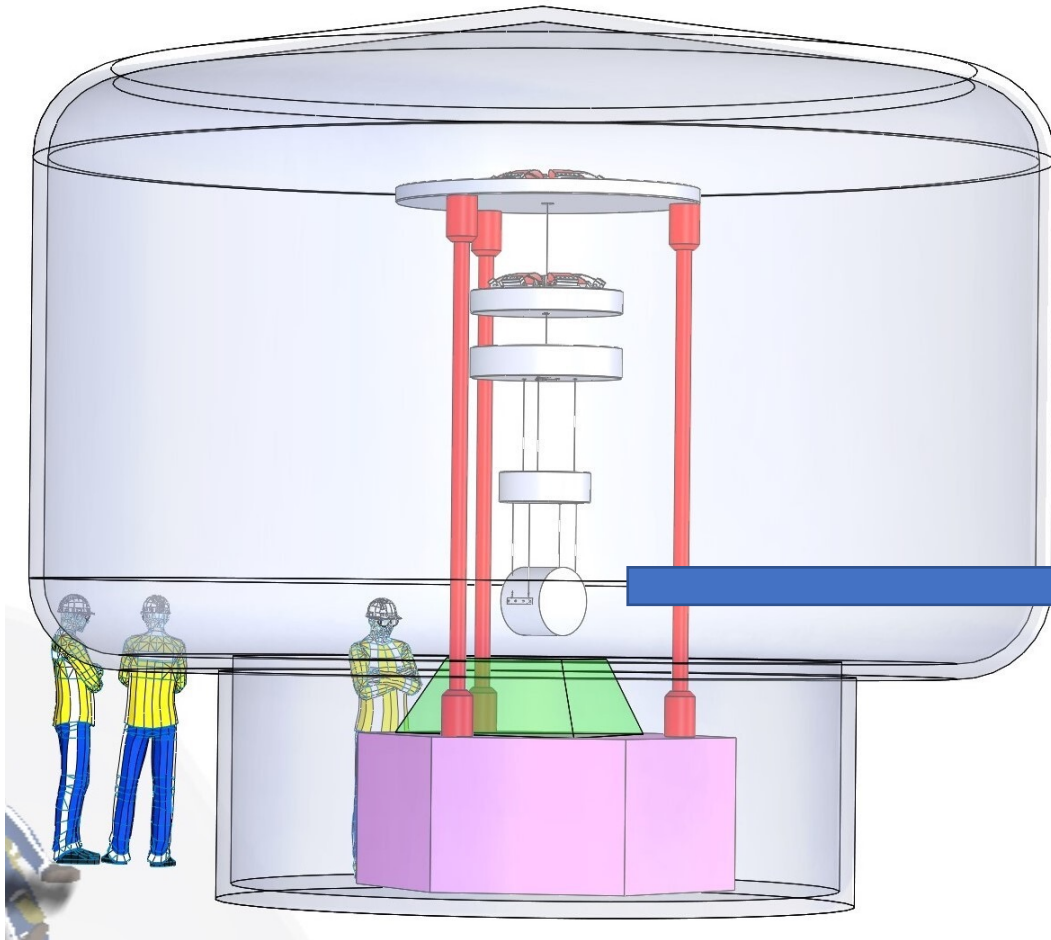


Target temperature ~ 20 K

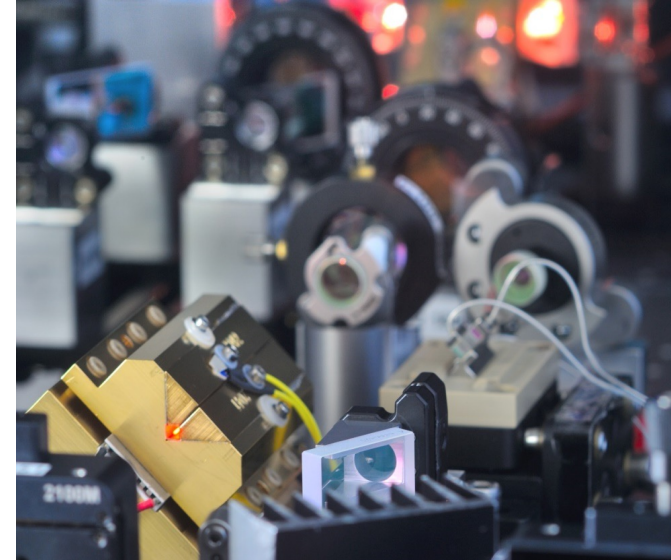




Stabilized laser and optical components

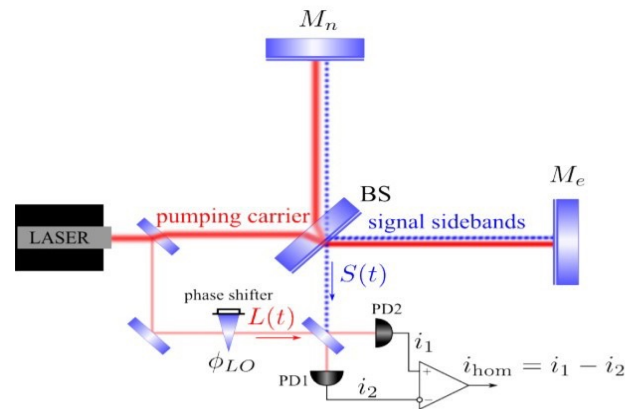


Fraunhofer
ILT

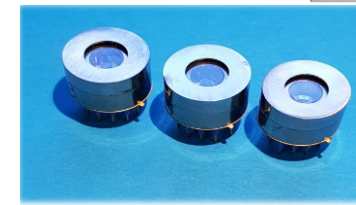
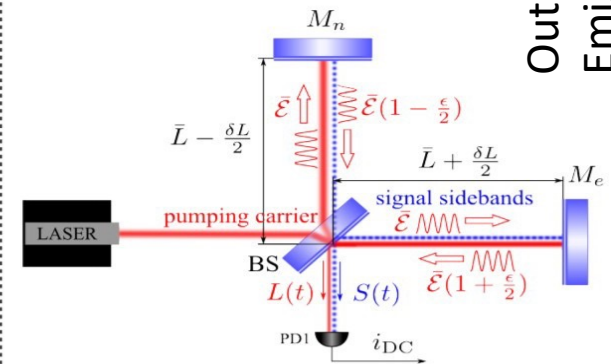


Output power: 5-10 W
Emission wavelength: ca. 2090 nm

Homodyne readout scheme



DC readout scheme



►► **UHASSELT**

Conclusions

- Suspension & cooling strategy developed
- Many ET-related research activities ongoing
- Prototype design is progressing
- Open consortium with many opportunities to collaborate !
- <https://www.etest-emr.eu>