WP4 - X-Ray Polarimetry Explorers

H2020-MSCA-RISE-2016 – Grant Agreement N° 734303

NEWS - SB KO - 25/9/2017

European Commission

EGO - Virgo

WP4 overview from the Agreement

Work Package Number	4				1 - 48		
Work Package Title	X-ray Polarimetry Explorers (Research, Training, Transfer of Knowledge)						
Lead Beneficiary	UNIPI						
Participant Short Name	UNIPI	INFN	Prisma	Clever	OIA	KIPAC	KTH
Person-months per Participant:	8	12	3	5	2	0	27

Objectives

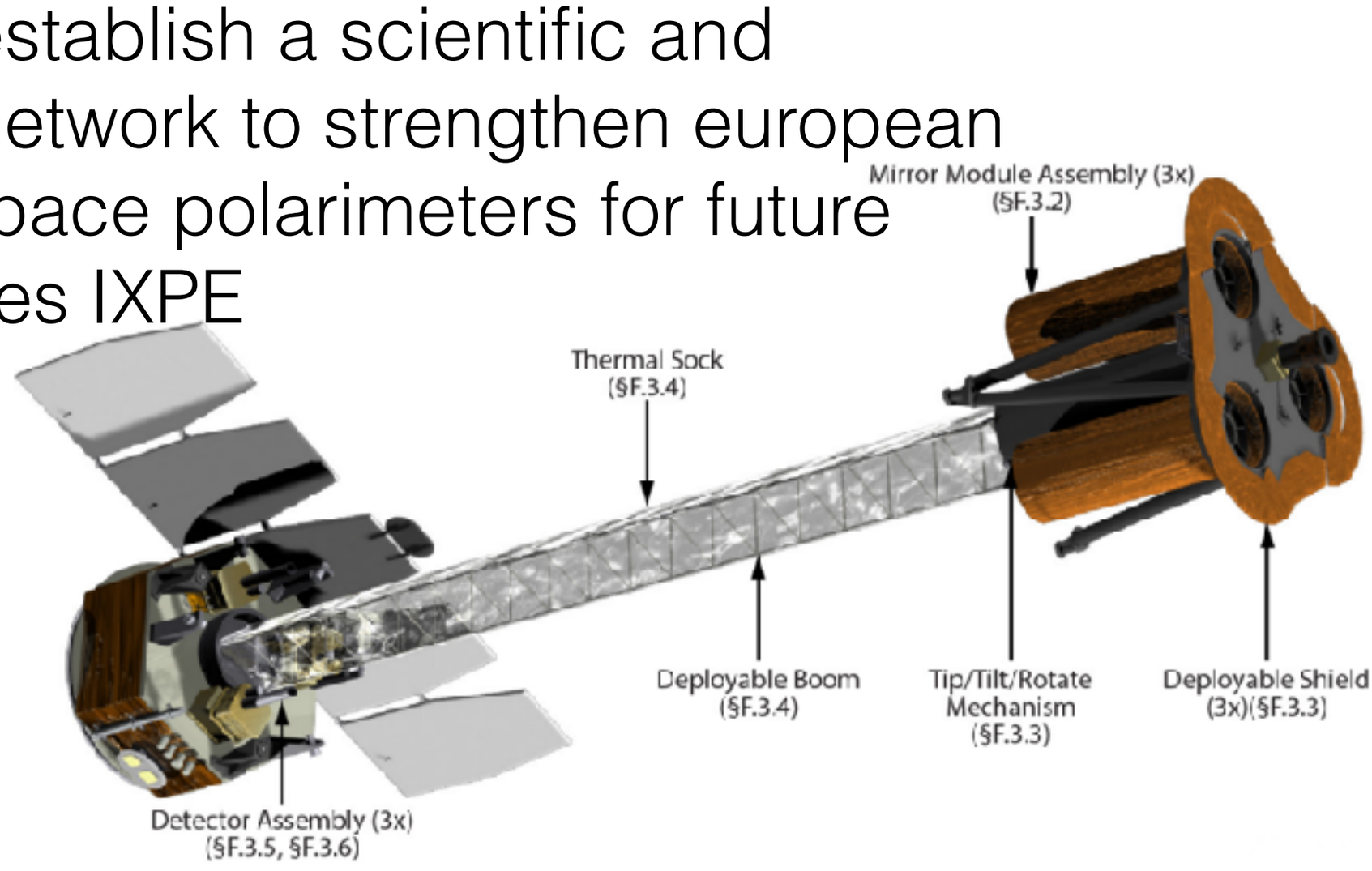
O4.1: Build a fully functional lab prototype of a Gas Pixel Detector (GPD) for the focal plane of an X-ray polarimetric mission.
O4.2: Study and design the basic components of a space-grade data acquisition system for the GPD.
O4.3: Optimize event reconstruction and classification.
O4.4: Implement an observation-simulation framework for the X-ray polarimetry explorers.
O4.5: Define and implement science analysis tools for the X-ray polarimetry explorers.

