The Galway-Liverpool Integrated Camera (GLIC)

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OÉ Gaillimh

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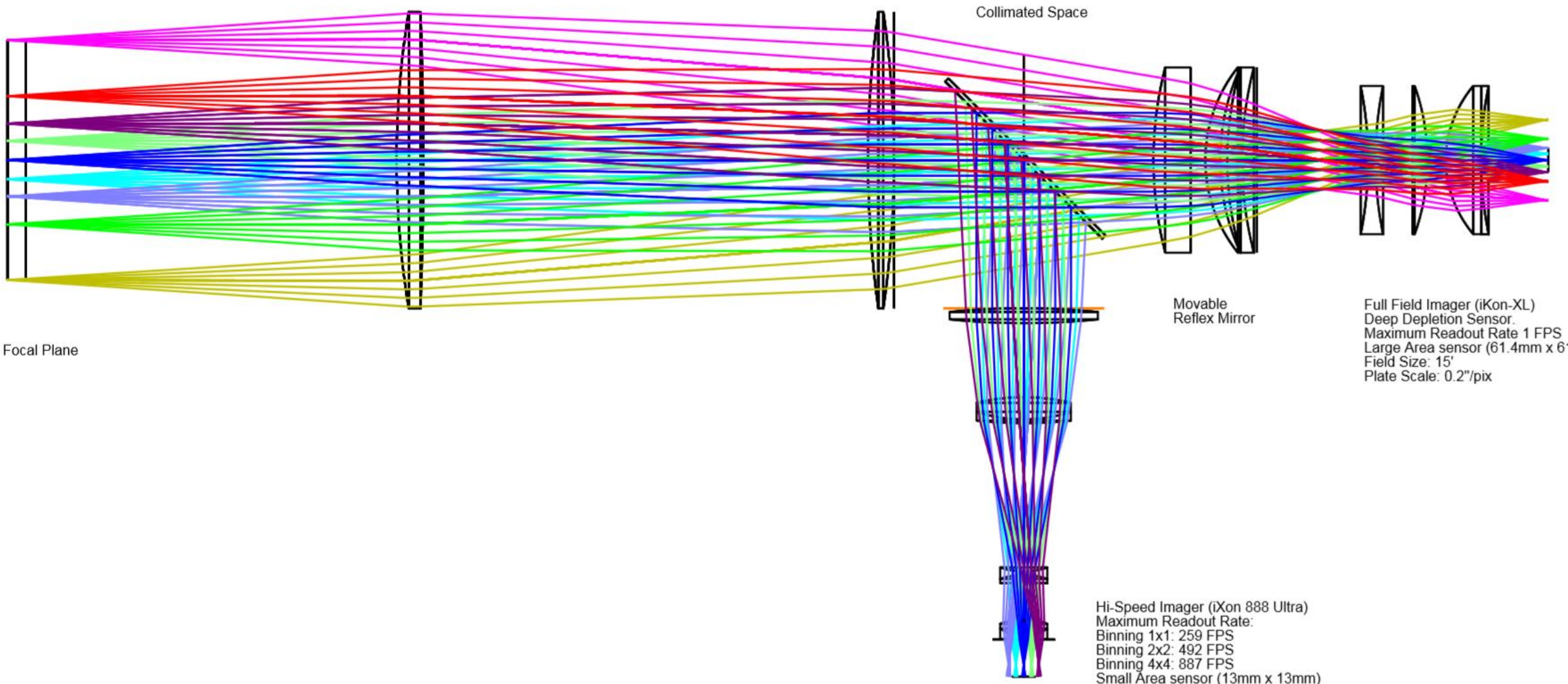
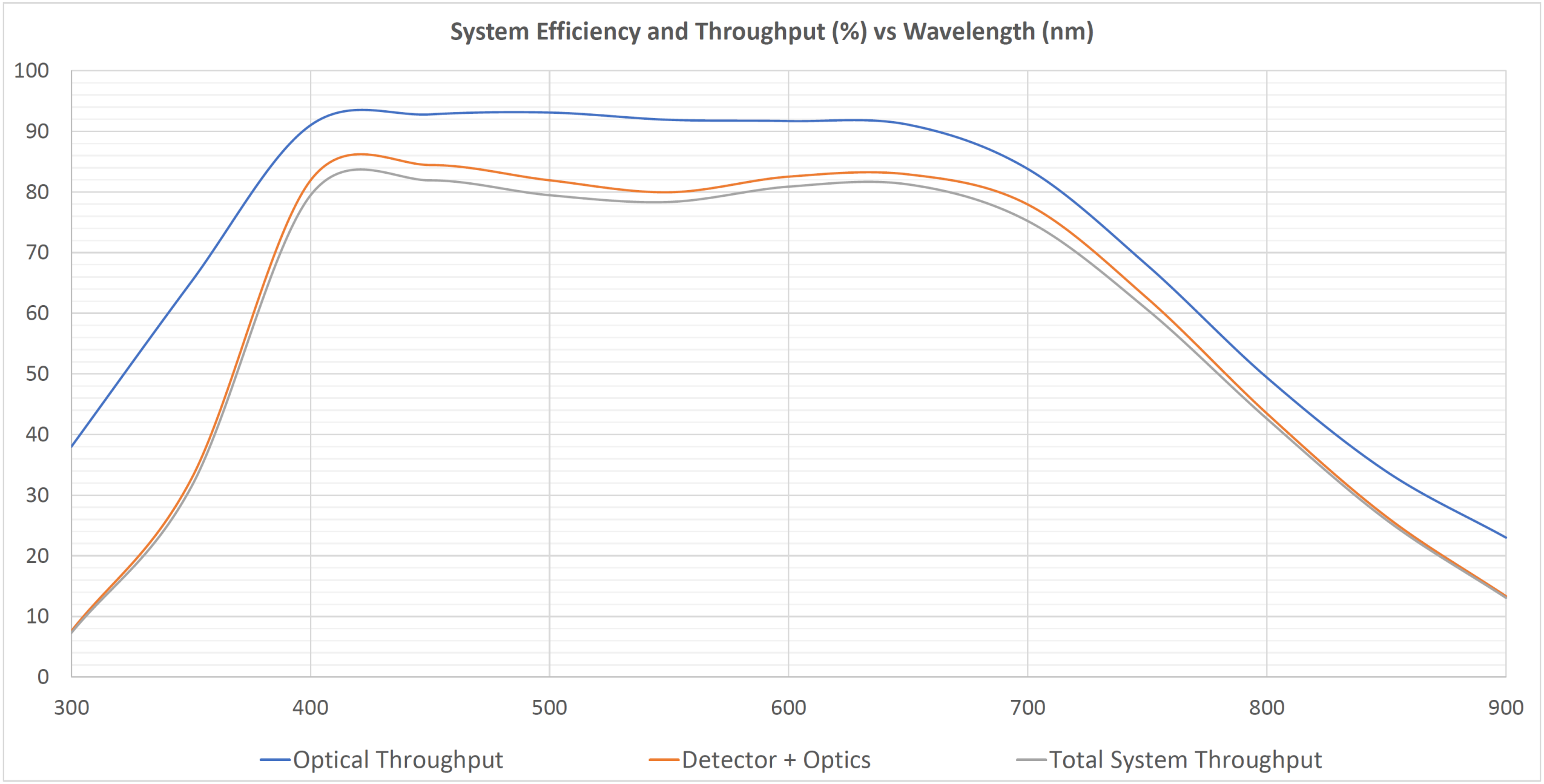
Multimode Imager Concept



