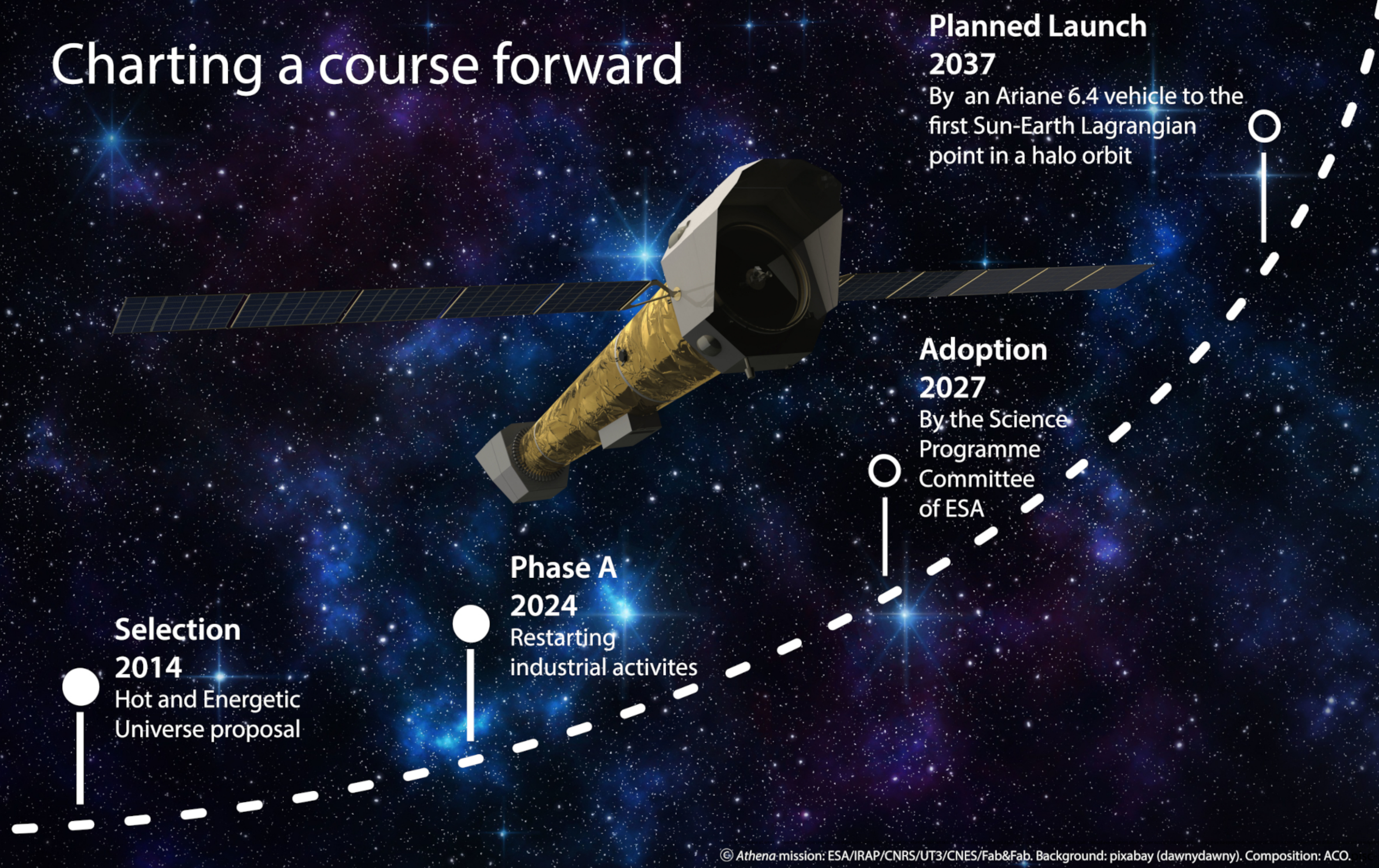


New-ATHENA - or simply ATHENA is back on Nov. 7 2023

Charting a course forward



© Athena mission: ESA/IRAP/CNRS/UT3/CNES/Fab&Fab. Background: pixabay (dawnydawny). Composition: ACO.

Agata Rózańska + ATHENA.PL, CAMK PAN

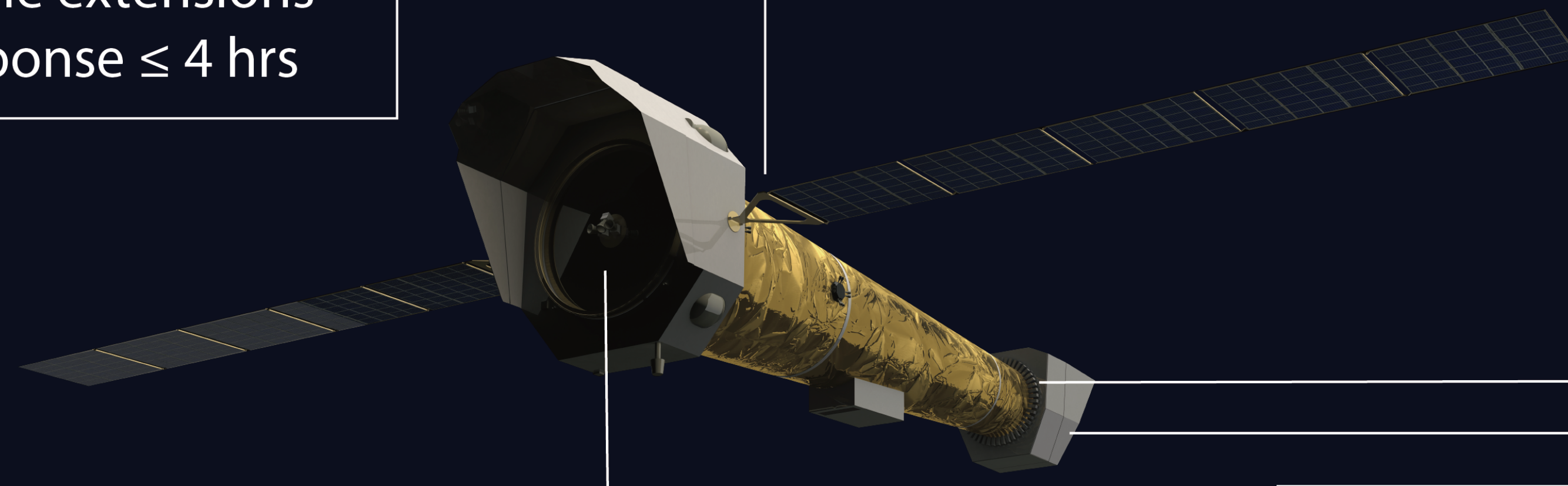
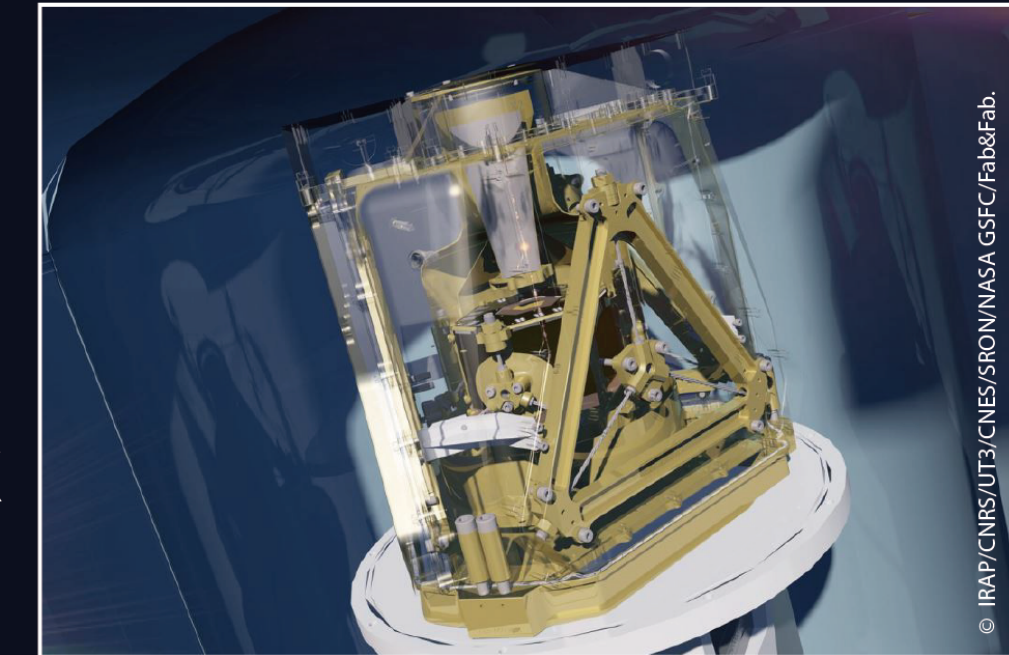


Large ESA flag mission - 10 years after instrument definition

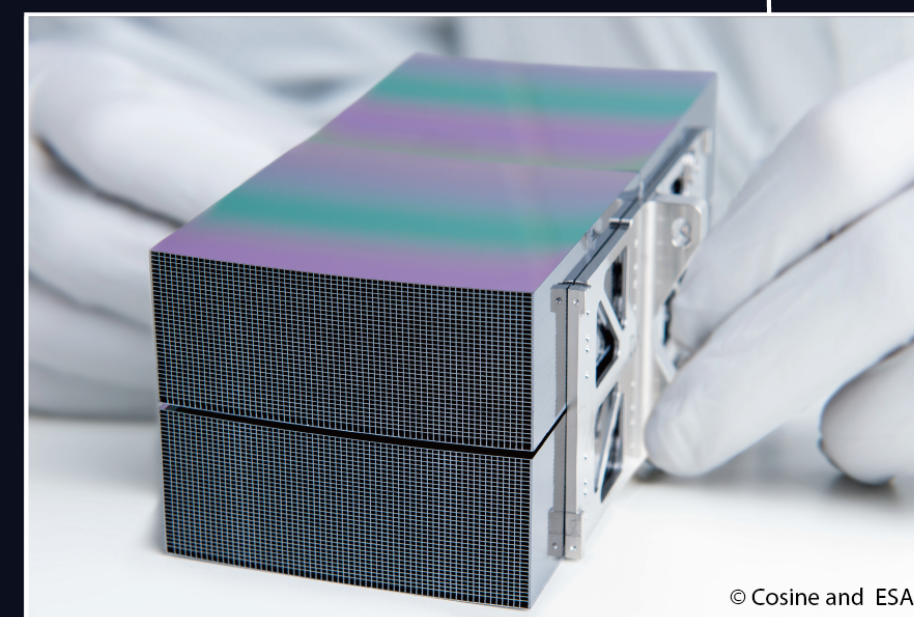
The *Athena* X-ray observatory

Ariane 6
L1 orbit
4 years nominal mission
+ possible extensions
ToO response ≤ 4 hrs

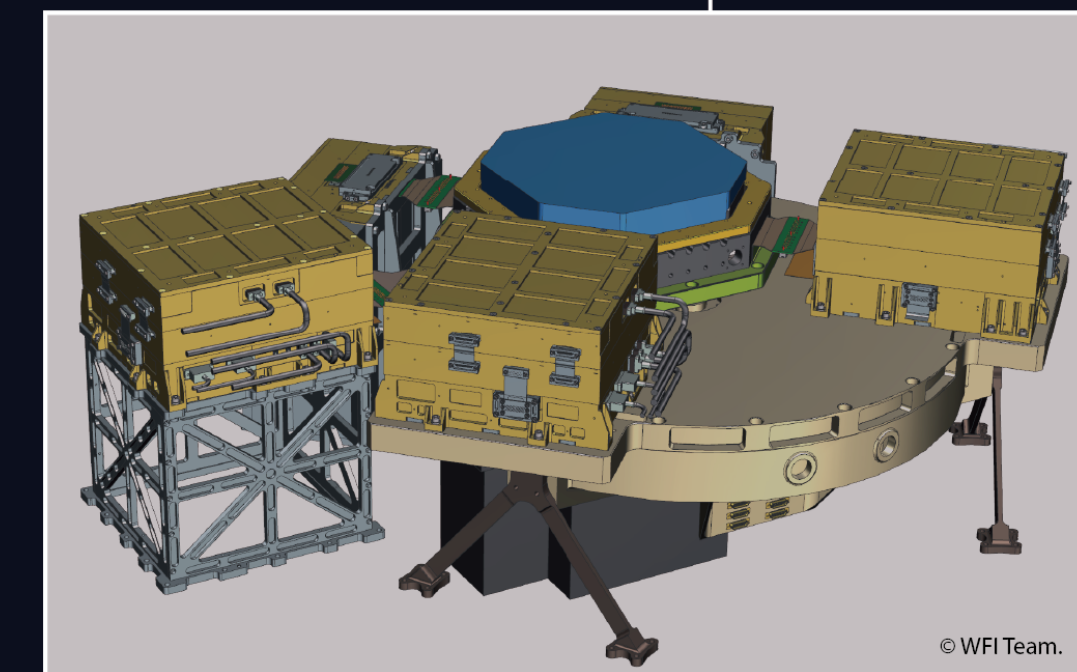
X-ray Integral Field Unit:
 ΔE : 2.5 eV
Field of view: 5 arcmin
Operating temperature: 50 mK



Silicon Pore Optics:
1.4 m² at 1 keV
5 arcsec HEW
Focal length: 12 m
Sensitivity: $3 \cdot 10^{-17}$ erg cm⁻²s⁻¹



Wide Field Imager:
 ΔE : < 80 eV at 1 keV
Field of view: 40 arcmin
Small/Fast detector for bright sources



© ESA/IRAP/CNRS/UT3/CNES/SRON/NASA GSFC/Fab&Fab.

