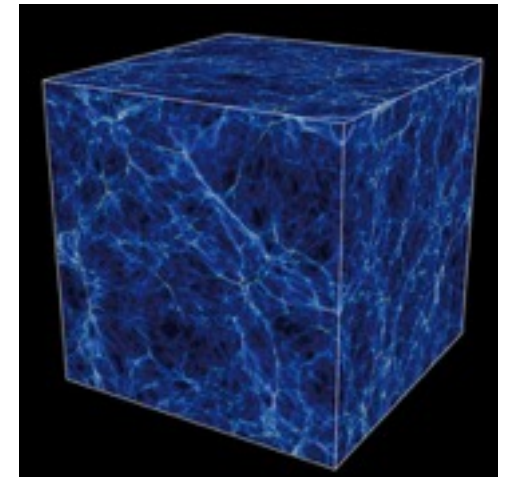
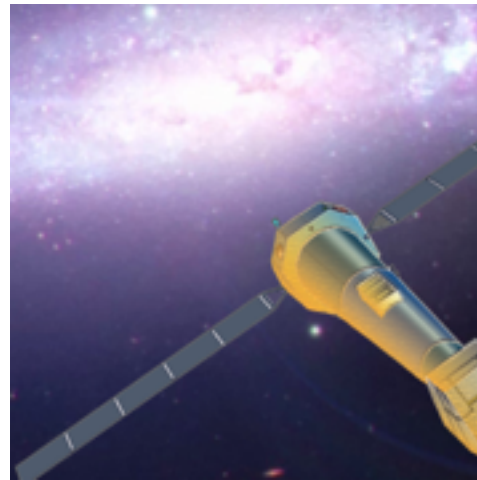