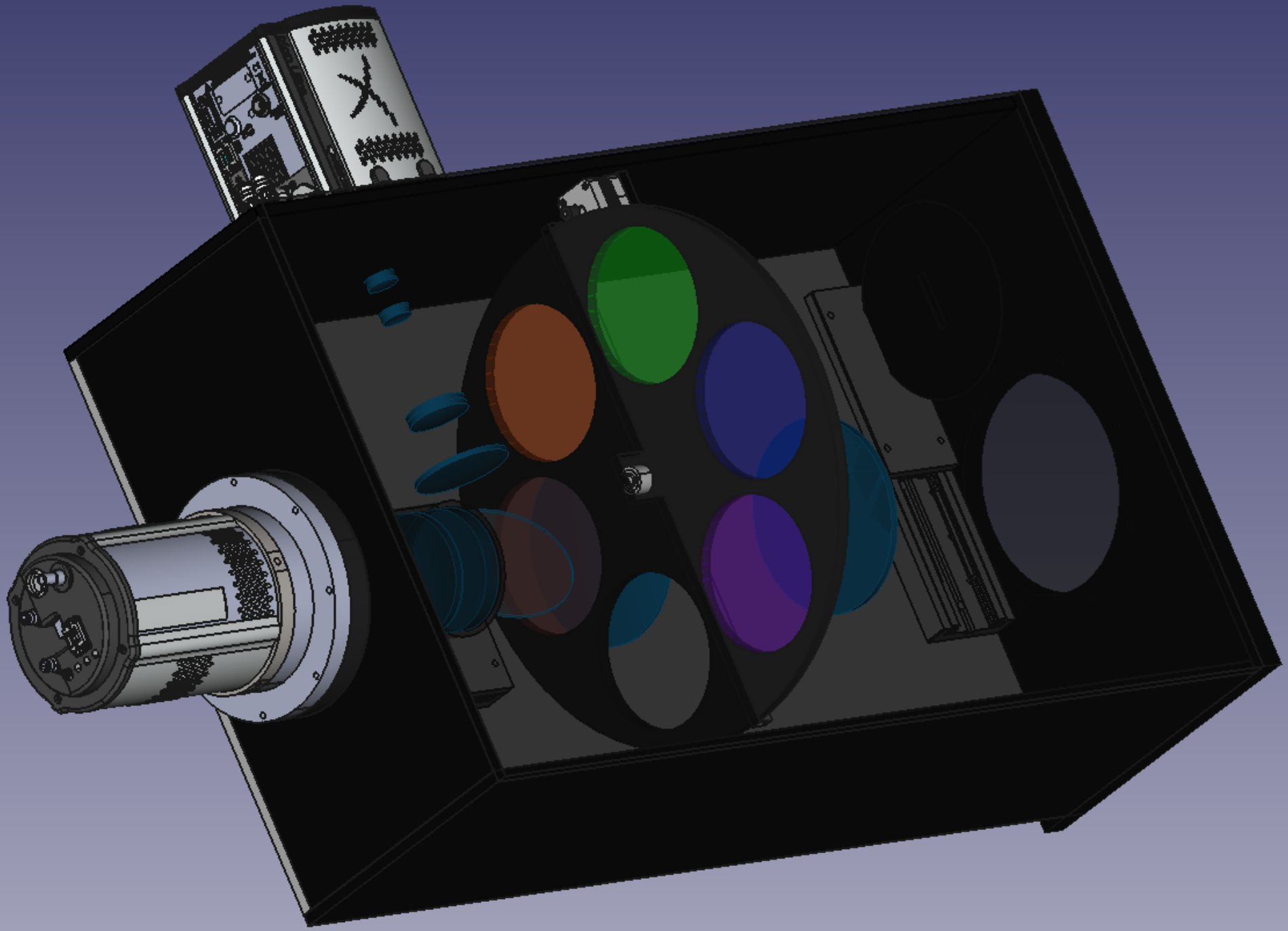

System Efficiency and Throughput (%) vs Wavelength (nm)
100
90
80
70
60
50
40
30
20
10
0
300
400
500
600
700
800
900
Optical Throughput
Detector + Optics
Total System Throughput

At the proposed location of the NRT, which is within 200m of the William Herschel Telescope (WHT), the median seeing is given as 0.55" to 0.73" [21], so a reasonable plate scale for the instrument would be on the order of half of this i.e. a plate scale of 0.2" - 0.3" per pixel.