Large ESA flag mission - 11 years after acceptance of science goals

- How does the large scale structure in the Universe form and evolve?
 - How do black hole grow and help shape the Universe?
 - How and when are the chemical elements formed?
- Athena is an observatory with ~500 projects/year:
- Stars, exoplanets, pulsars, neutron stars, gravitational wave events, galaxies
 - Unprecedented discovery space



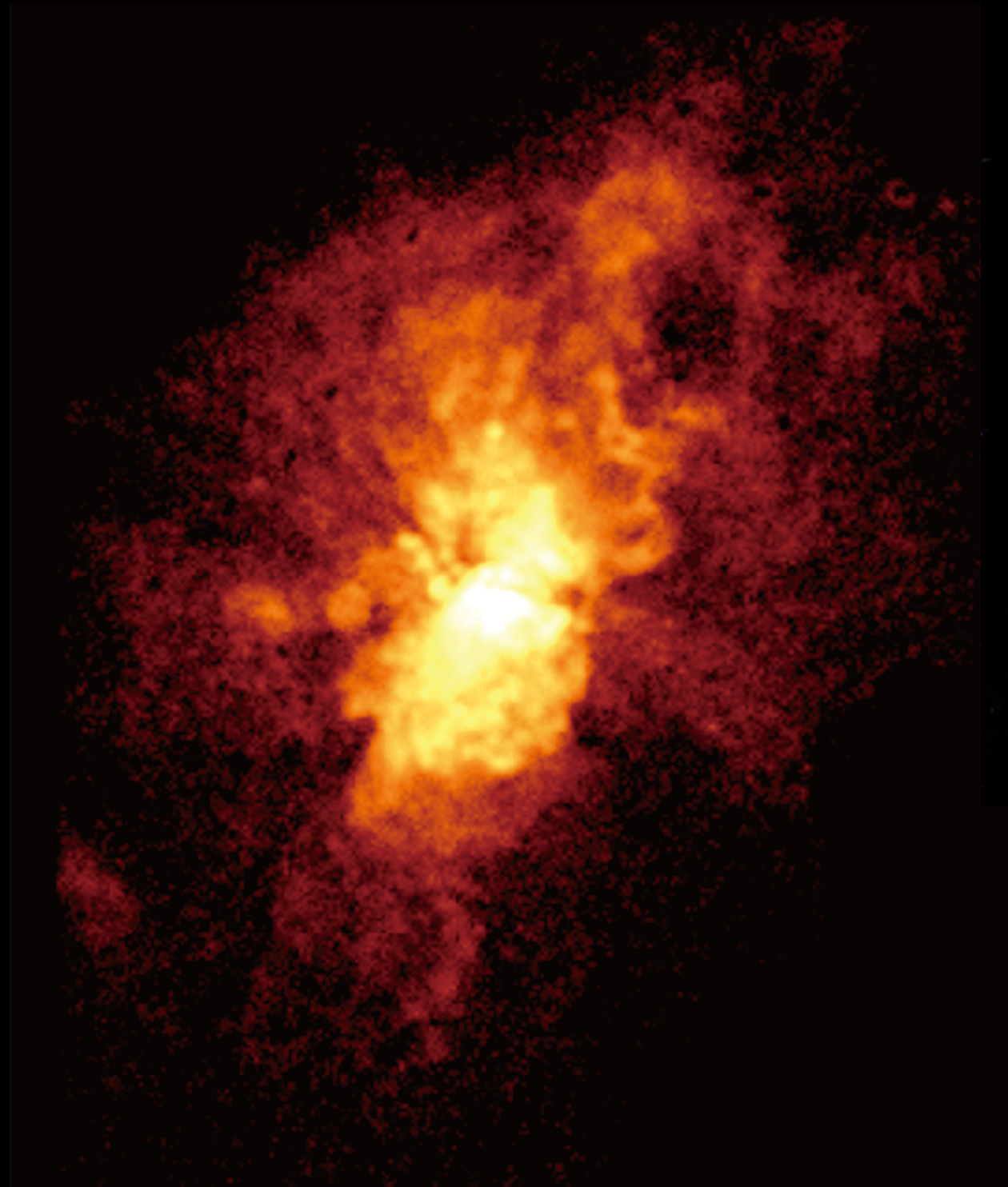
Temperature



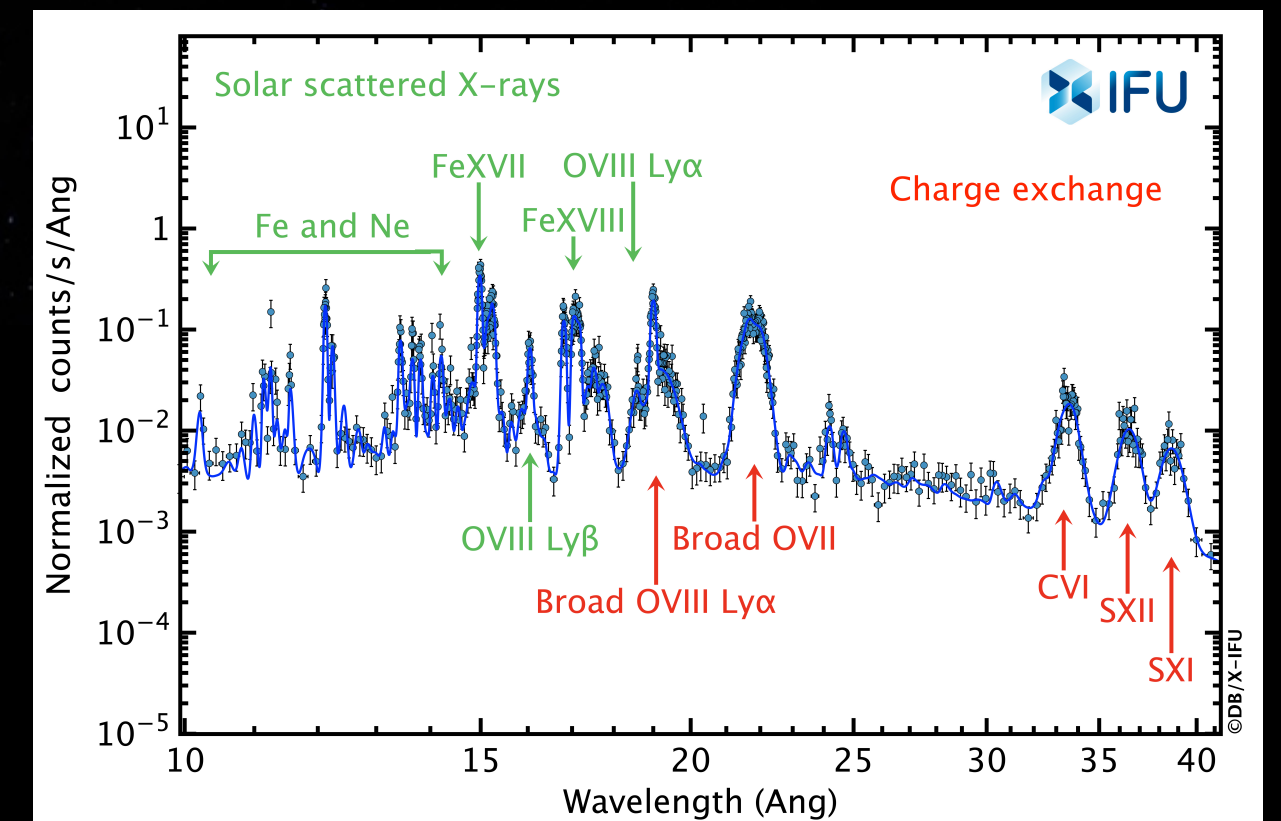
Chemical elements

Fe	O	Ne	Mg	Si	S
Ca	Cr	K	Ni	L	Ar

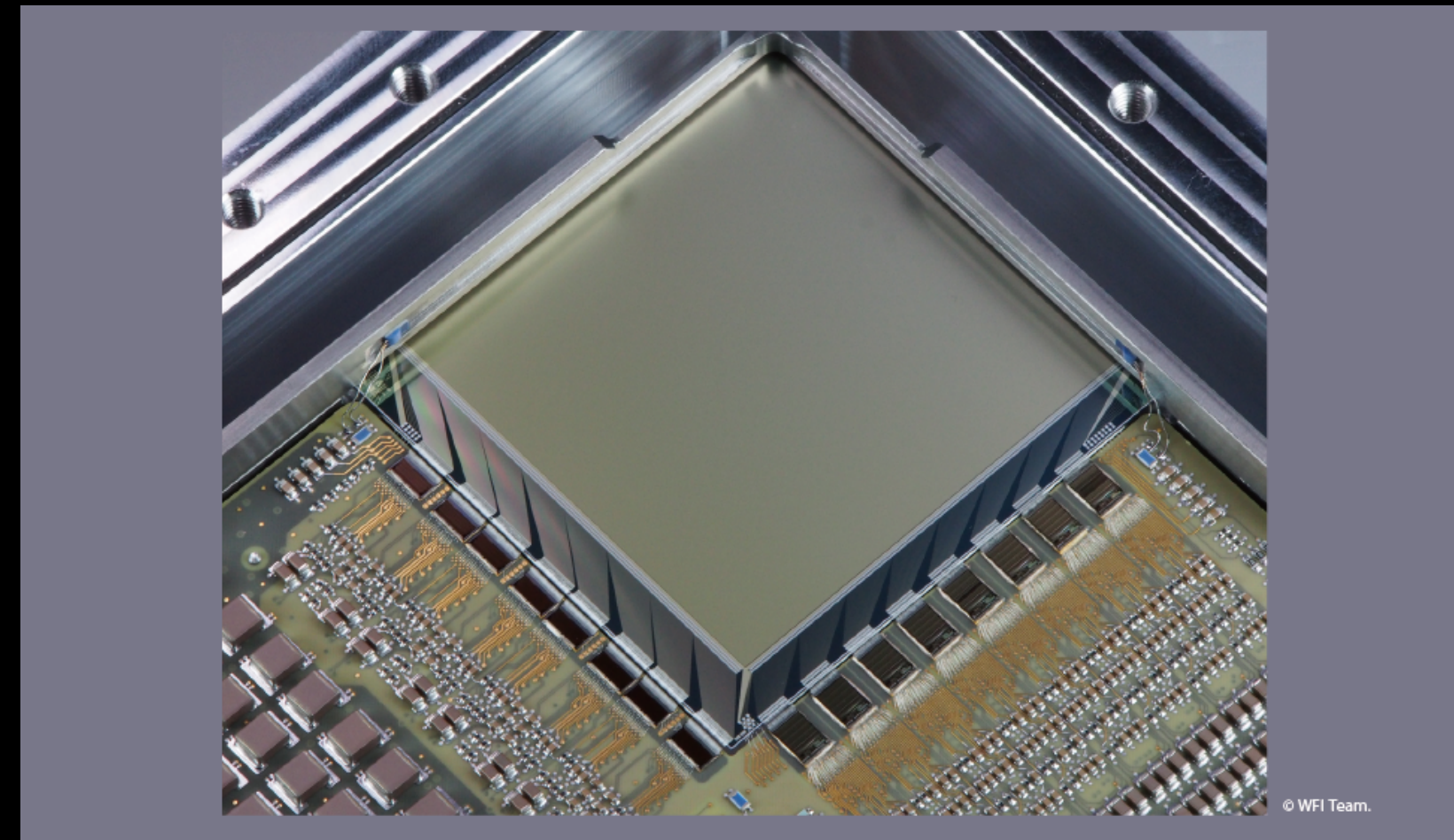
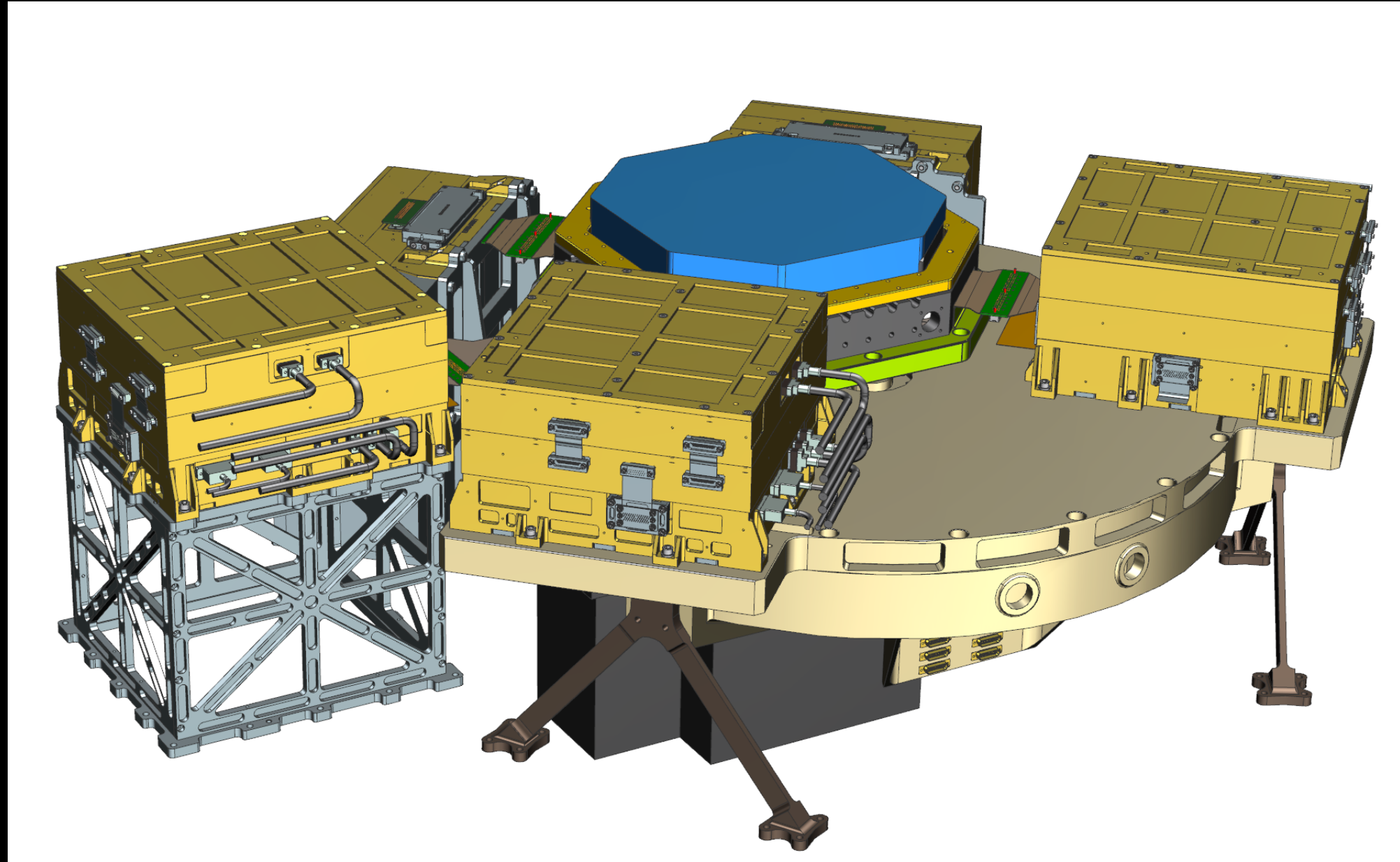
M82. WFI. SIXTE