# ATHENA:

New generation X-ray  
telescope

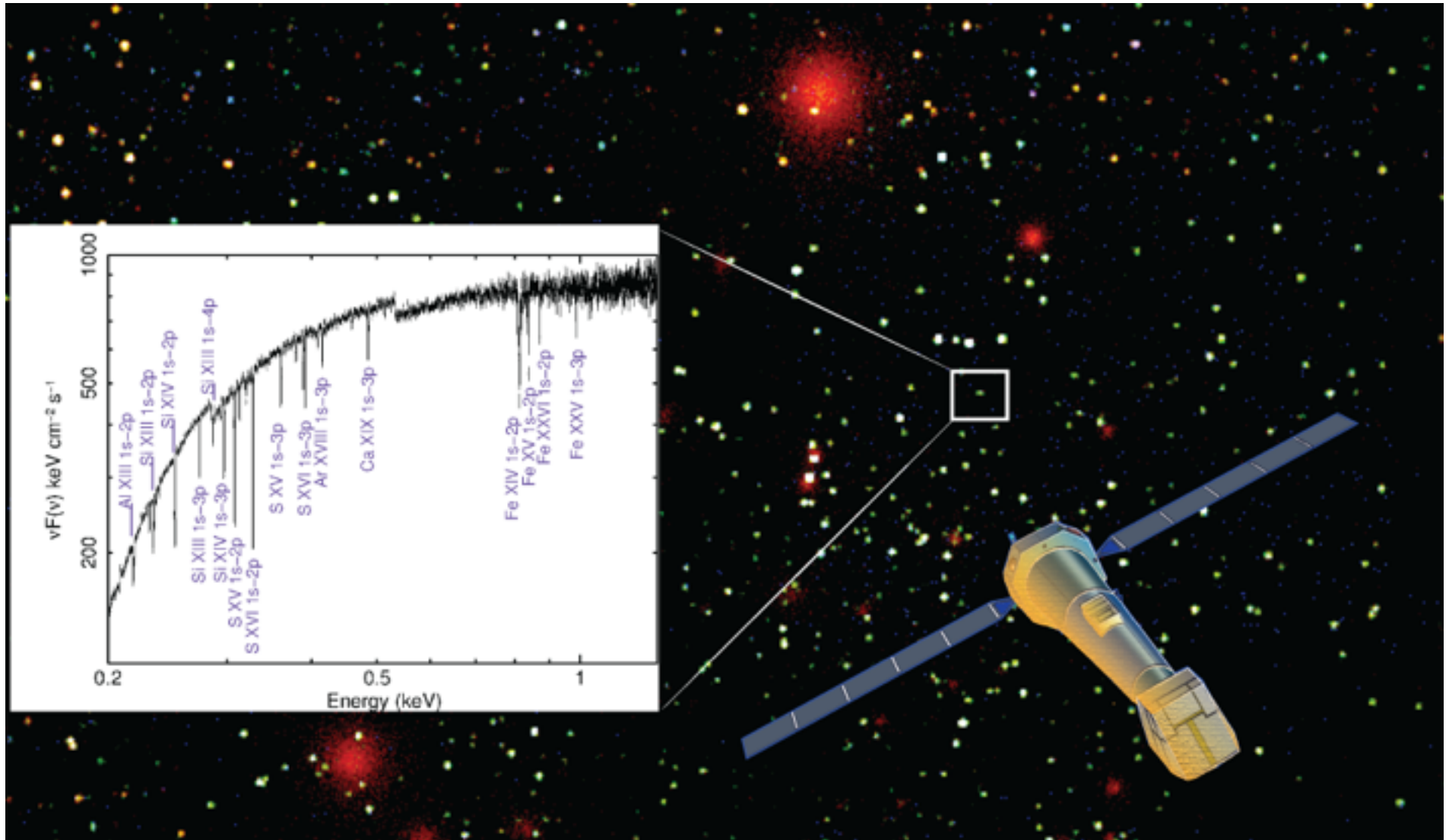
**Project updates**



Agata Różańska  
CAMK PAN, Warsaw

<http://athena.camk.edu.pl>

# ATHENA - ESA mission in 2031, Cosmic Vision (2015-2035)



# The Athena Observatory: Now

**L2 orbit Ariane 64**  
Mass ~7100 kg  
Power ~10,000 W  
>4 year mission

Movable mirror array (MMA)

Science Instrument Module (SIM)

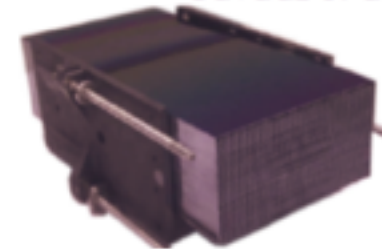
CNES project team

**X-ray Integral Field Unit:**  
TES-based calorimeter  
 $\Delta E$ : 2.5 eV  
Field of View: 5 arcmin  
Operating temp: 50 mK

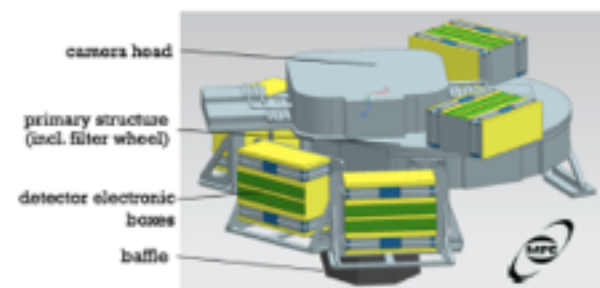


Barret et al., 2016, 2018 SPIE

Willingale et al, 2013  
Bavdaz et al. 2016,2018



**Silicon Pore Optics:**  
1.4 m<sup>2</sup> (goal 2 m<sup>2</sup>) @ 1 keV  
5 arcsec HEW  
Focal length: 12 m  
Sensitivity:  $2.4 \cdot 10^{-17}$  erg cm<sup>-2</sup> s<sup>-1</sup>