Description of Deliverables

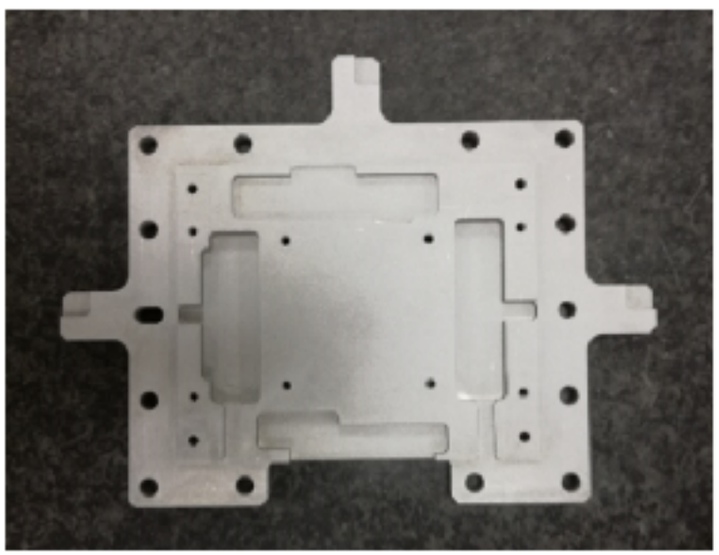
D4.1: A sealed, lab-grade Gas Pixel Detector prototype - M24
D4.2: Conceptual design report for a space-grade data acquisition system for the GPD - M36
D4.3: Implementation of an optimized event-level analysis for the GPD polarimeter - M24
D4.4: Implementation of an observation-simulation framework for an X-ray polarimetric mission - M36
D4.5: Definition and prototyping of the science analysis tools for an X-ray polarimetric mission - M48

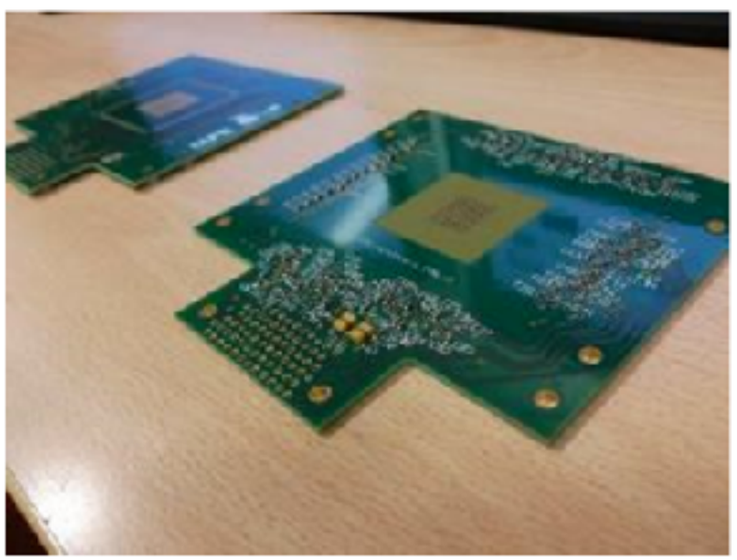
WP4 framework

- Much happens within the IXPE mission approved by NASA in January 2017
- Use NEWS to establish a scientific and technological network to strengthen european leadership in space polarimeters for future missions besides IXPE