© ACO & SIXTE Team.

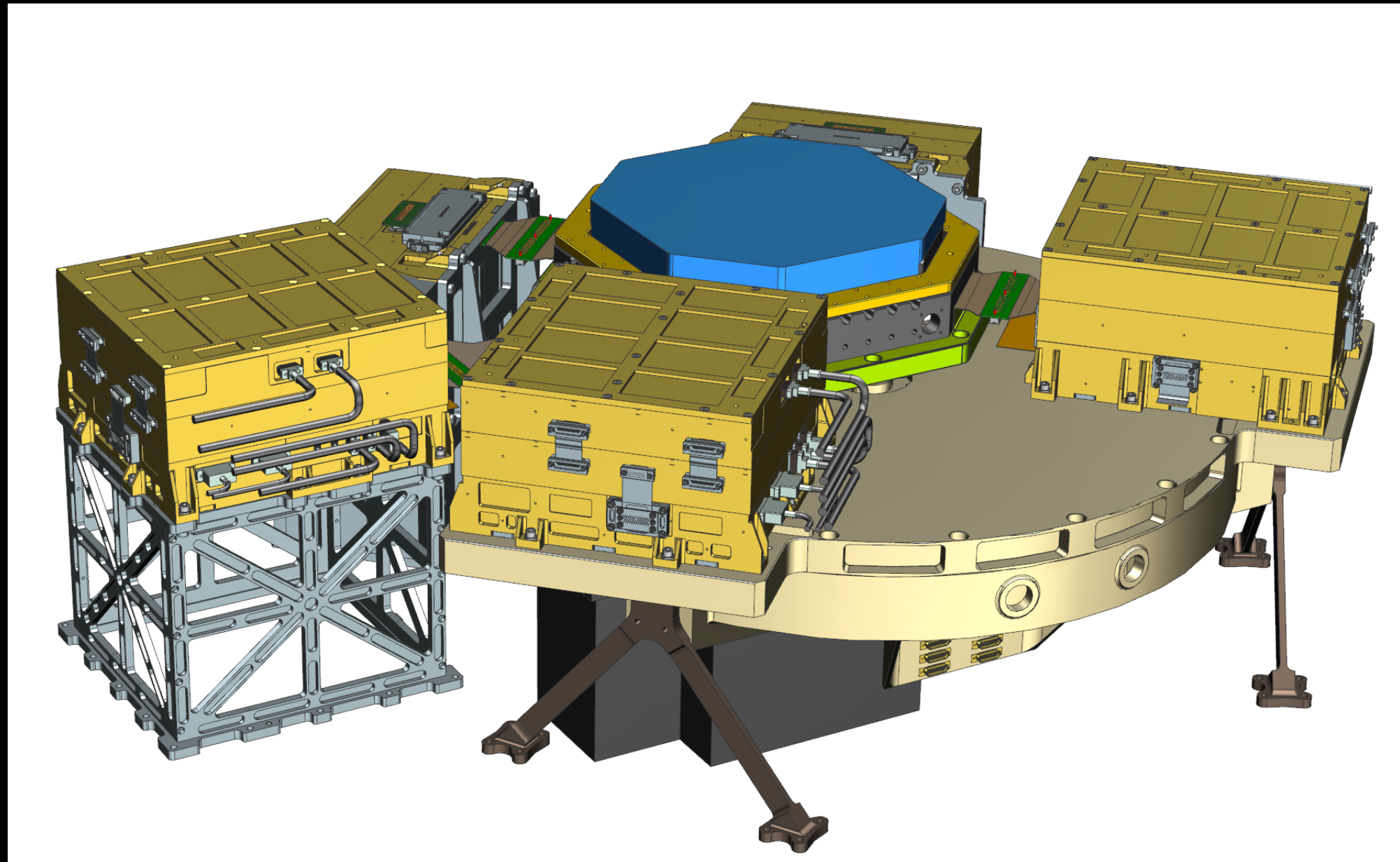


Wide Field Imager - WFI: CBK+CAMK Filter wheel + PSU

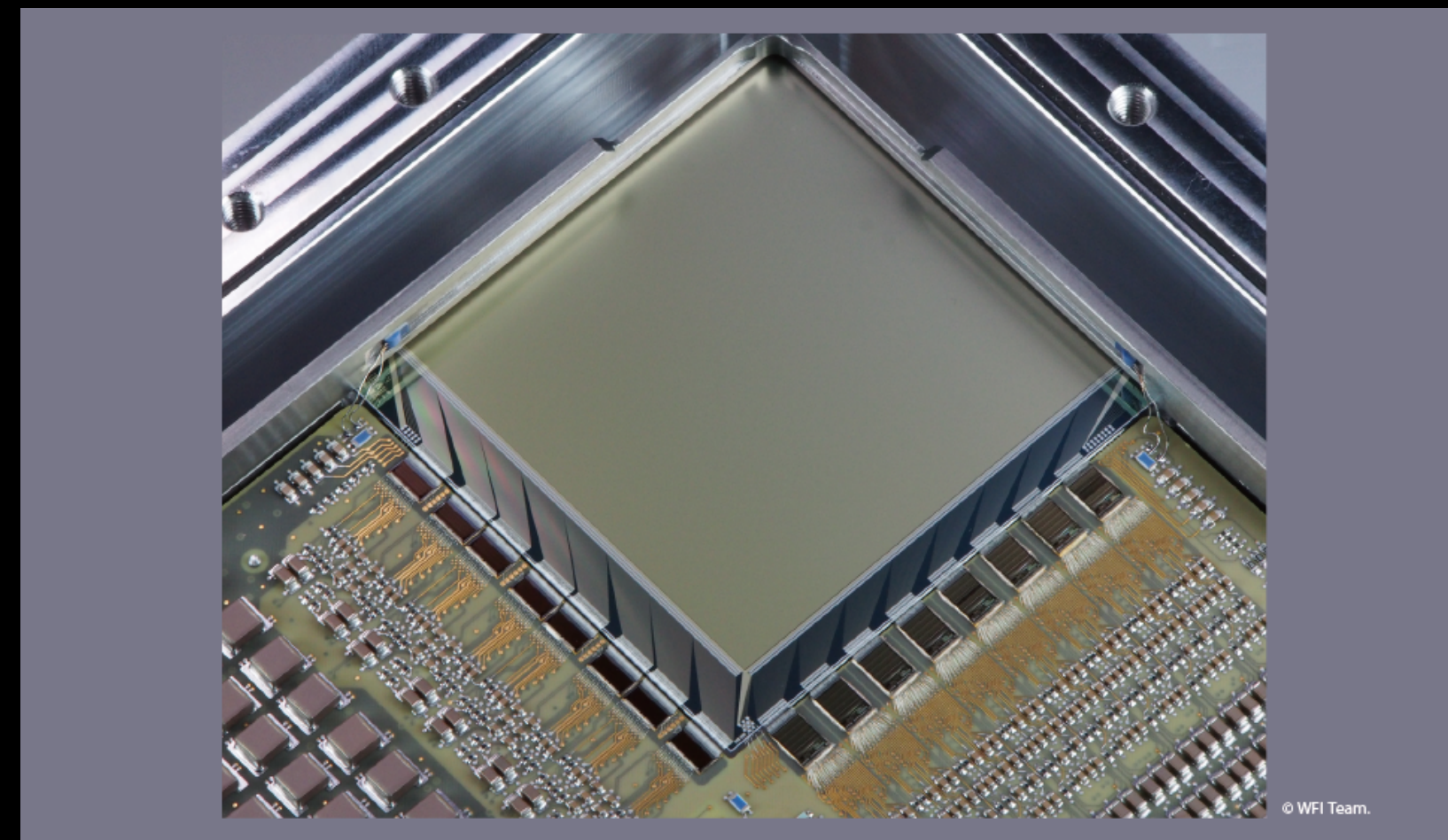
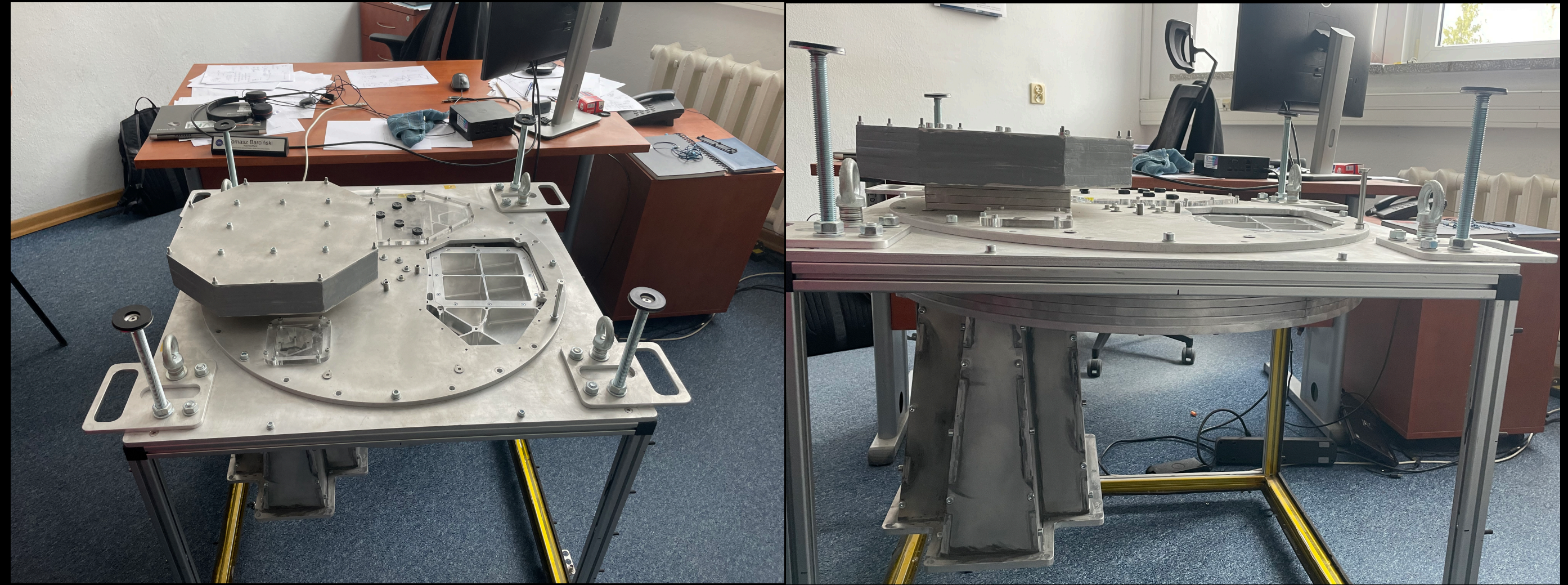