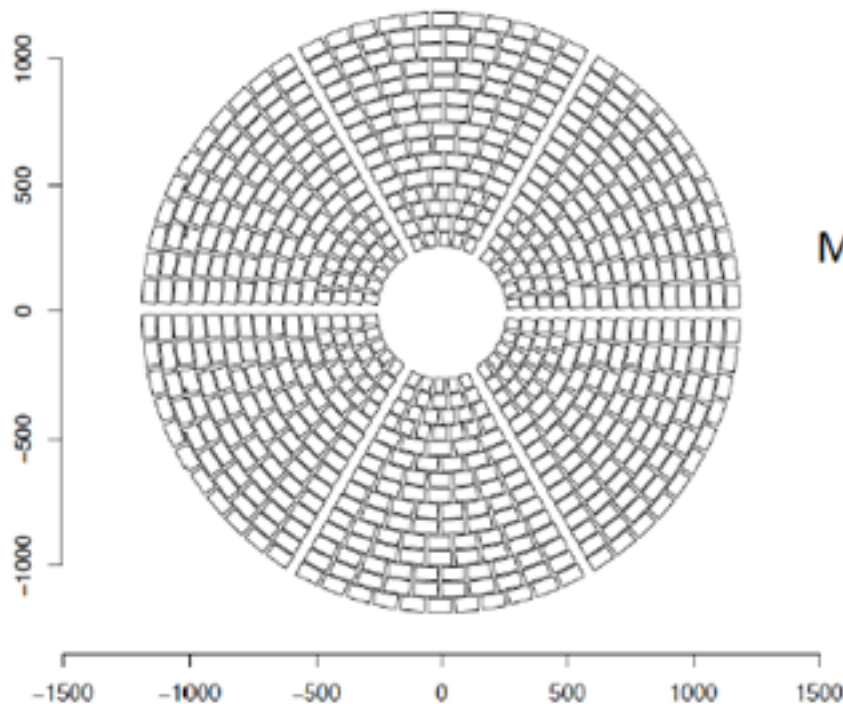


**Wide Field Imager:**  
Si DEPFET-based detector  
 $\Delta E$ : 125 eV  
Field of View: 40 arcmin  
High count rate capability