Imaging Camera Specifications

Camera	Binning	Plate Scale	Max. Readout Speed (FPS)	Field Size
Widefield Camera				
iKon - XL	1x1	0.2"/pix	0.5	
	2x2	0.4"/pix	0.81	15'
	4x4	0.8"/pix	1.18	
High Speed Camera				
iXon 888 Ultra	1x1	0.3"/pix	259	
	2x2	0.6"/pix	492	4.5' x 0.4'
	4x4	1.2"/pix	887	

Table 2: Specifications for the readout modes which will be available at instrument first light.



Why Optical High Speed Photometry?

The missing link in the spectrum?

Currently looking at FRB121102 -

Integral
ALMA
FAST
Nancay
Effelsberg
Arecibo

This really needs 1KHz optical imaging!

FAST Detects Multiple Bursts in L-band from FRB 121102

ATel #13064; *Di Li (NAOC), Xinxin Zhang (NAOC), Lei Qian (NAOC), Weiwei Zhu (NAOC), Ran Duan (NAOC), Dan Werthimer (Berkeley), Vishal Gajjar (Berkeley), Yan Zhu (NAOC), Jeff Cobb (Berkeley), Youling Yue (NAOC), Chengjin Jin (NAOC), Bing Zhang (UNLV), Christian Gouiffes (CEA), Shen Wang (NAOC), Laura Spitler (MPIfR), Mary Cruces (MPIfR), Jason Hessels (University of Amsterdam), Andrew Seymour (Arecibo), Eric Korpela (Berkeley), Jingtao Luo, HengQian Gan (NAOC), Peng Jiang (NAOC), Hui Li (NAOC), Qi Li (NAOC), HongFei Liu (NAOC), Chenchen Miao (NAOC), Chenhui Niu (NAOC), GaoFeng Pan (NAOC), Zhichen Pan (NAOC), Bo Peng (NAOC), JingHai Sun (NAOC), Ningyu Tang (NAOC), QiMing Wang (NAOC), Pei Wang (NAOC), Xin Pei (XAO), Jun Yan (NAOC), Rui Yao(NAOC), DongJun Yu (NAOC), Mao Yuan (NAOC), Haiyan Zhang (NAOC), Lei Zhang (NAOC), ShuXin Zhang (NAOC), and and FAST Collaboration (NAOC)*
*on **2 Sep 2019; 01:32 UT***
Credential Certification: Di Li (dili@nao.cas.cn)