DEPFET - DEPLETED Field Effect Transistor

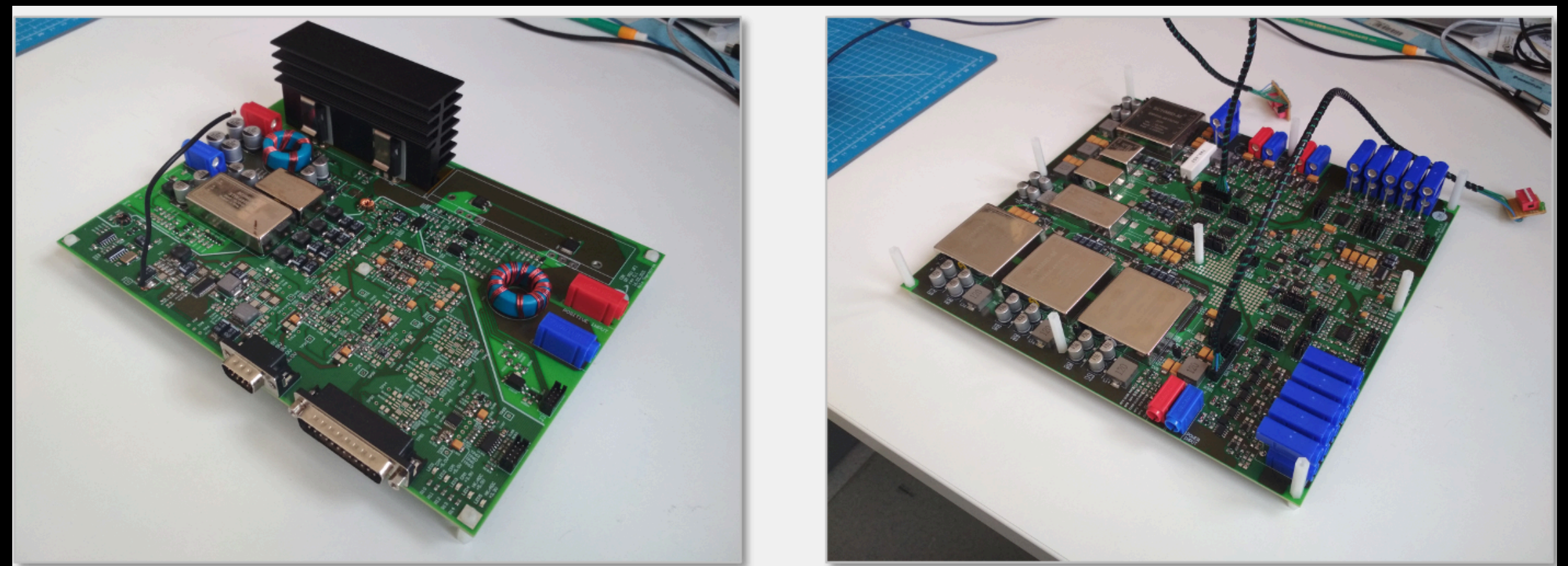
Wide Field Imager - WFI: CBK+CAMK Filter wheel + PSU



Prototype of the Filter Wheel

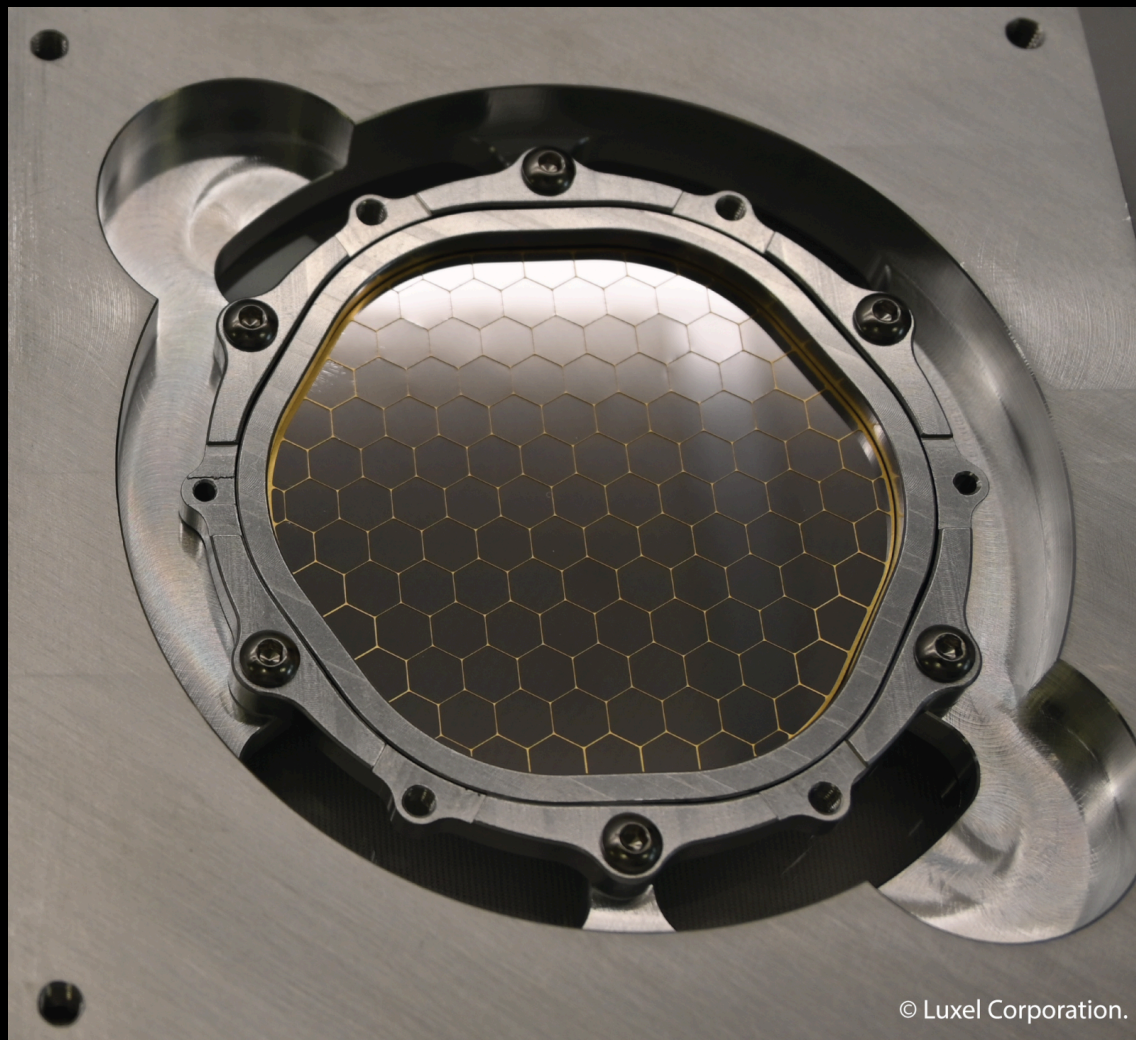
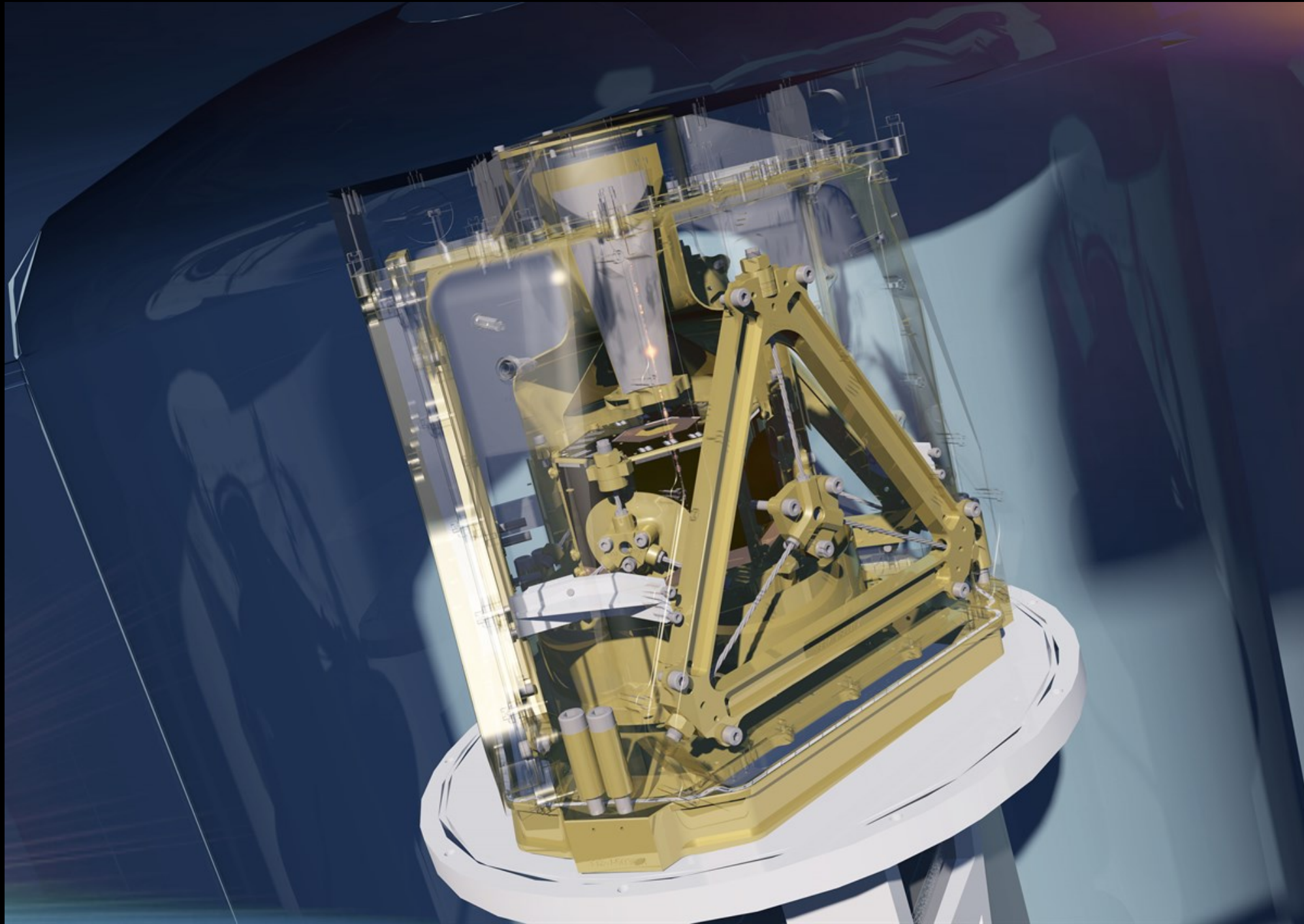