Meidinger et al. 2016, 2018, SPIE

# CORE Exercise, 19 - 15-row mirror (1.4m<sup>2</sup>)

## Mirror V2.4 – 15 rows, 6 sectors



678 SPO modules

Maximum azimuthal width of module plates

100 mm  $r > 500$  mm

60 mm  $r < 500$  mm

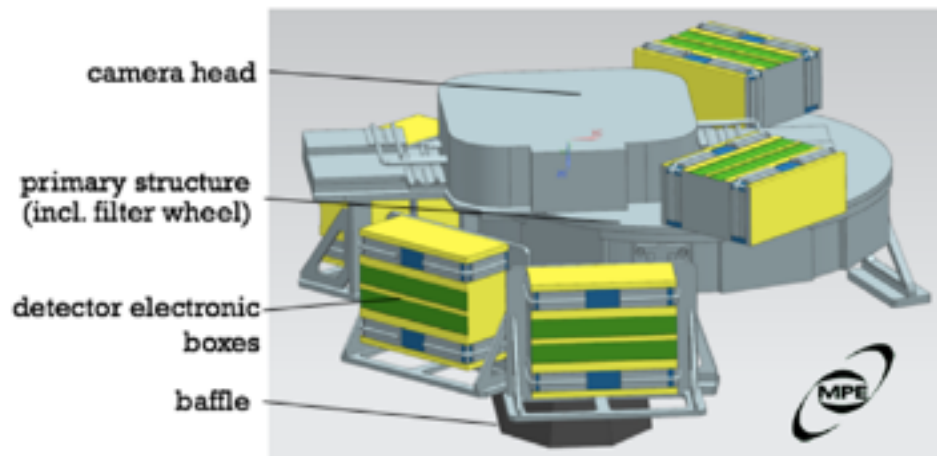
by Dick Willingale - 2019



# Two detectors in focal plane of ATHENA

## WFI:

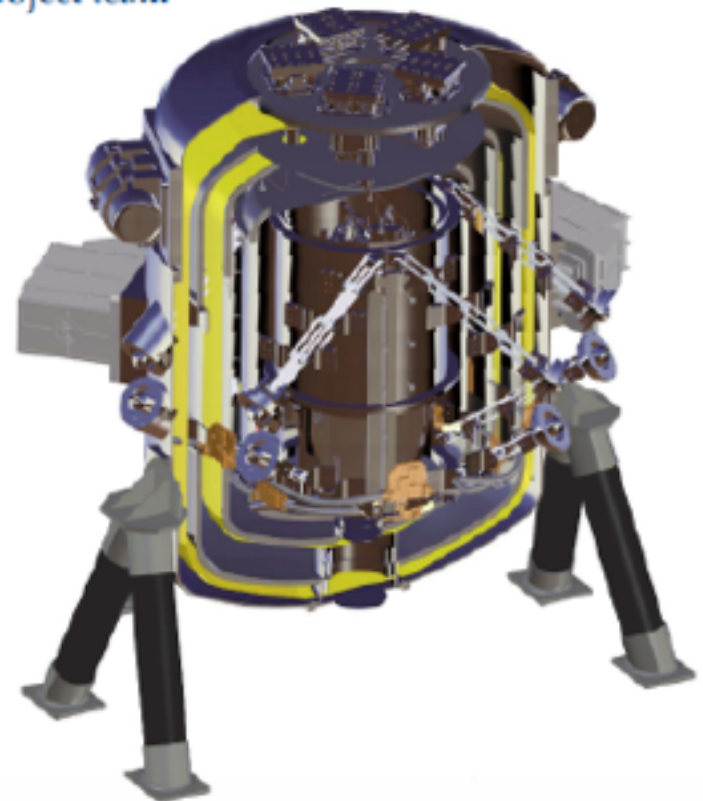
energy resolution - 125 eV  
focal plane - **40'x40'**  
time resolution - **8 micro sek.**



## X-IFU:

energy resolution- **2.5 eV**  
focal plane - 5'x5'  
time resolution - mili sek.

CNES project team



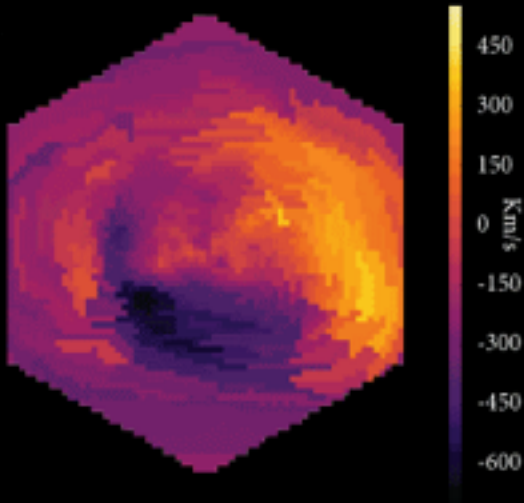
# Two detectors in focal plane of ATHENA

**WFI:**

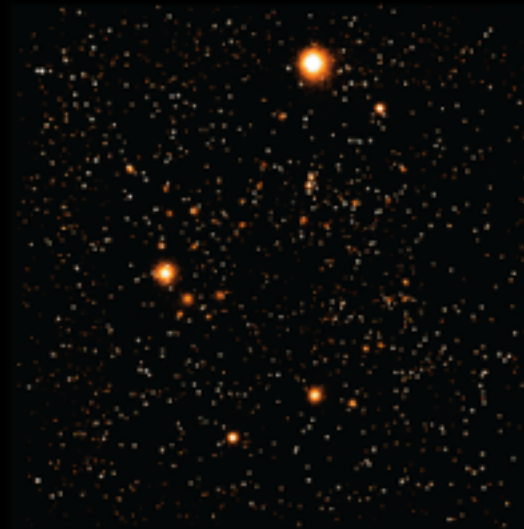
energy resolution - 125 eV

**X-IFU:**

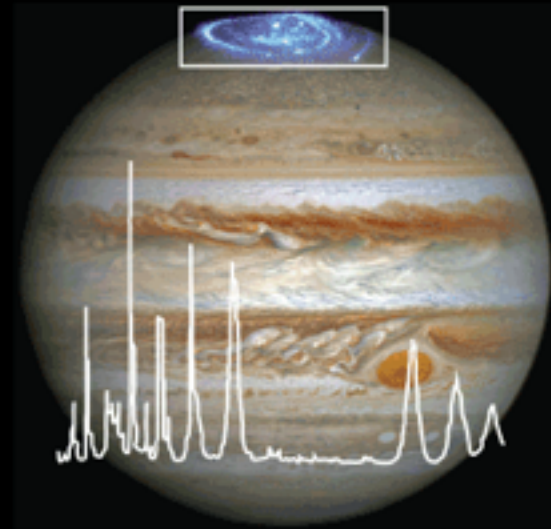
energy resolution- 2.5 eV



Credit: X-IFU Team (E. Cucchetti, IRAP)



