# WP5 - X-Ray Polarimetry Explorers

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

## NEWS - Scientific Board Meeting - 12 March 2020

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# OUTLINE - STATUS OF THE OBJECTIVES

- **O5.1 - GPD Prototype - COMPLETE**
  - see Nov 2019 report
- **O5.2 Design DAQ for space operations - COMPLETE**
  - see Nov 2019 report
- **O5.3 Event Reconstruction - 90% COMPLETE**
  - covers most recent efforts to cope with complex detector calibrations
- **O5.4 Observation Simulator - 80% COMPLETE**
- **O5.5 Science Tools - 50% COMPLETE**

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# O5.3 Event Reconstruction updates

- **Baseline sim/recon incorporates time-dependent calibrations**
  - consistent model based on pressure evolution explains secular gain variations, track properties dependency vs energy and pressure,  efficiency trends
- **Machine Learning alternatives in progress**
  - direction and impact point reconstruction

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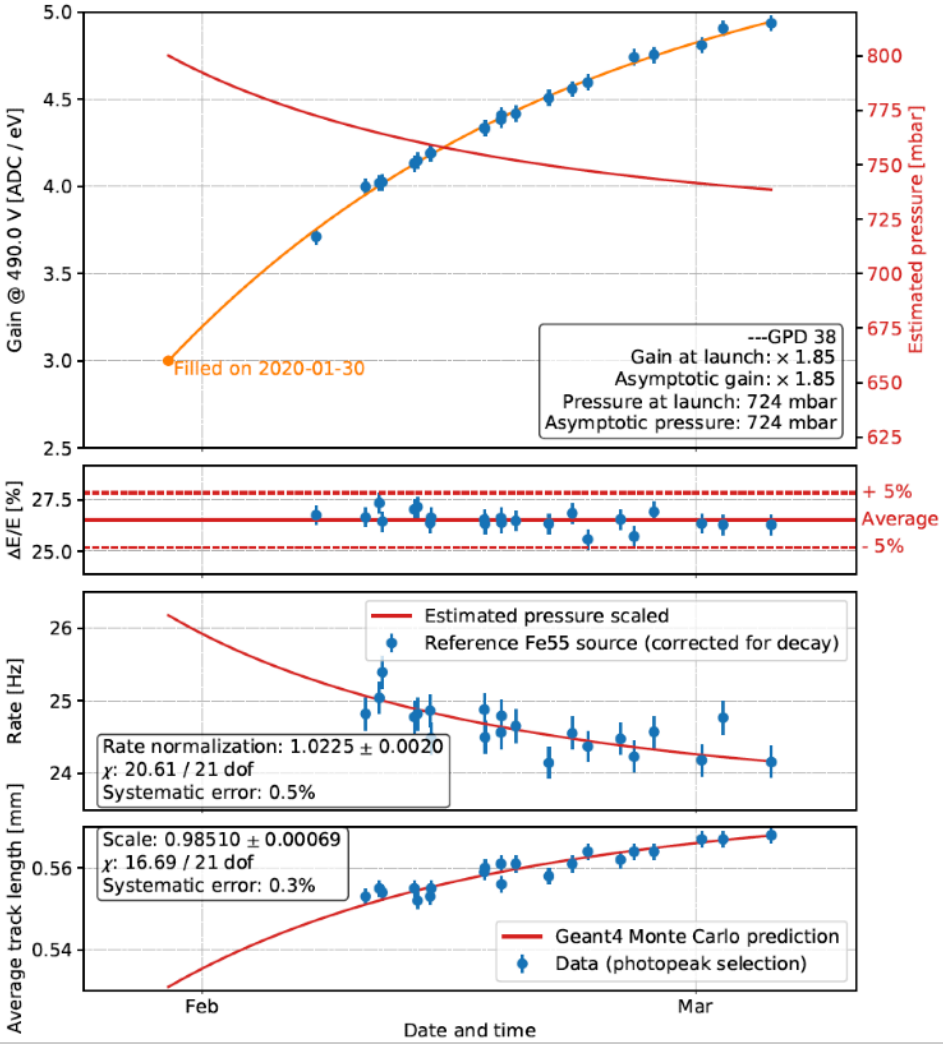
# O5.3 Event Recon - calibrations