Breadboard of two electronic parts



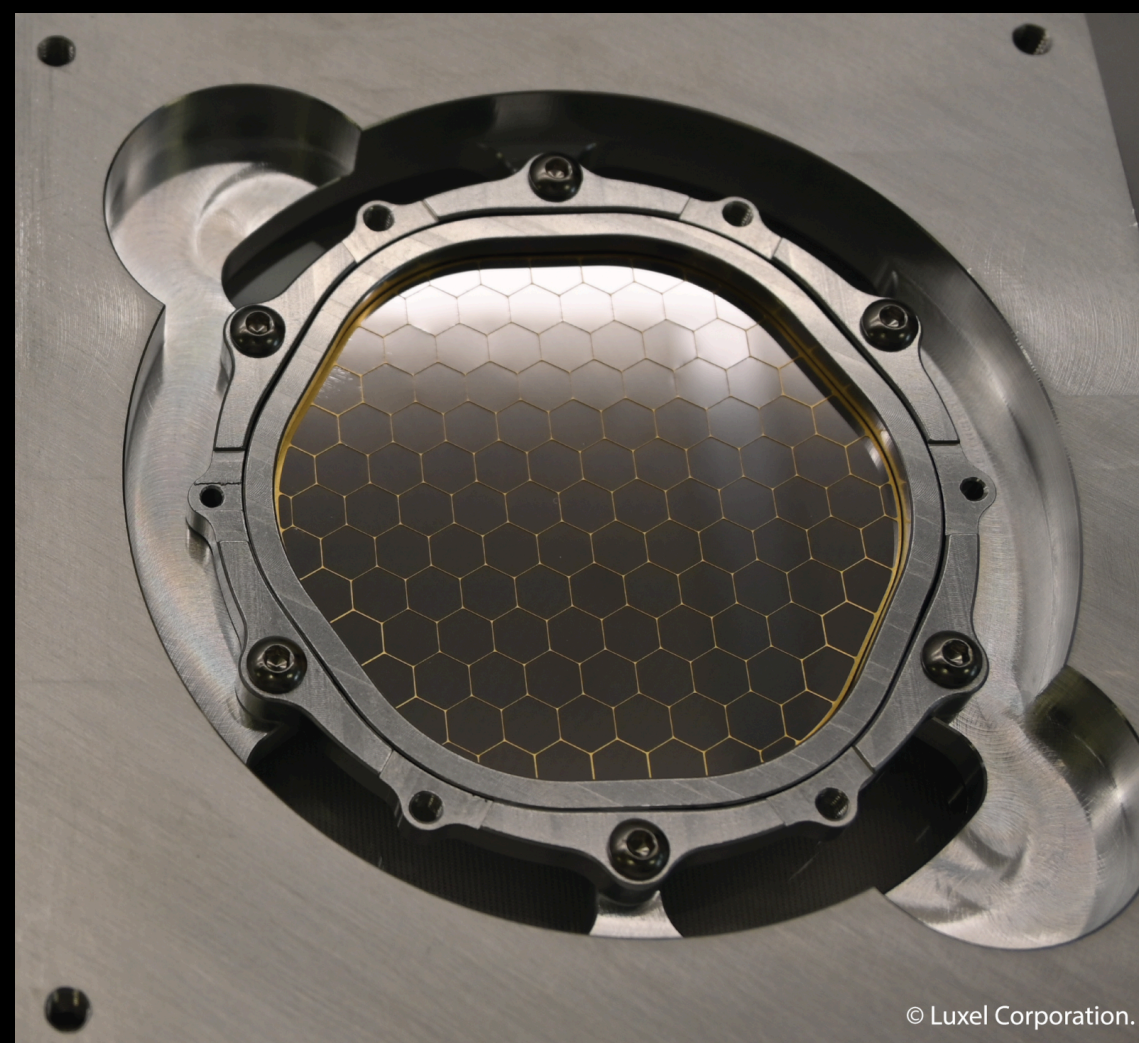
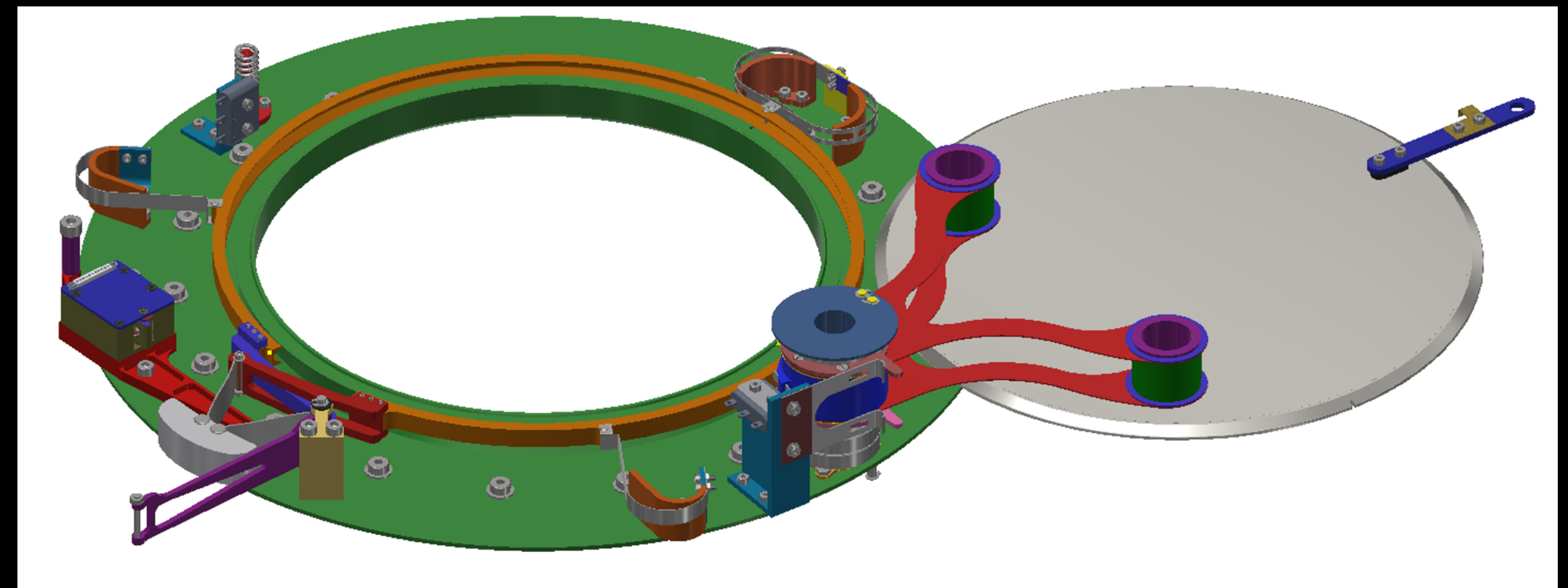
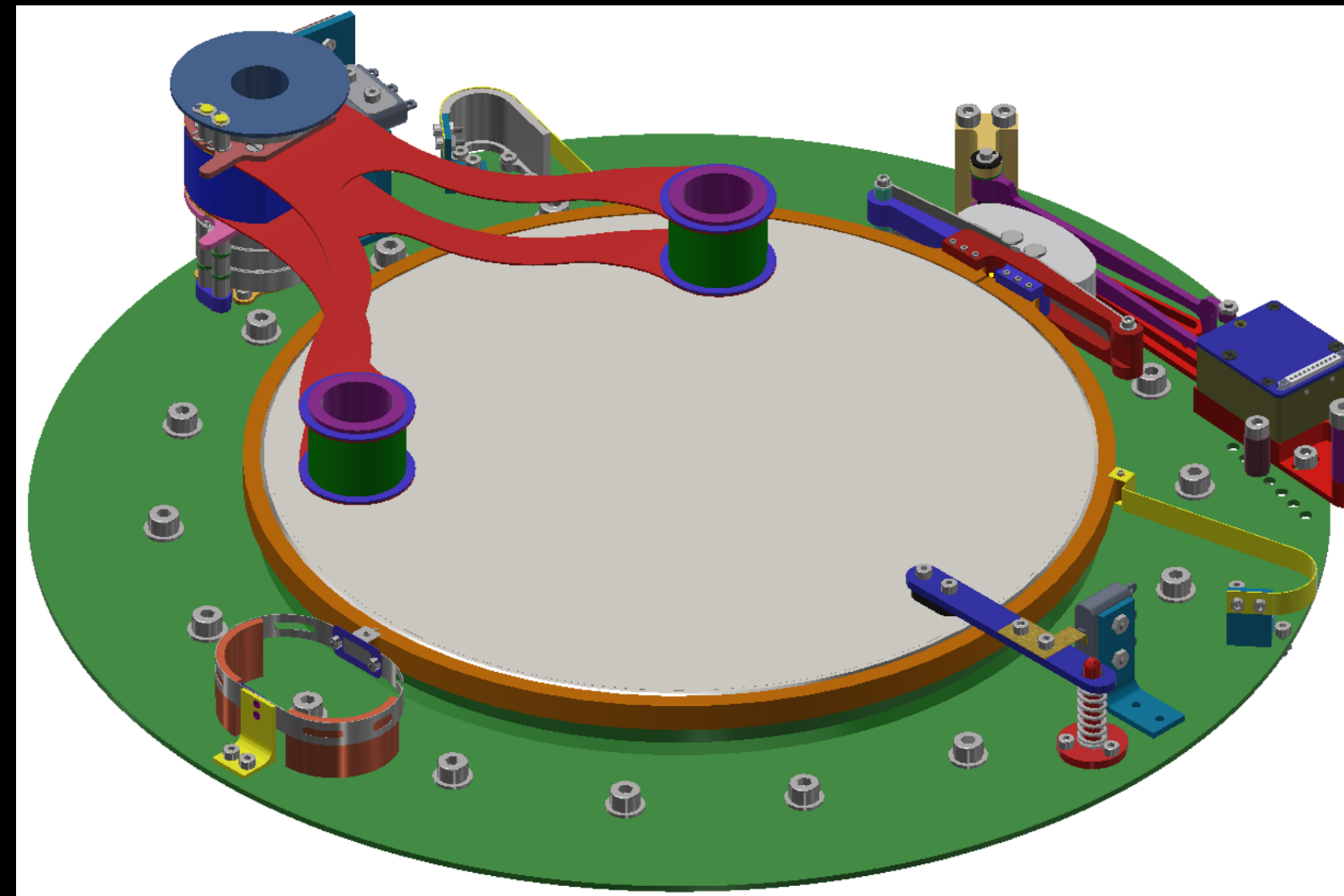
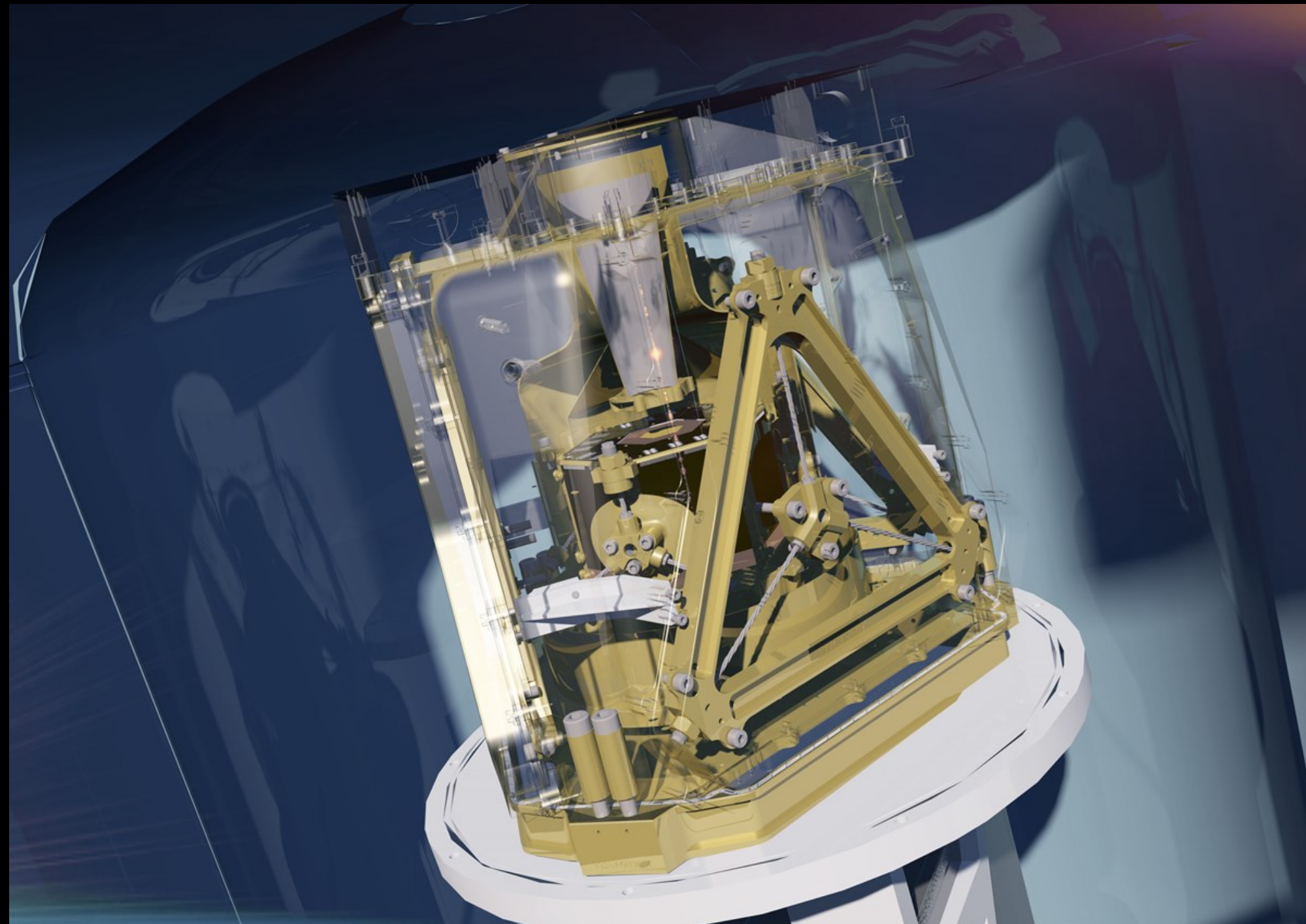
DEPFET - DEPLETED Field Effect Transistor