Credit: WFI Team



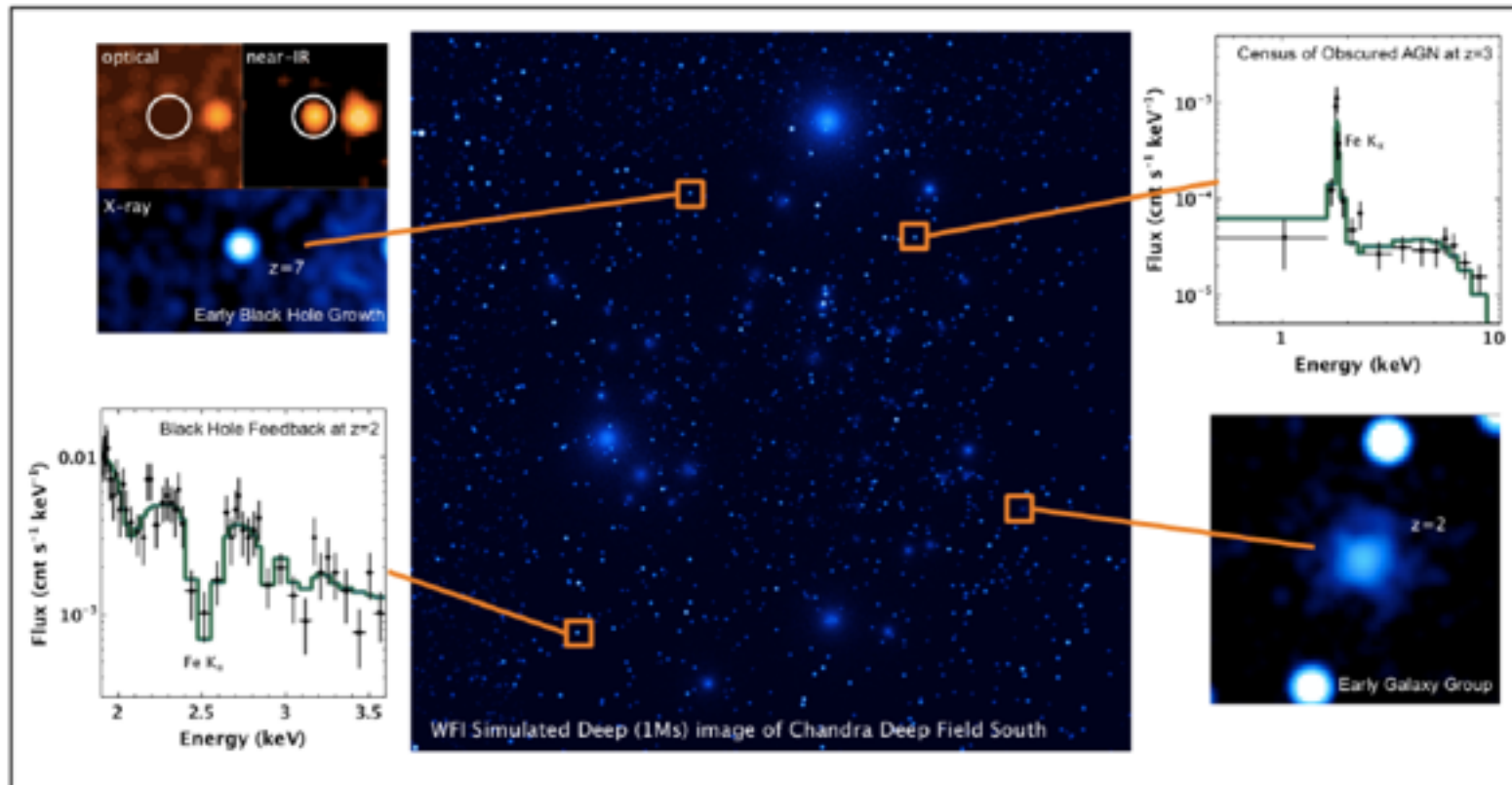
Credit: J. Nichols (Univ. of Leicester), NASA and ESA, X-IFU Spectrum: G. Branduardi-Raymont (UCL)