- Model confirmed with many control GPDs
- Effect demonstrated to be reversible through temperature cycles
- Root cause conjectured to be adsorption of DME inside gas cell elements



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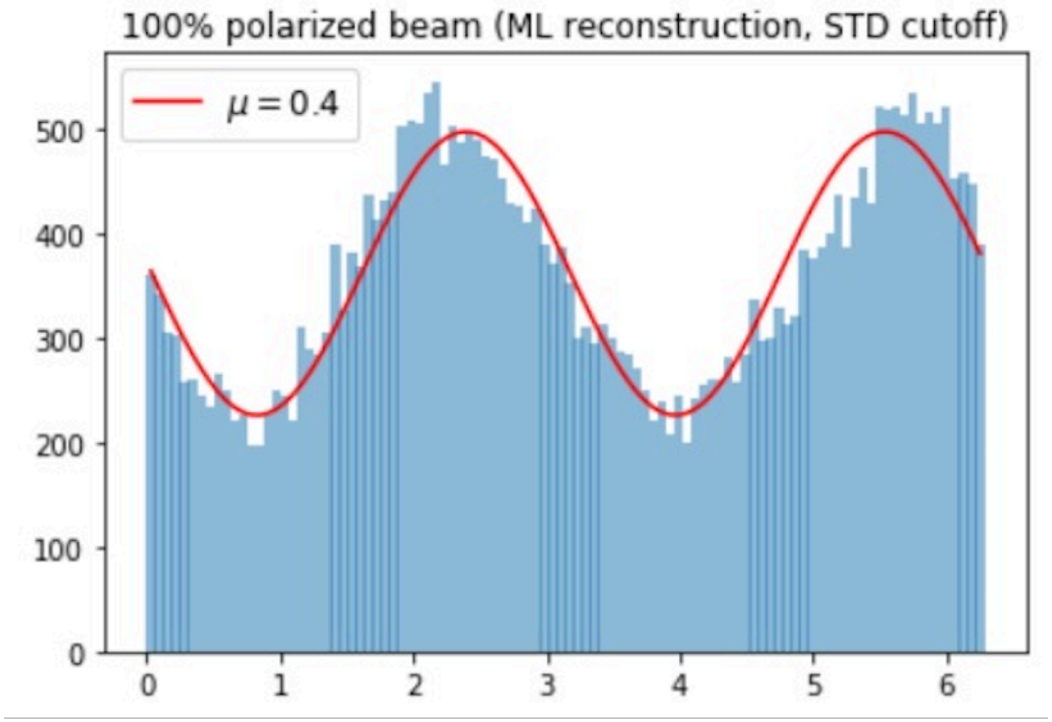
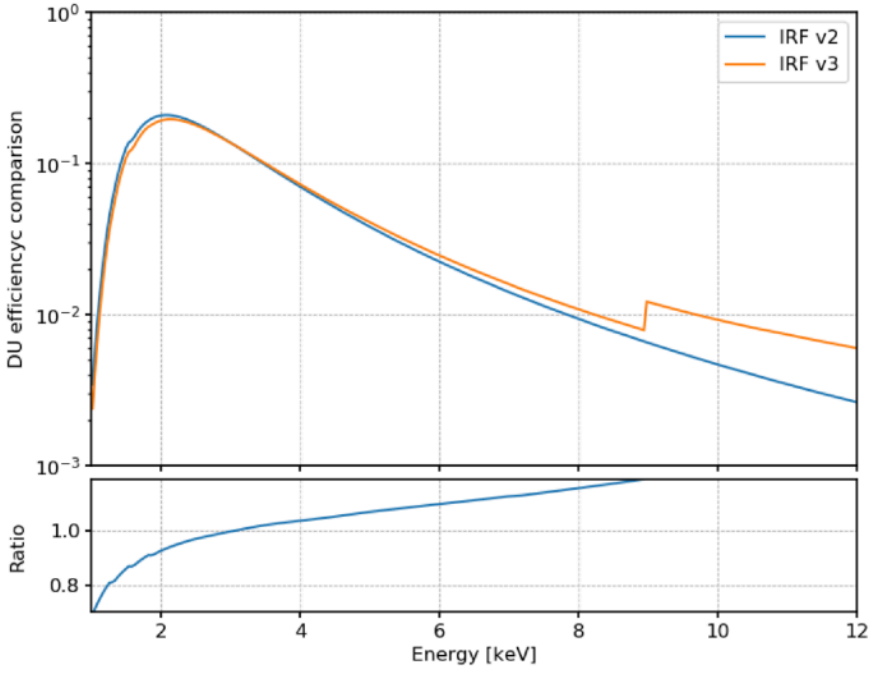
# O5.3 Event Recon - Machine Learning