X-ray Integral Field Unit - X-IFU: Astronika + CAMK, Door



Micro-calorimeter
smaller FoV
but larger
energy resolution
 $T \sim 50$ mK

X-ray Integral Field Unit - X-IFU: Astronika + CAMK, Door

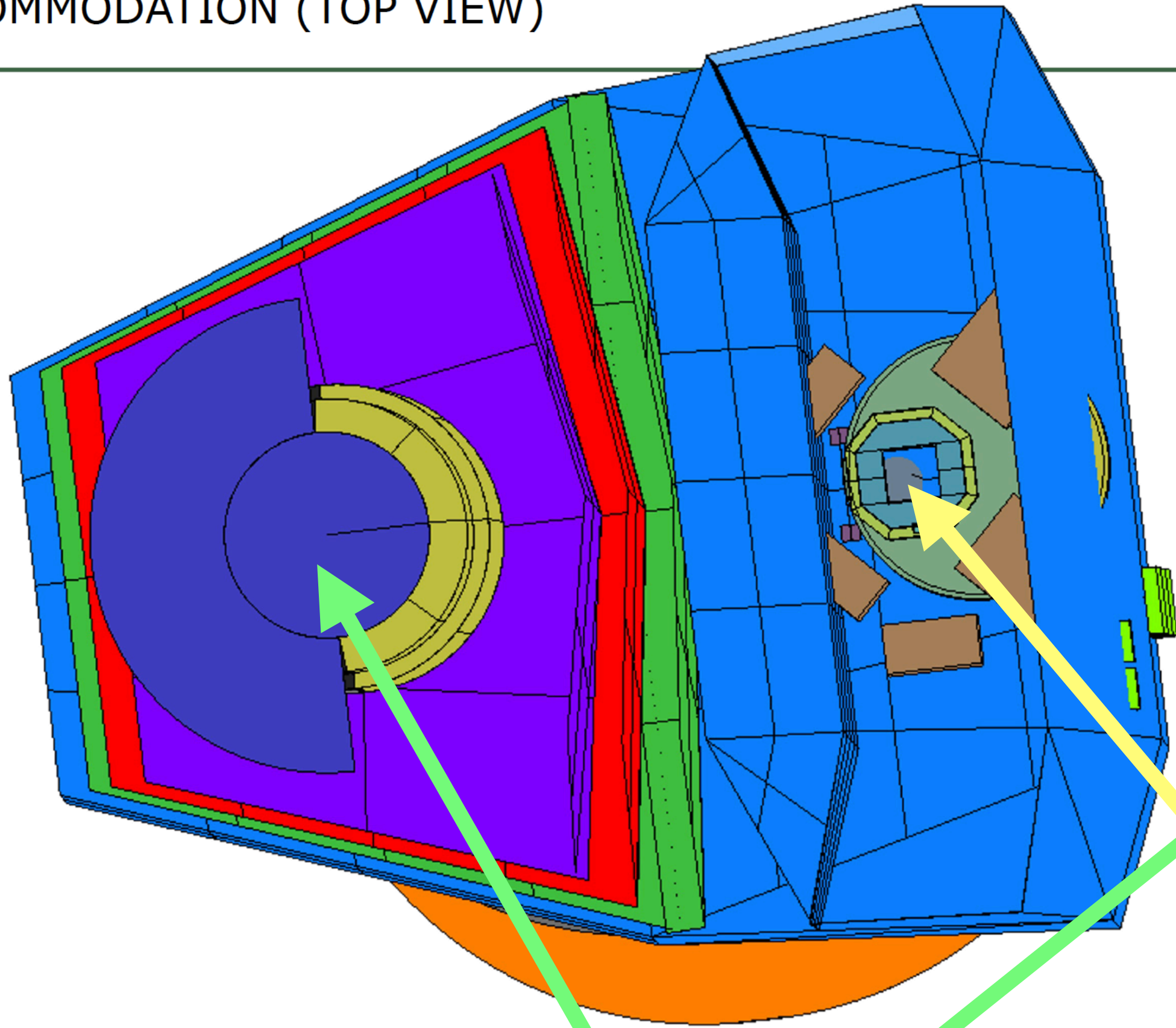


Micro-calorimeter
smaller FoV
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 $T \sim 50$ mK

© Luxel Corporation.

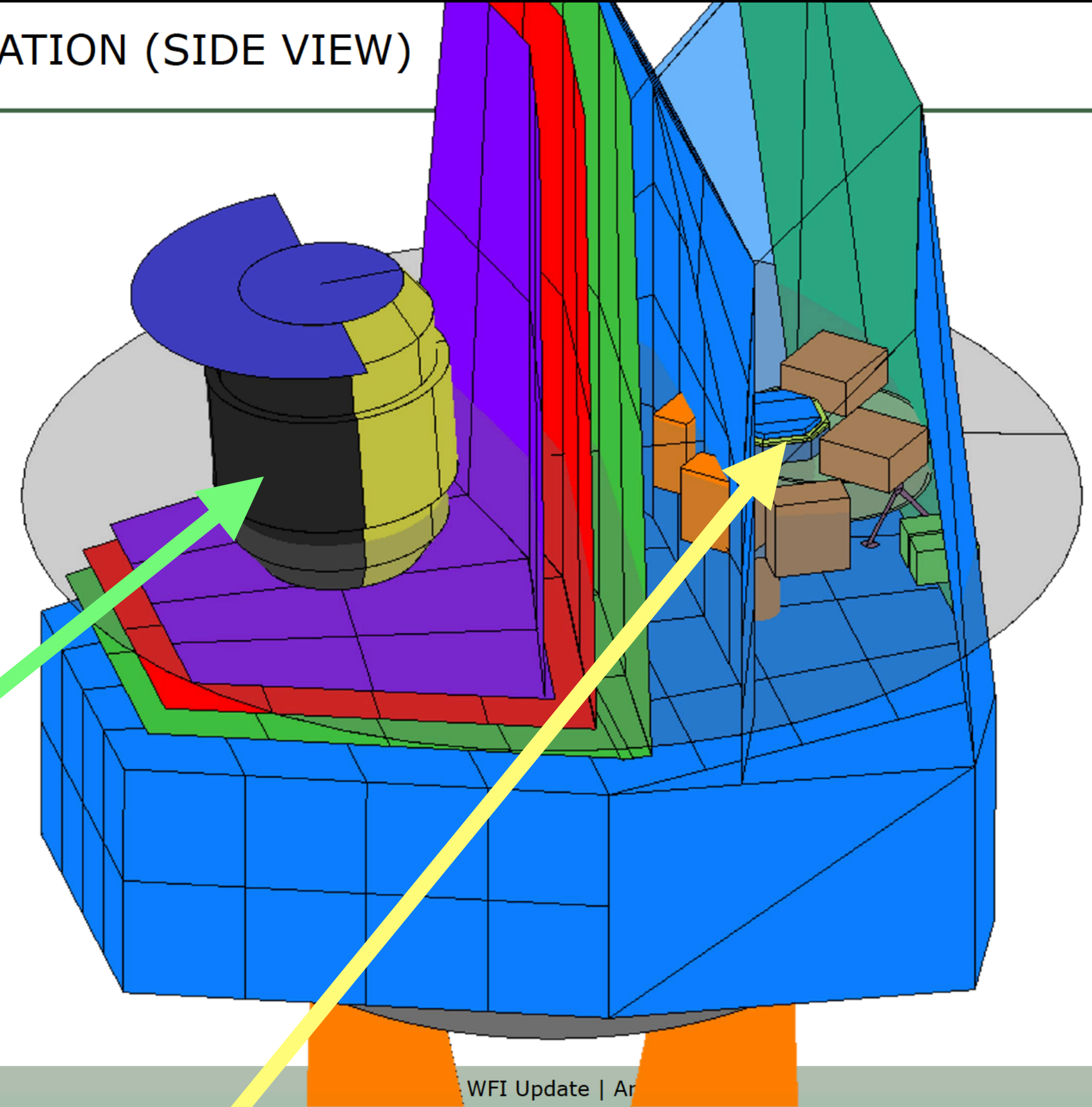
X-IFU Consortium Meeting 29.11.2022

ACCOMMODATION (TOP VIEW)



X-IFU

ACCOMMODATION (SIDE VIEW)

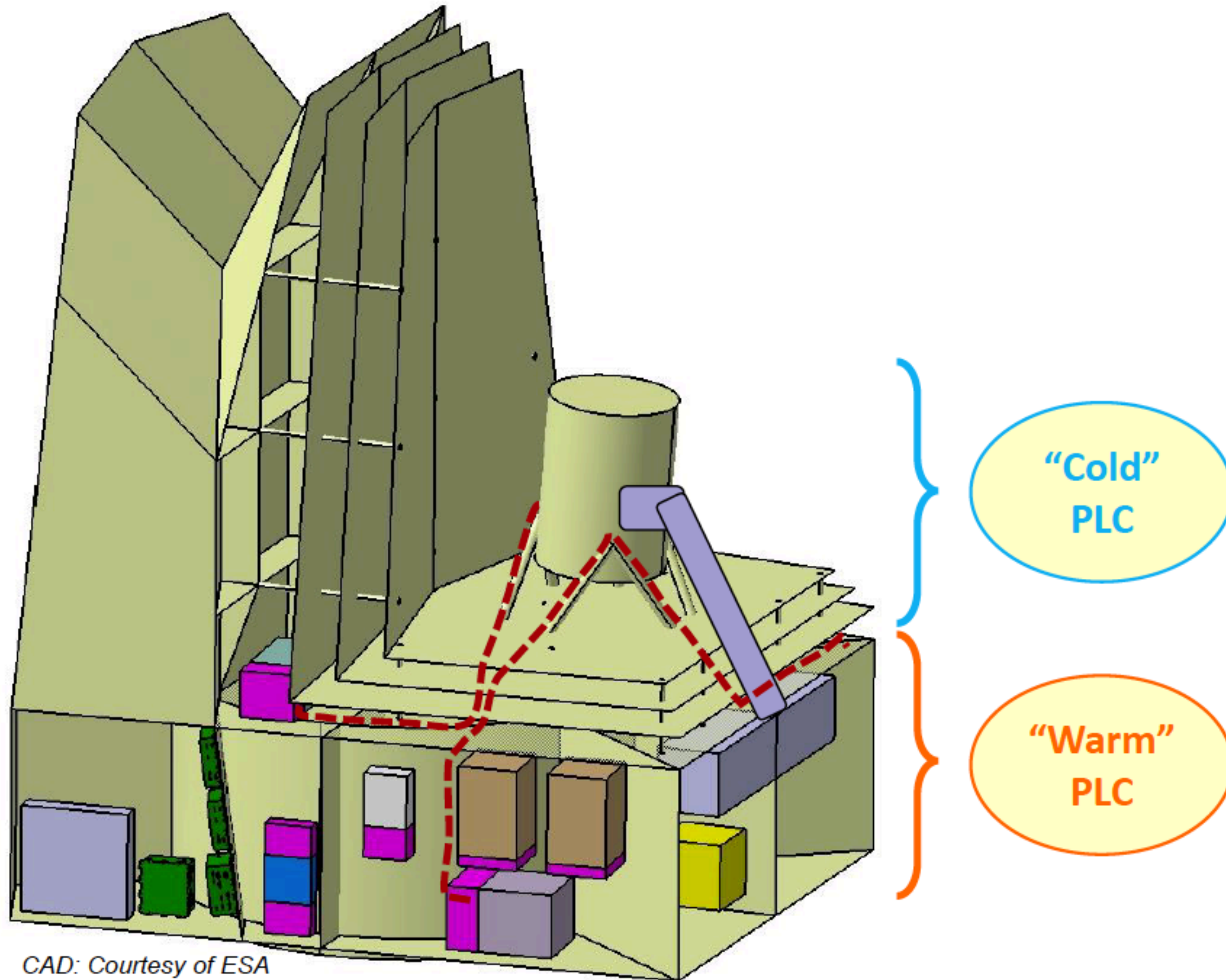


WFI

X-IFU Consortium Meeting 29.11.2022

Cold passive cryostat:

V-groove (or L-groove) technology can replace all shield coolers:



CAD: Courtesy of ESA

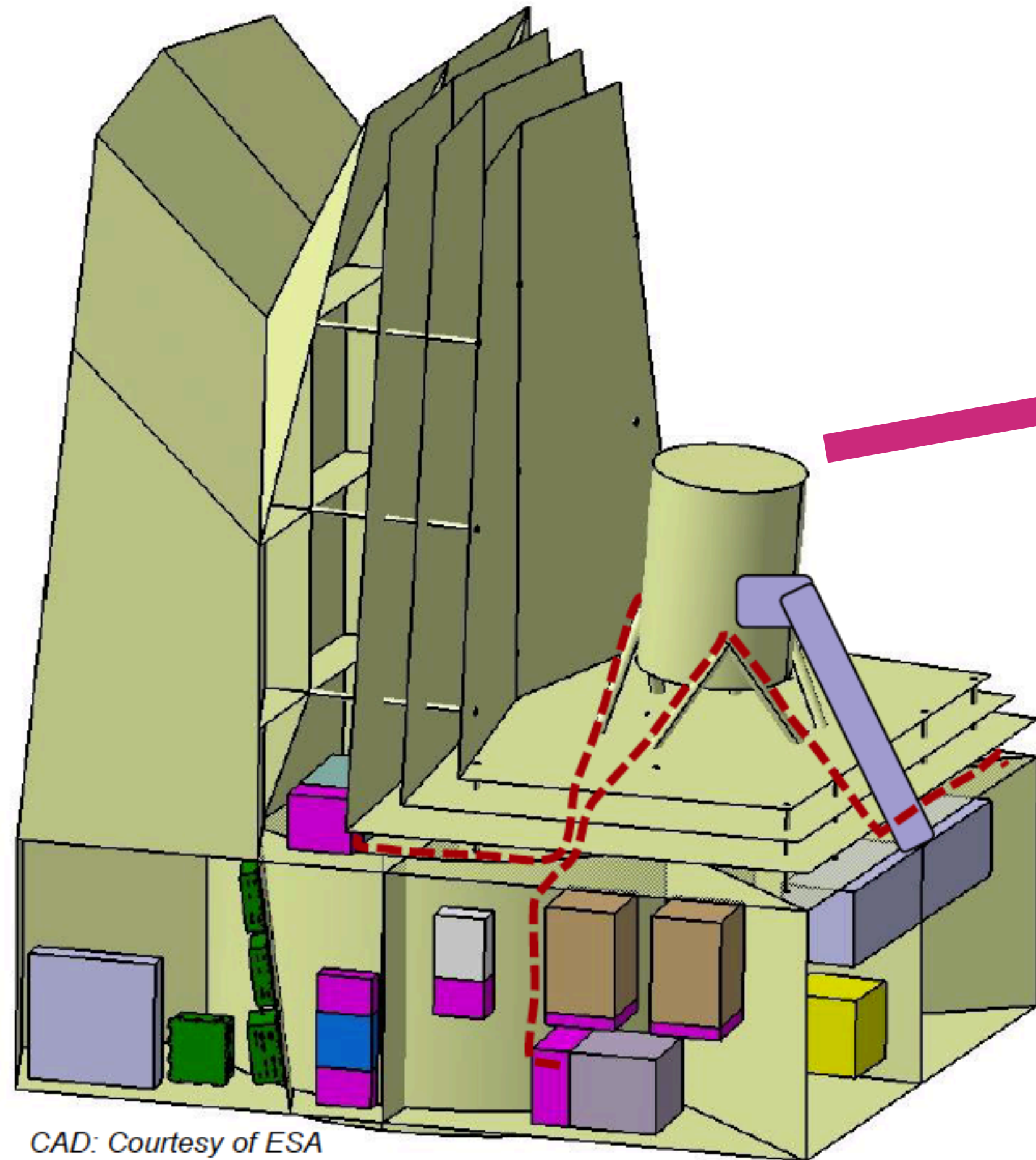
X-IFU in the NewAthena PayLoad Compartment

X-IFU Consortium Meeting 29.11.2022

Cold passive cryostat:

V-groove (or L-groover) technology can replace all shield coolers:

X-IFU Entrance Assembly



CAD: Courtesy of ESA

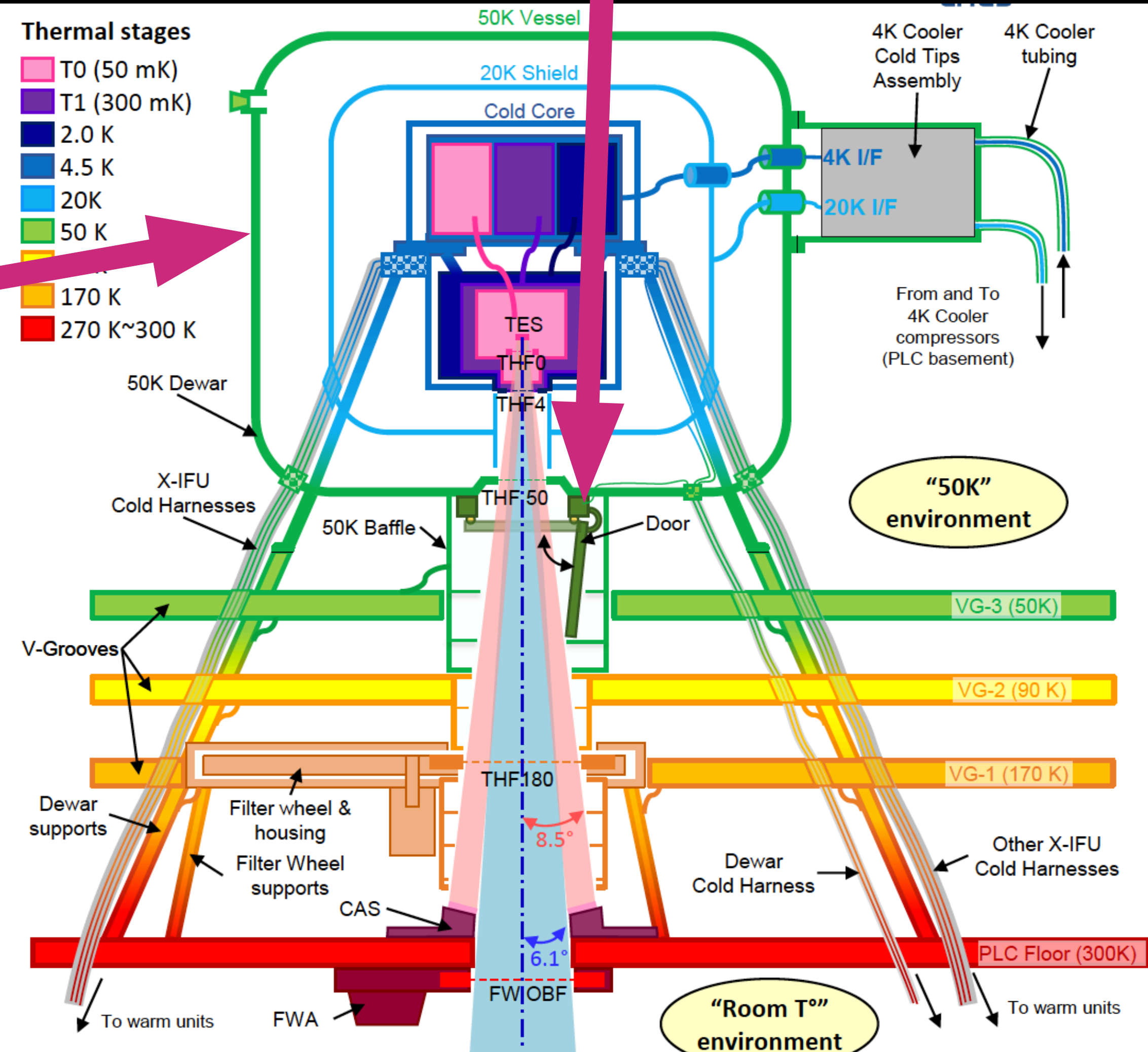
X-IFU in the NewAthena PayLoad Compartment