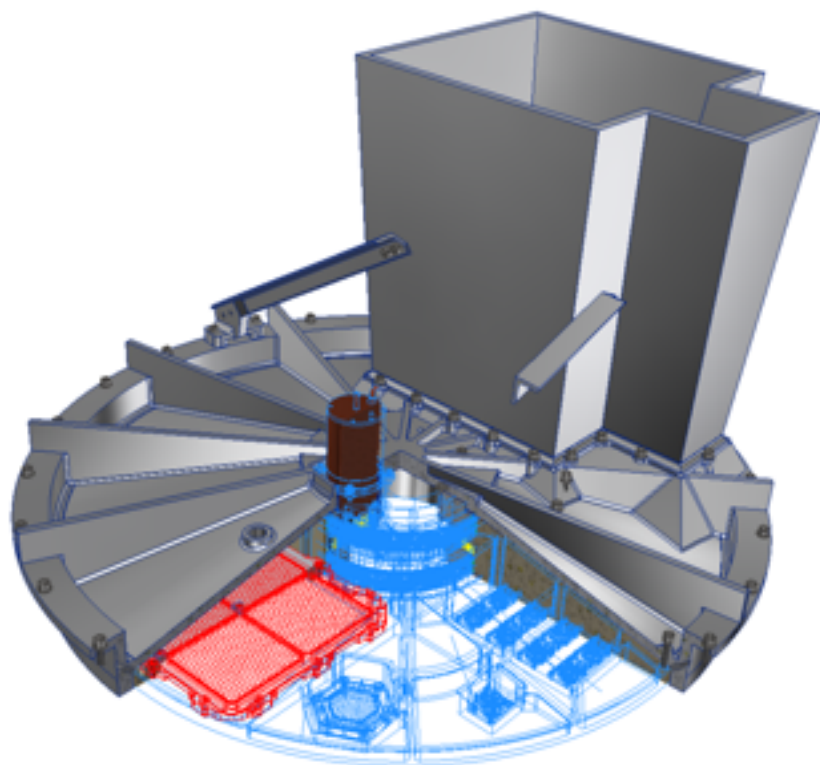
# ATHENA is still challenging - by Arne Rau

Six years later (2019)

- scientific landscape evolved (and political constraints lifted)
- mission profile and instruments are stabilising (latest after MFR)
- overwhelming majority of original science objectives remain exciting
- new opportunities are recognised
- timely to refresh description of science goals