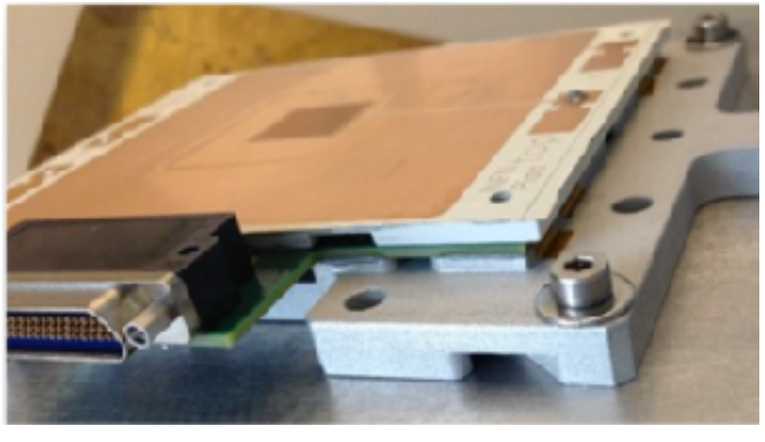


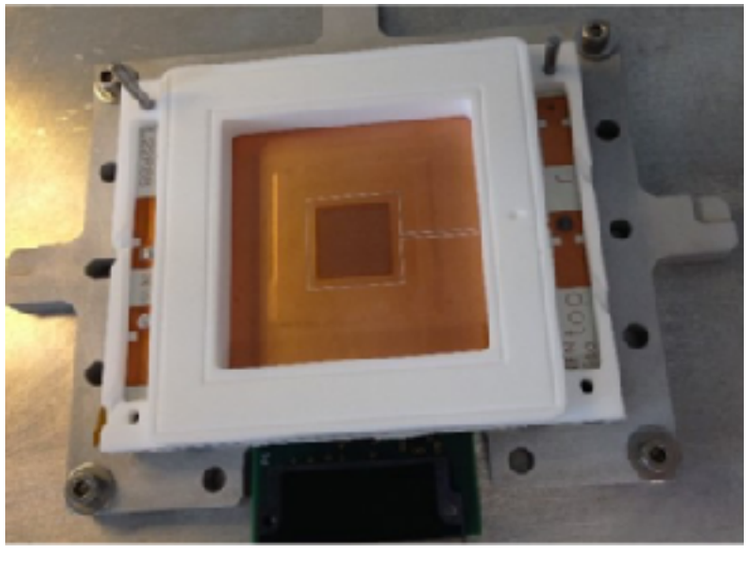
O.4.1 Gas Pixel Detector

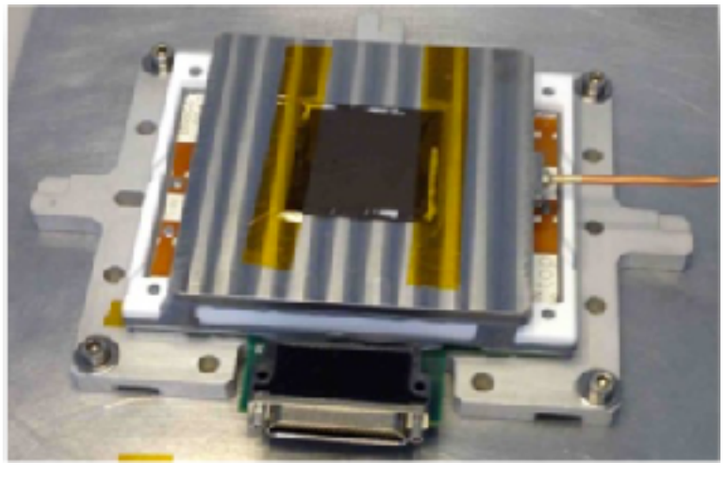




INFN mechanics and PCB, integration with ASIC