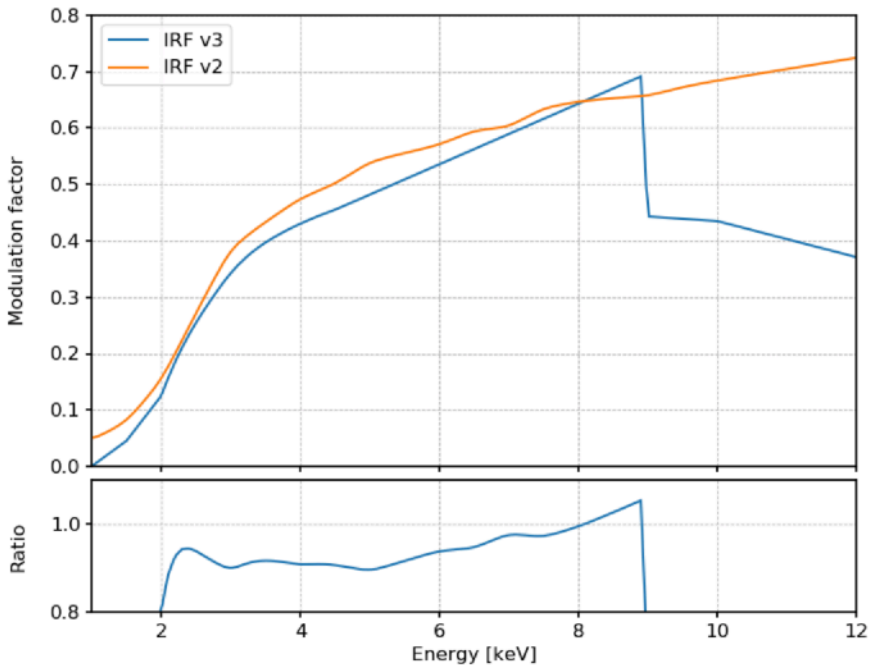
- **Convolutional Neural Networks in place to predict x-ray modulation**
  - Stability and performance under evaluation



# O5.4 Observation Simulator Updates

- **Updated Instrument Response Functions (effective area and modulation factor)**
  - includes mirror effective area and GPD efficiency details



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# O5.5 Science Tools Updates

- **Observation simulator updates to support users**
  - completed infrastructure to handle instrumental background models and data
  - resolved apparent bias in polarization of simulated magnetars
  - improved interfaces for large datasets and third-party softwares

# WP5 Secondment Status

- **CRITICAL: italian support to calibration and integration activities in USA on-hold until further notice due to COVID-19 pandemia**
  - DU2 calibration at MSFC, planned for mid-March 2020
  - Instrument integration at Ball Aerospace, planned for mid-April 2020
- **Impact to IXPE mission schedule under evaluation**
  - extension of NEWS project desirable

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# CONCLUSIONS

- **Continuous progress in Instrument calibrations and software developments**
- **COVID-19 outbreak stopped all planned secondments**
- **Message from the IXPE PI Martin Weisskopf**

*Because of the coronavirus and limitations placed on Italian personnel, it will be impossible for the Italians to perform the unpacking, checkout, installation at the SLTF, and operation of DU2 for the upcoming X-ray calibration with MMA#2 scheduled to begin on March 24, 2020. MSFC, in collaboration with Italy, has begun to investigate ways in which these tasks can be accomplished here at MSFC with remote Italian support. In so doing, we have defined impediments to accomplishing these tasks while maintaining the schedule*