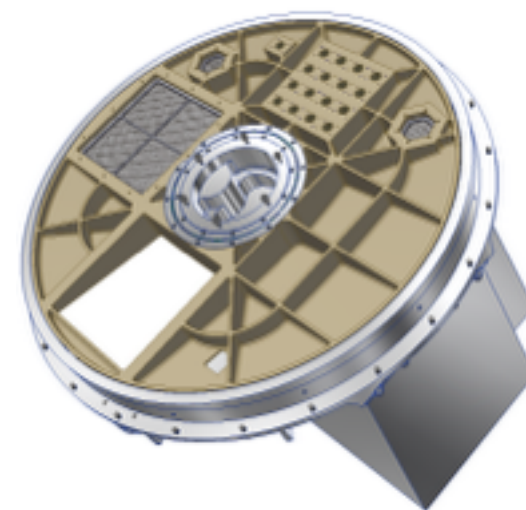


# Poland is building instruments for ATHENA

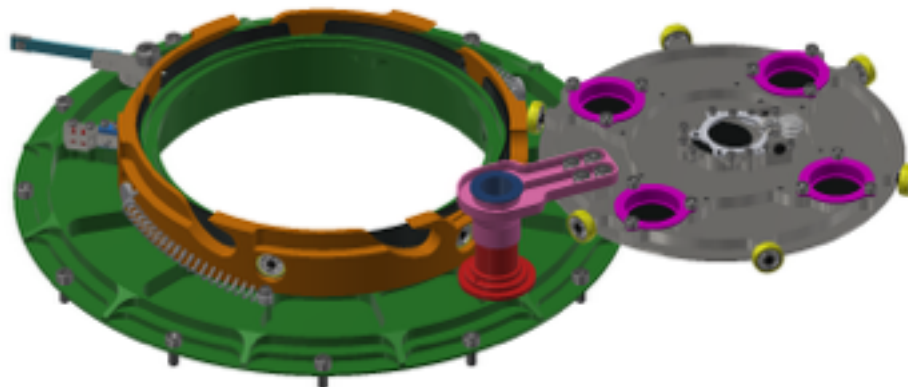


## WFI

- Filter Wheel Assembly 632 x 64 mm
- Baffle - 675 x 430 mm
- 55 kg
- PDU
- 2 el. subsystems



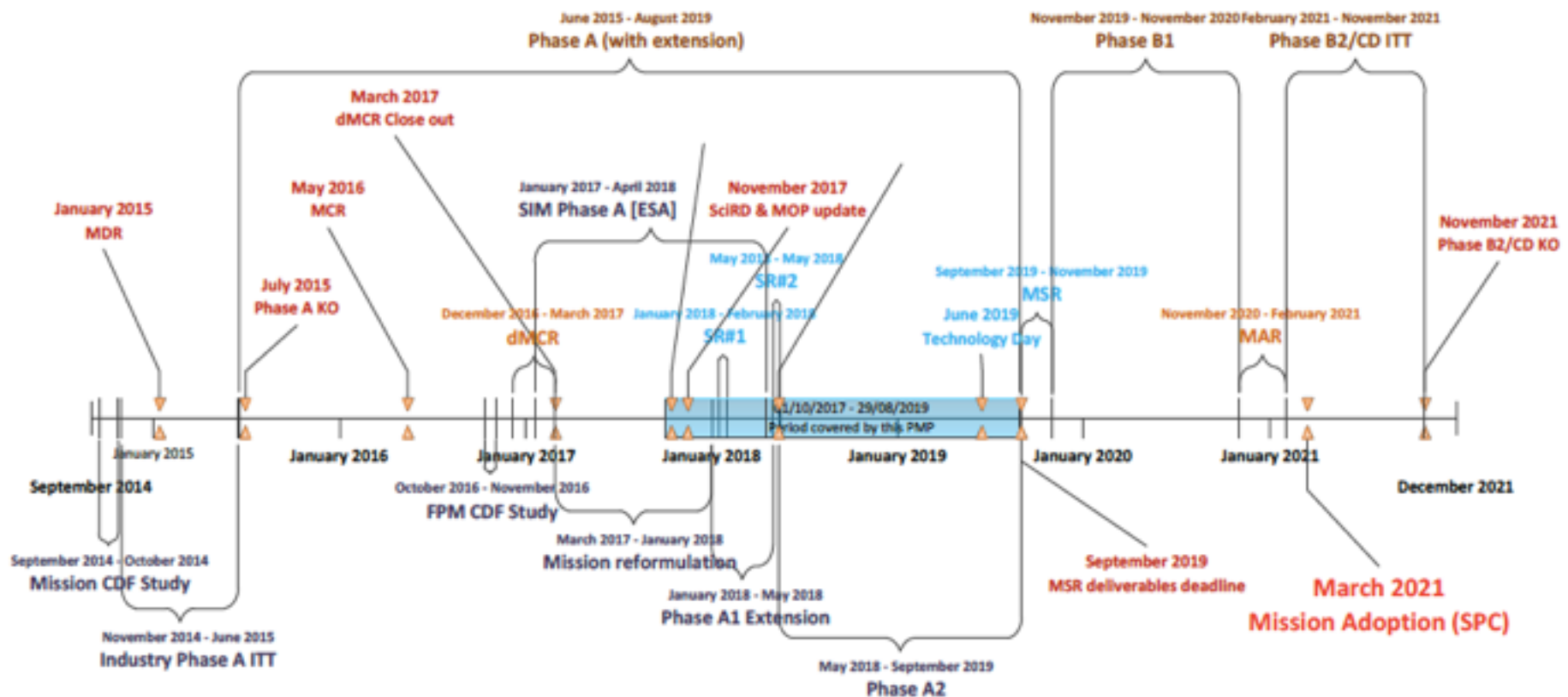
Dewar Door for **X-IFU** + PDU





# ATHENA has great collaboration

## ATHENA Study Status & Study Logic



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Alexander Stefanescu | 2019-03-28 | Slide 2