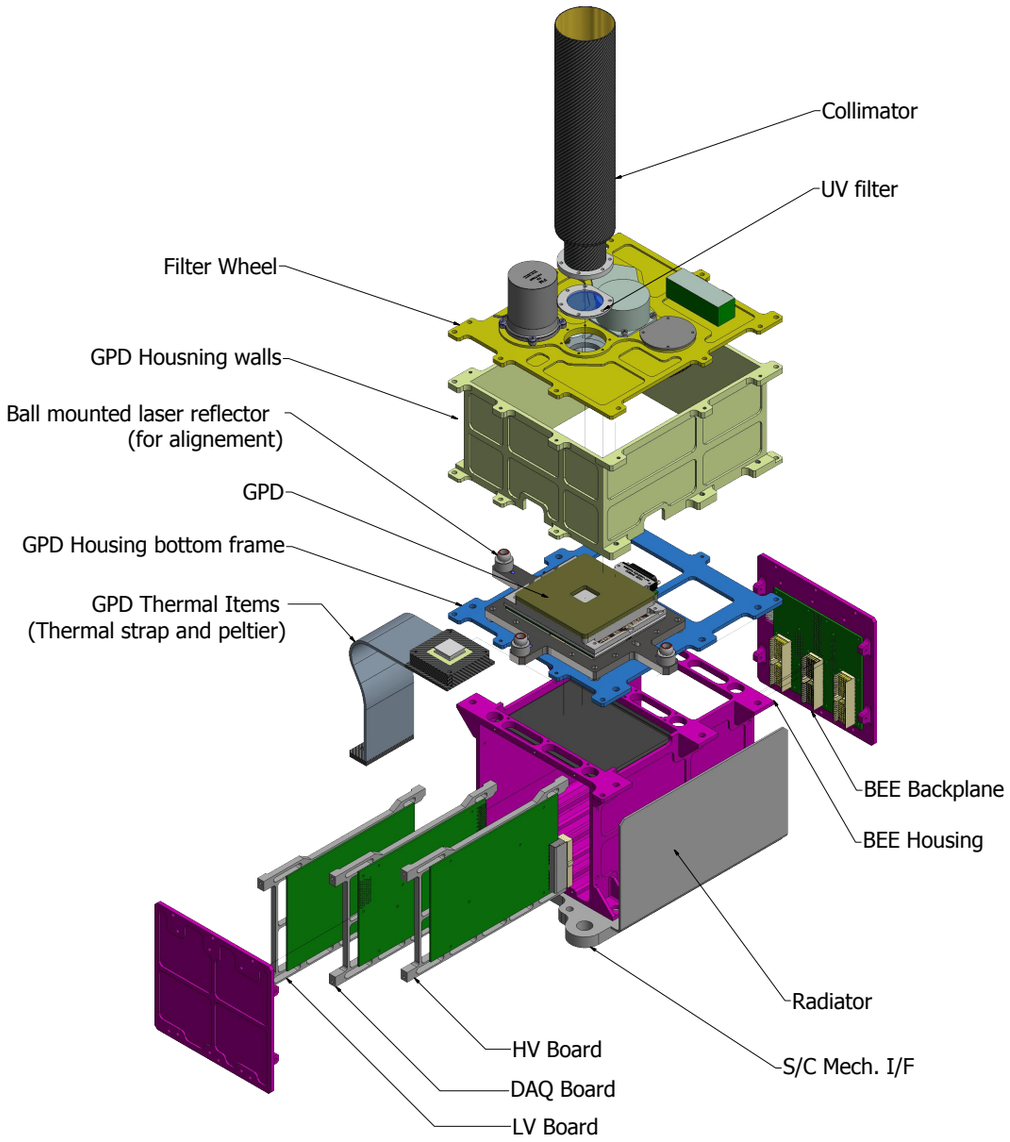


Integration with GEM, drift spacers, closing Be window

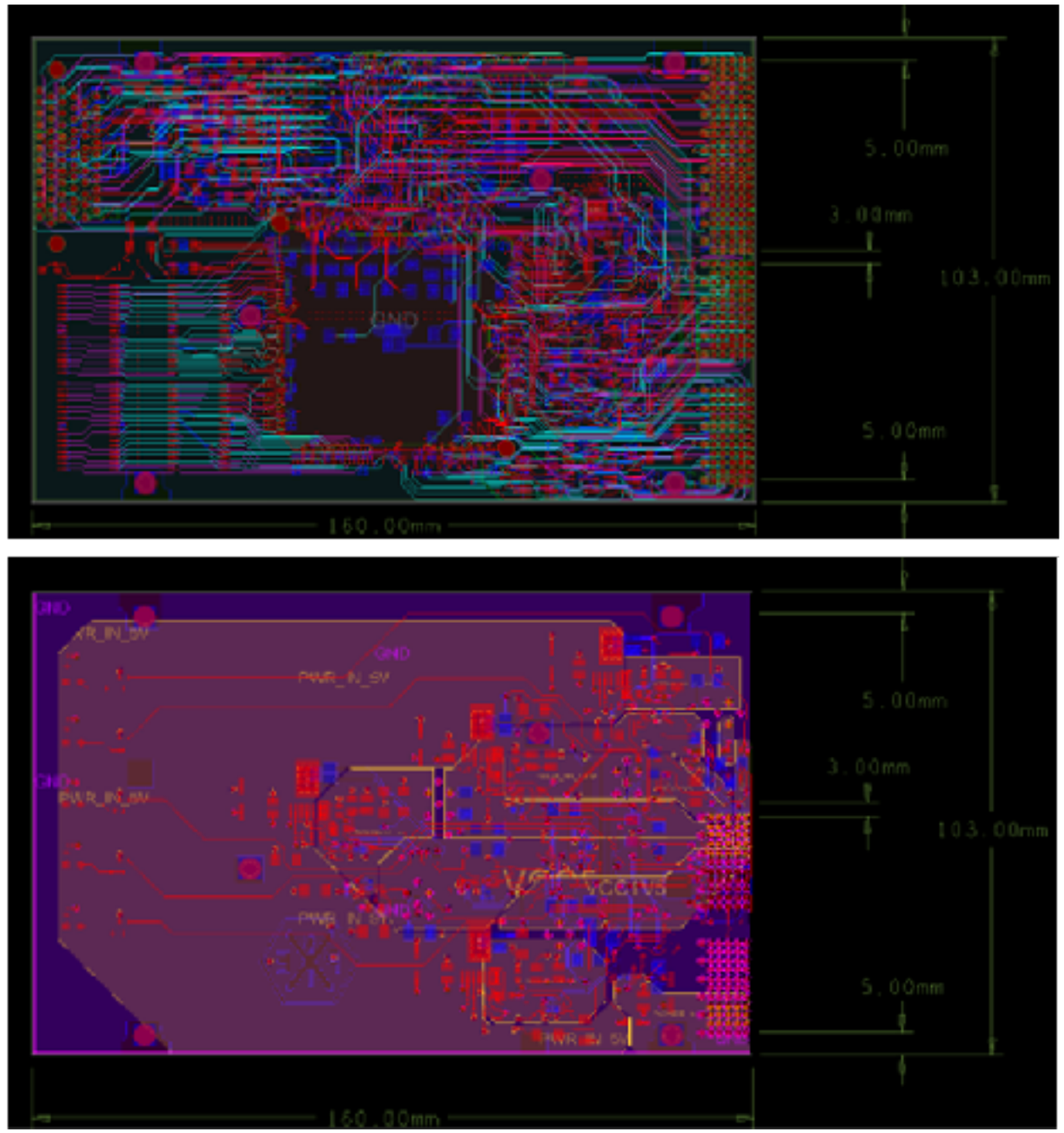
O.4.1 Gas Pixel Detector

- IXPE schedule pushes definition of I&T procedures for flight GPD
- Complete and mutual transfer of knowledge between INFN and Oxford Instrument Technologies (former NEWS partner) to allow complete integration at INFN

O.4.2 GPD Electronics



Detector Unit
(GPD and Electronics Assembly)