“Cold”
PLC

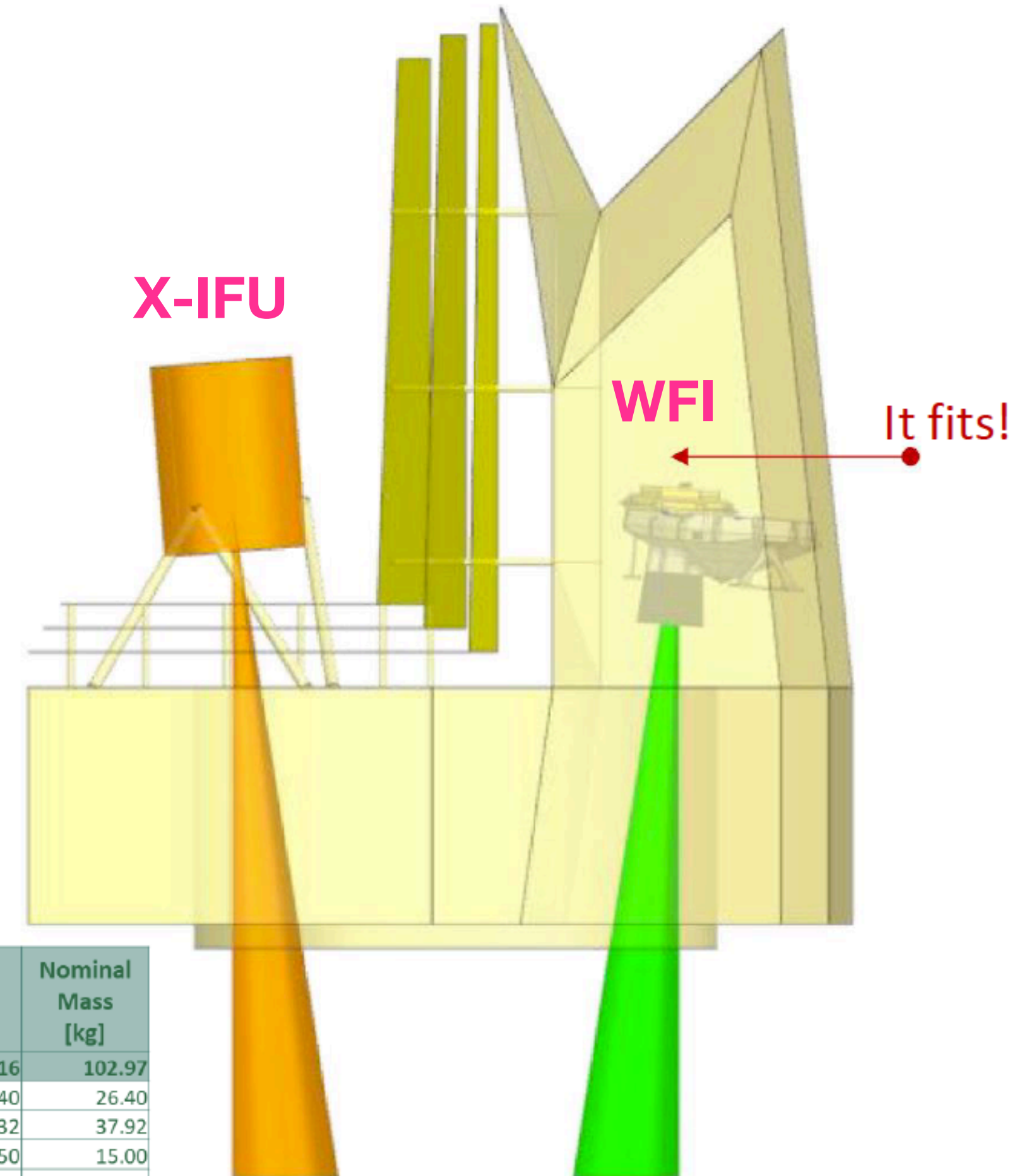
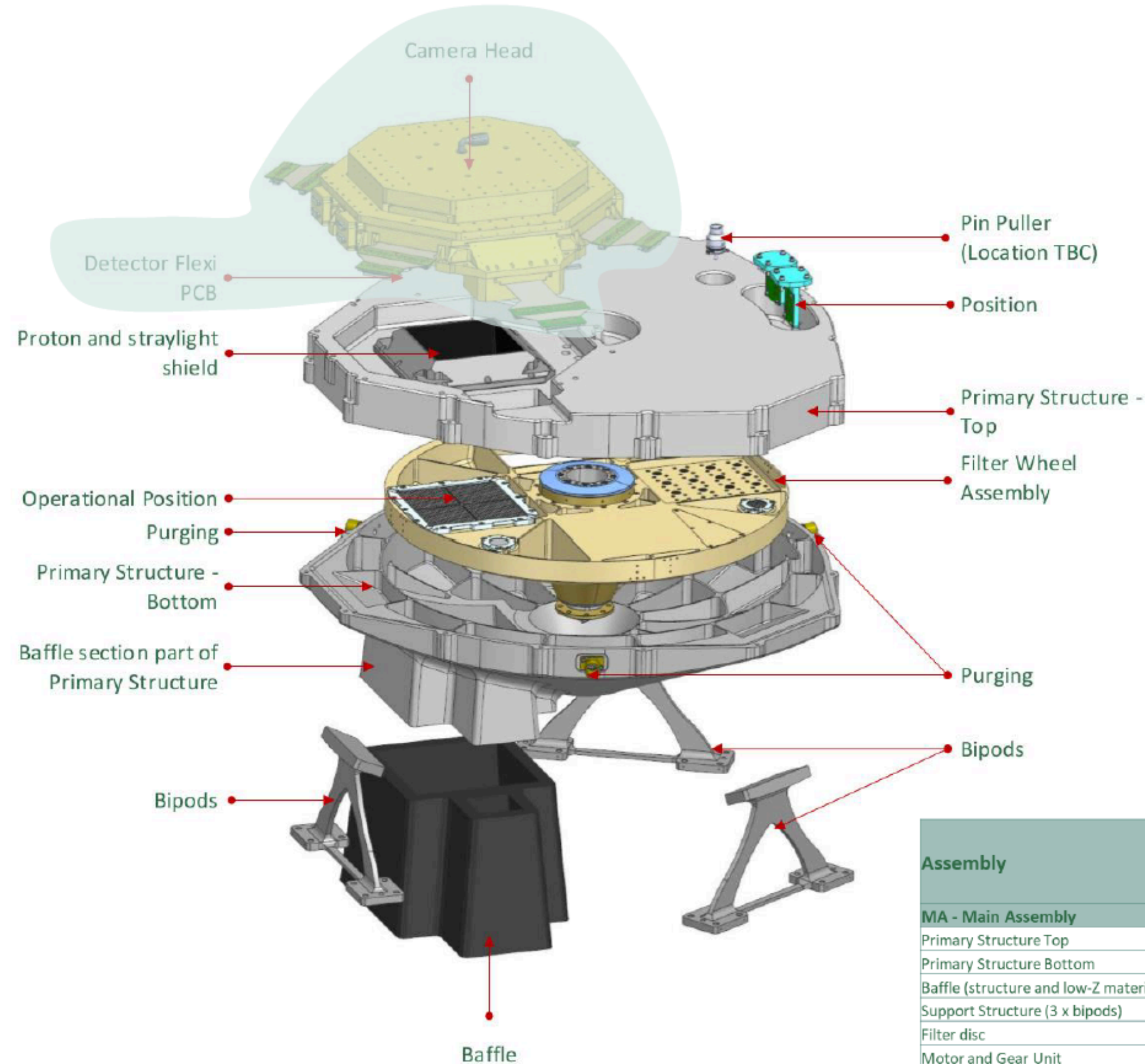
“Warm”
PLC

Thermal stages

- T0 (50 mK)
- T1 (300 mK)
- 2.0 K
- 4.5 K
- 20K
- 50 K
- 170 K
- 270 K~300 K



Lobbing and Politics come to the game: WFI CM 27.11.2023

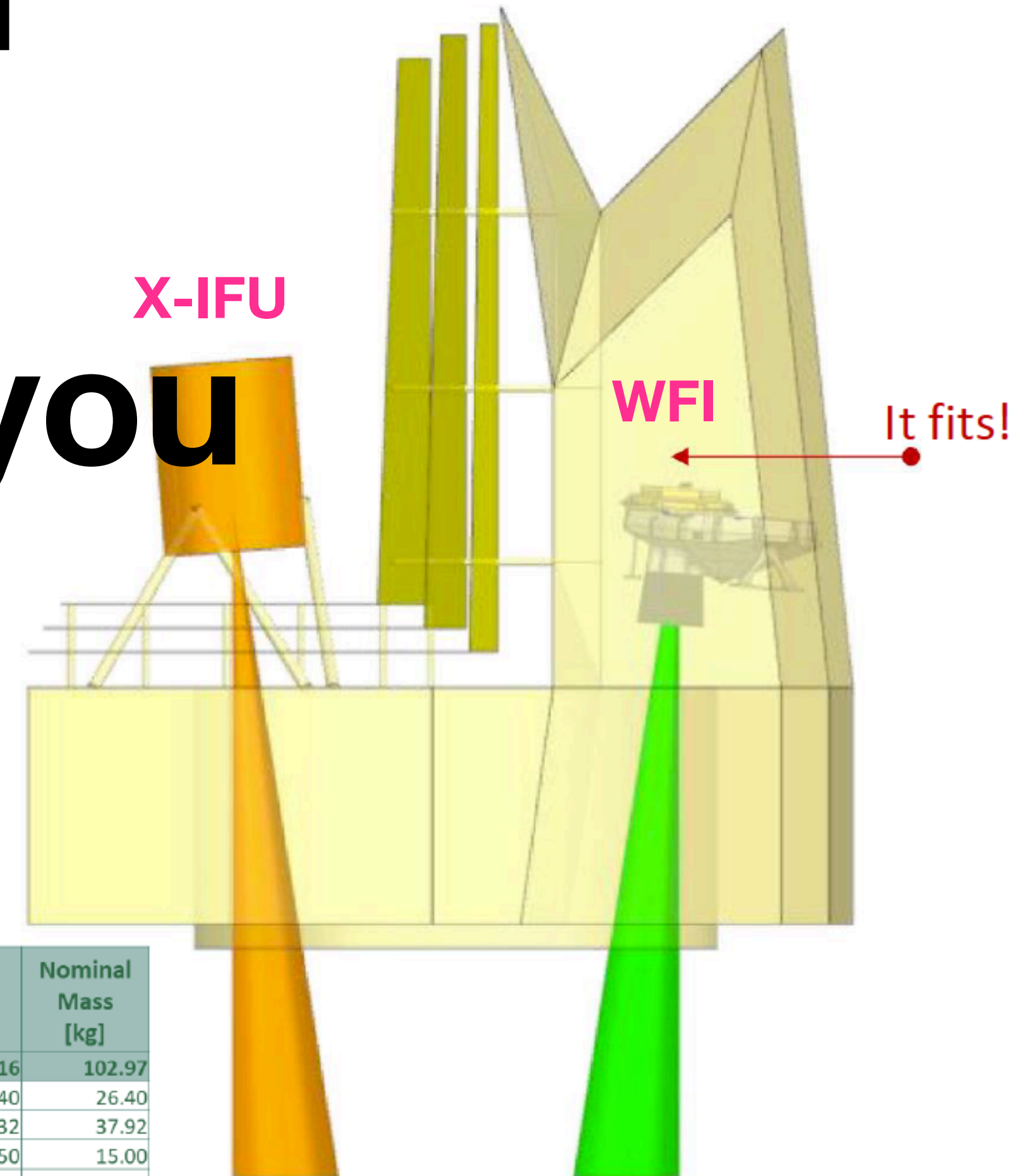
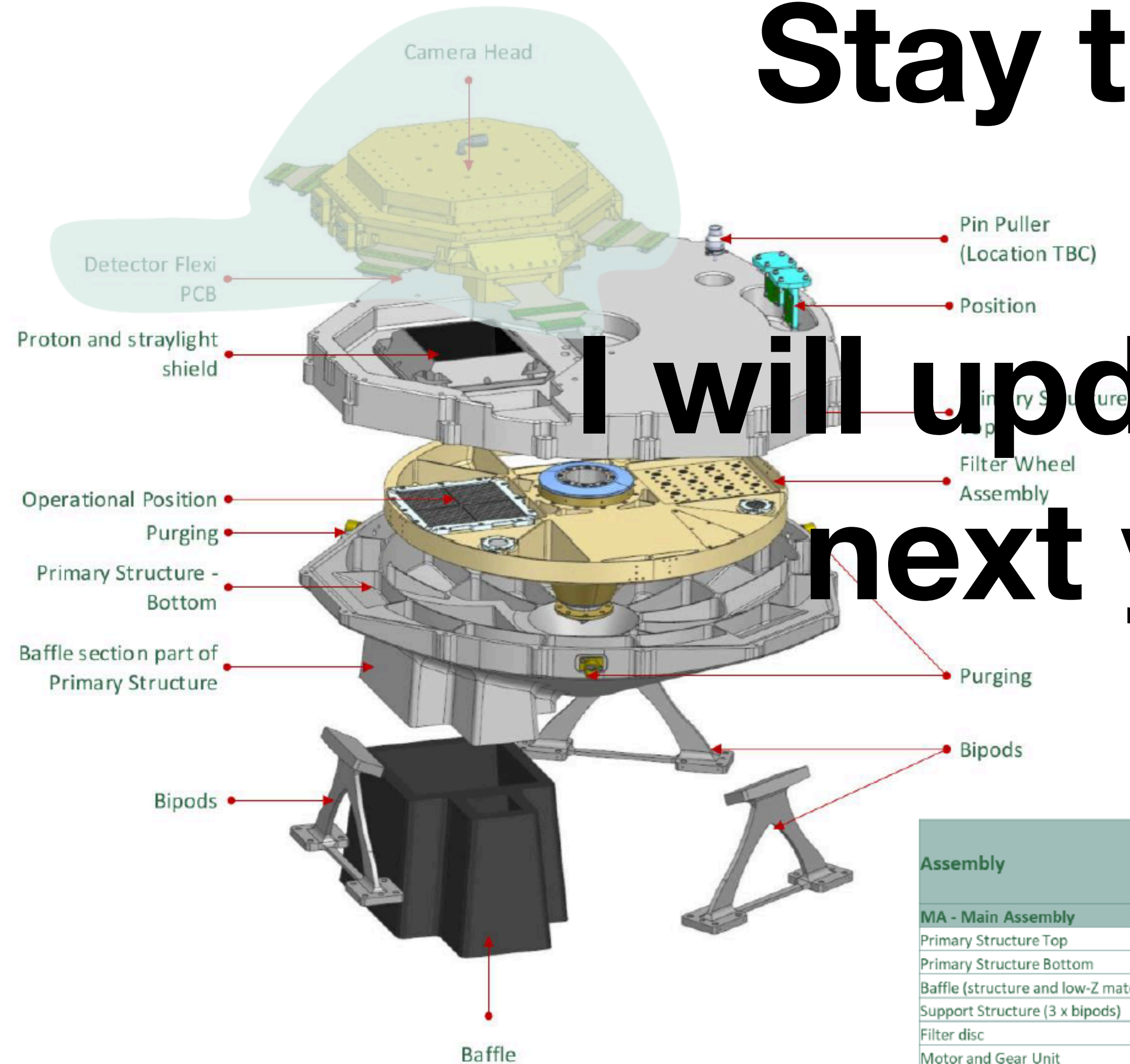


Assembly	Current Best Estimate [kg]	DMM	DMM [kg]	Nominal Mass [kg]
MA - Main Assembly	85.81	20%	17.16	102.97
Primary Structure Top	22.00	20%	4.40	26.40
Primary Structure Bottom	31.6	20%	6.32	37.92
Baffle (structure and low-Z material)	12.5	20%	2.50	15.00
Support Structure (3 x bipods)	4.80	20%	0.96	5.76
Filter disc	7.30	20%	1.46	8.76
Motor and Gear Unit	6.95	20%	1.39	8.34
Functional Components of filter disc	0.66	20%	0.13	0.80

Lobbing and Politics come to the game: WFI CM 27.11.2023

Stay tuned

I will update you next year



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