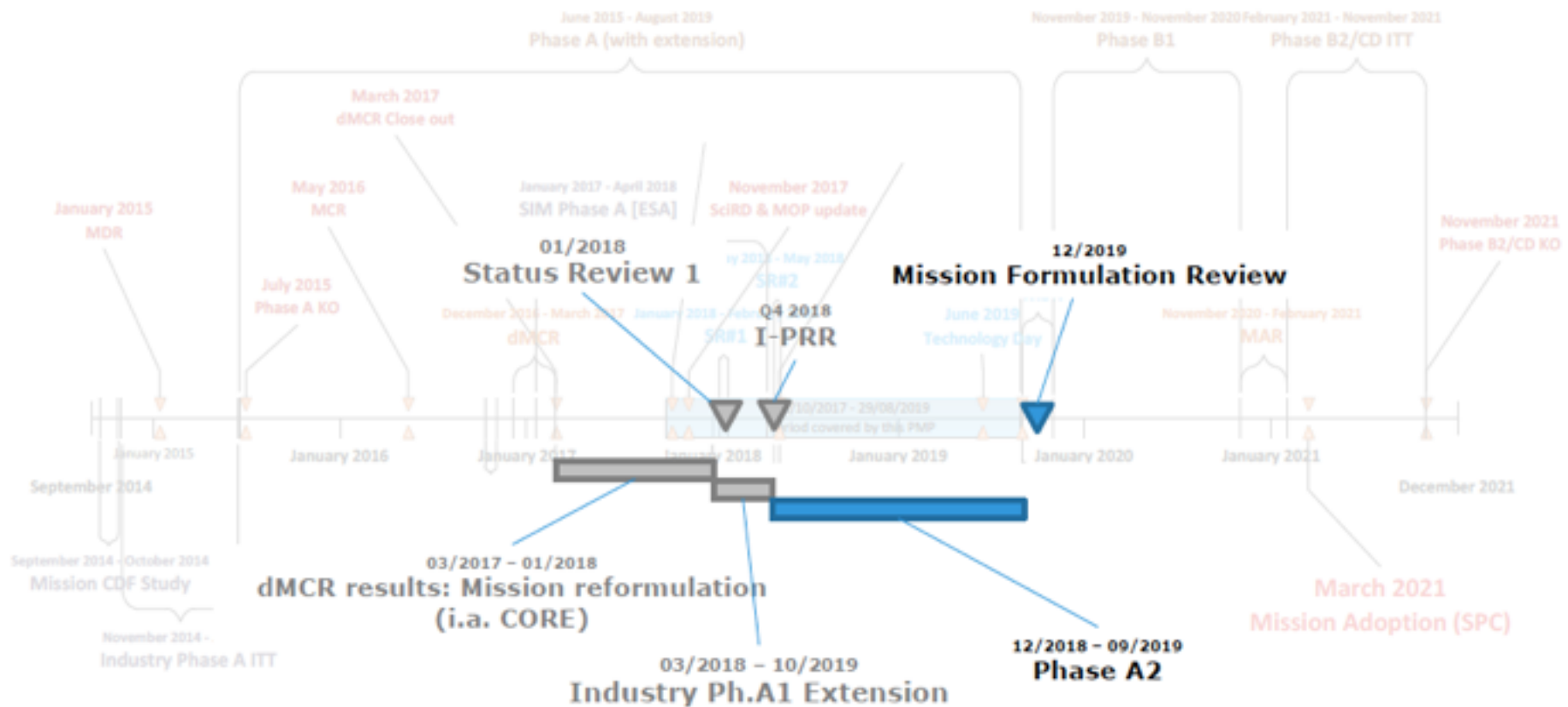
European Space Agency



Particle Astrophysics in Poland, 21.05.2019

# Both instruments after IPRR phase

## ATHENA Study Status & Study Logic



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European Space Agency



Particle Astrophysics in Poland, 21.05.2019