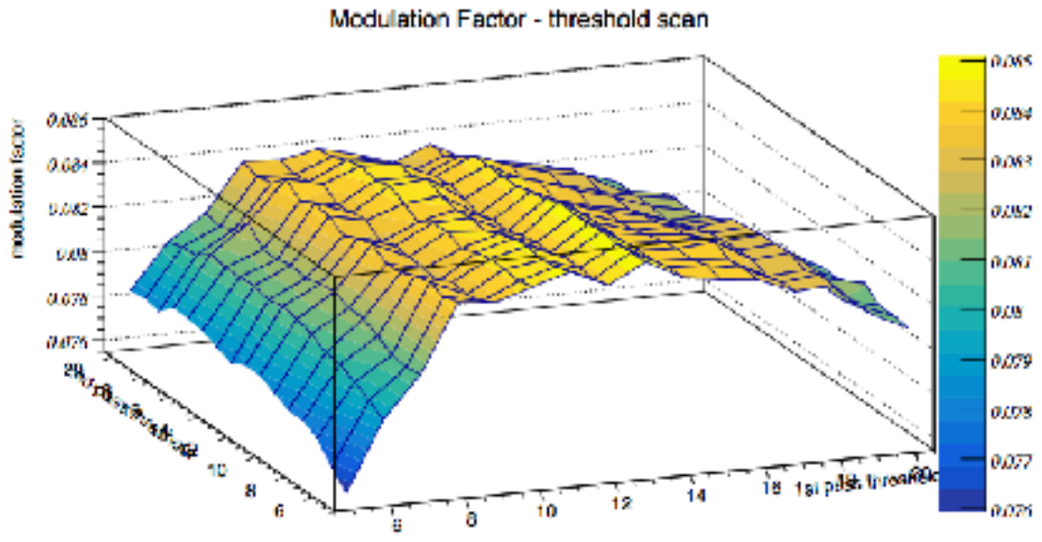


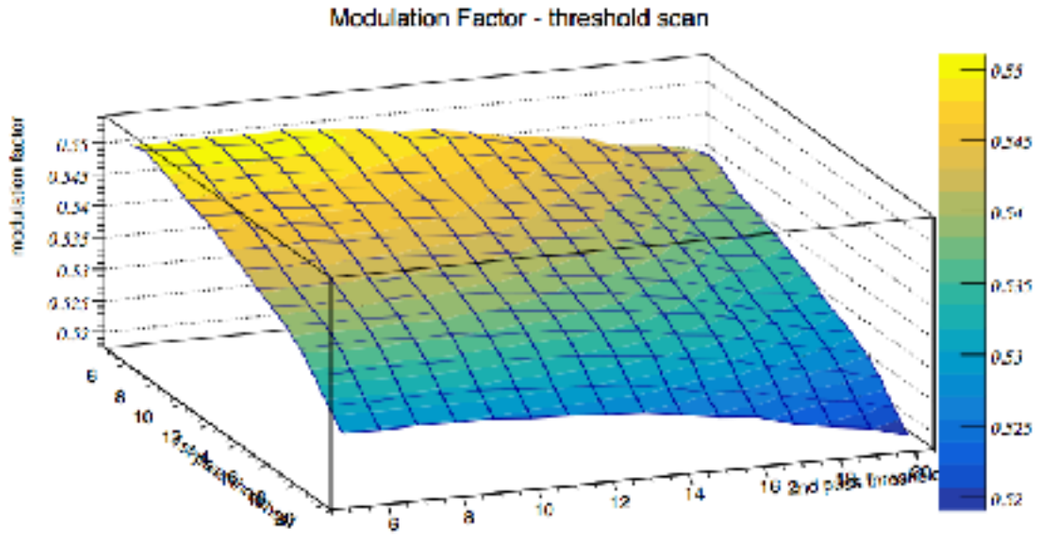
Electronics Board design

O.4.3 Optimize Event Reconstruction

- IXPE - distribute software to collaboration

- Scans of GPD recon software parameters to optimize response to polarization





O.4.5 Science Analysis Tools

- Defined a Science Analysis Software group with the IXPE collaboration
    - define, develop and distribute software tools for GPD track reconstruction, photon selection, polarimetry analysis, observation simulation (O.4.4)
- Chair: Luca Baldini (WP4 co-lead)
- First meeting Sept. 20 at Marshall Space Flight Center

Secondments

- Not activated yet, but definitely planned

- 57 months in 4 years - lots of interesting opportunities