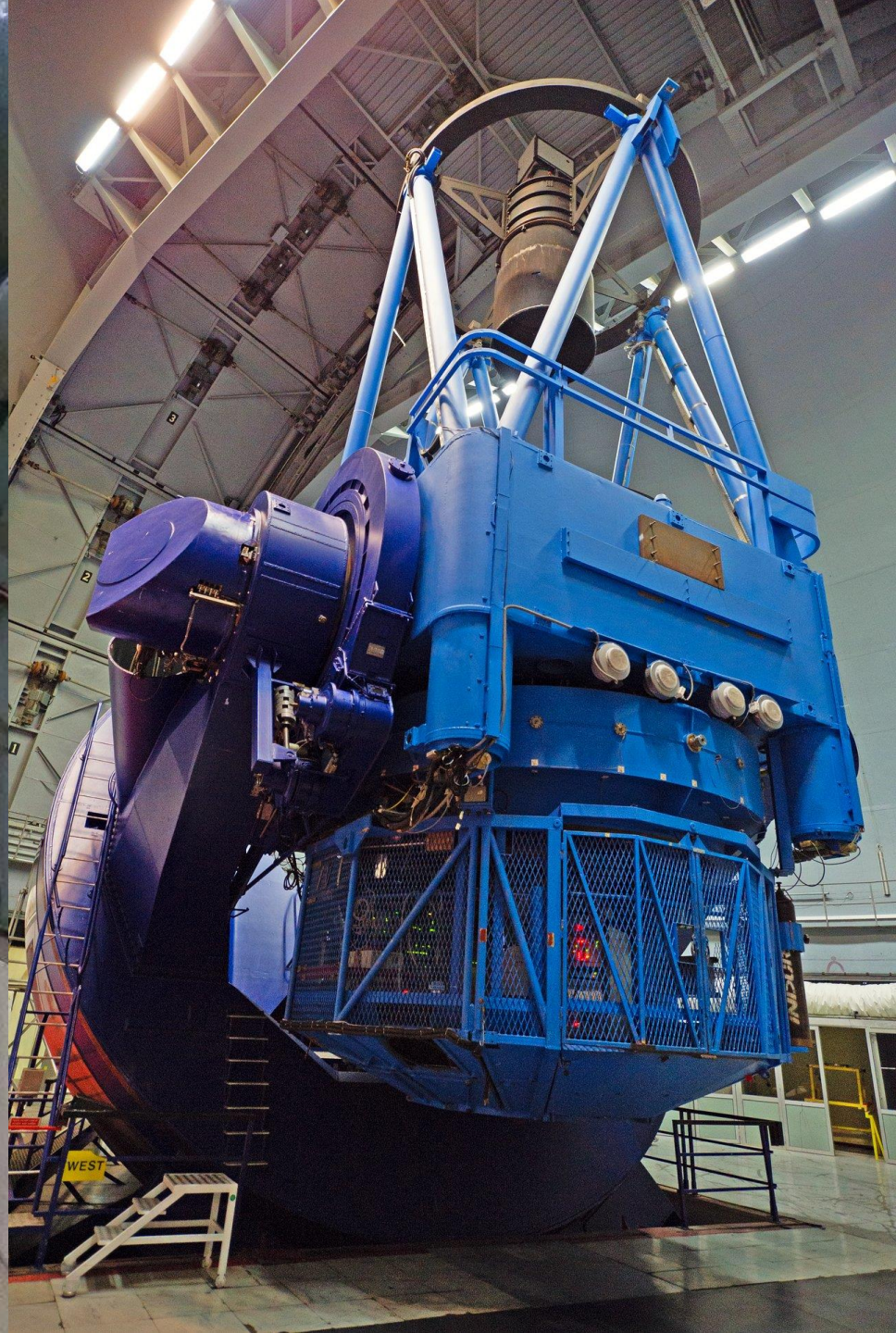
Subjects: Radio, Fast Radio Burst

Tracking observations of FRB 121102 were carried out with the newly commissioned Five-hundred-meter Aperture Spherical radio Telescope (FAST). We used the FAST L-band Array of 19-beams (FLAN), which has a FWHM of ~2.95' for individual beams and a ~26' footprint. The source was placed in the central beam, while all 19 beams were recorded. The bursts were firstly identified by the FRB backend on August 29th (UT), whichÂ performs real time signal processing of 19-beams data and automatic candidate selection/triggering. The subsequent single pulse search using multiple pipelines have turned up many tens of pulses with significant SNR in observations carried out so far, on the 29th, 30th, and 31st (UT). While careful cross-check are being carried out, the majority of these detections are expected to be credible. FAST has been targeting FRB 121102 since April of this year. In addition to the regular on-going FRB follow-up programs, the current observations was also motivated by timely and valuable alerts from our colleagues in the INTEGRAL team, Arecibo team, Max-Plank Institute for Radio Astronomy, Berkeley, and Cornell University. Given the significance of this source and its now apparent active state, FAST is executing more observations under the auspice of engineering testing time and multiple approved PI-led programs, which targeted FRB 121102. We encourage more ToO observations with other facilities.

FAST pulsar survey results

Why Galway?

- A proven track record of delivering relatively complex instruments on-time and fully functional.


WEST

Why Galway?

- A proven track record of delivering relatively complex instruments on-time and fully functional.
- Highly educated, experienced and dedicated technical staff.
  >100 years experience

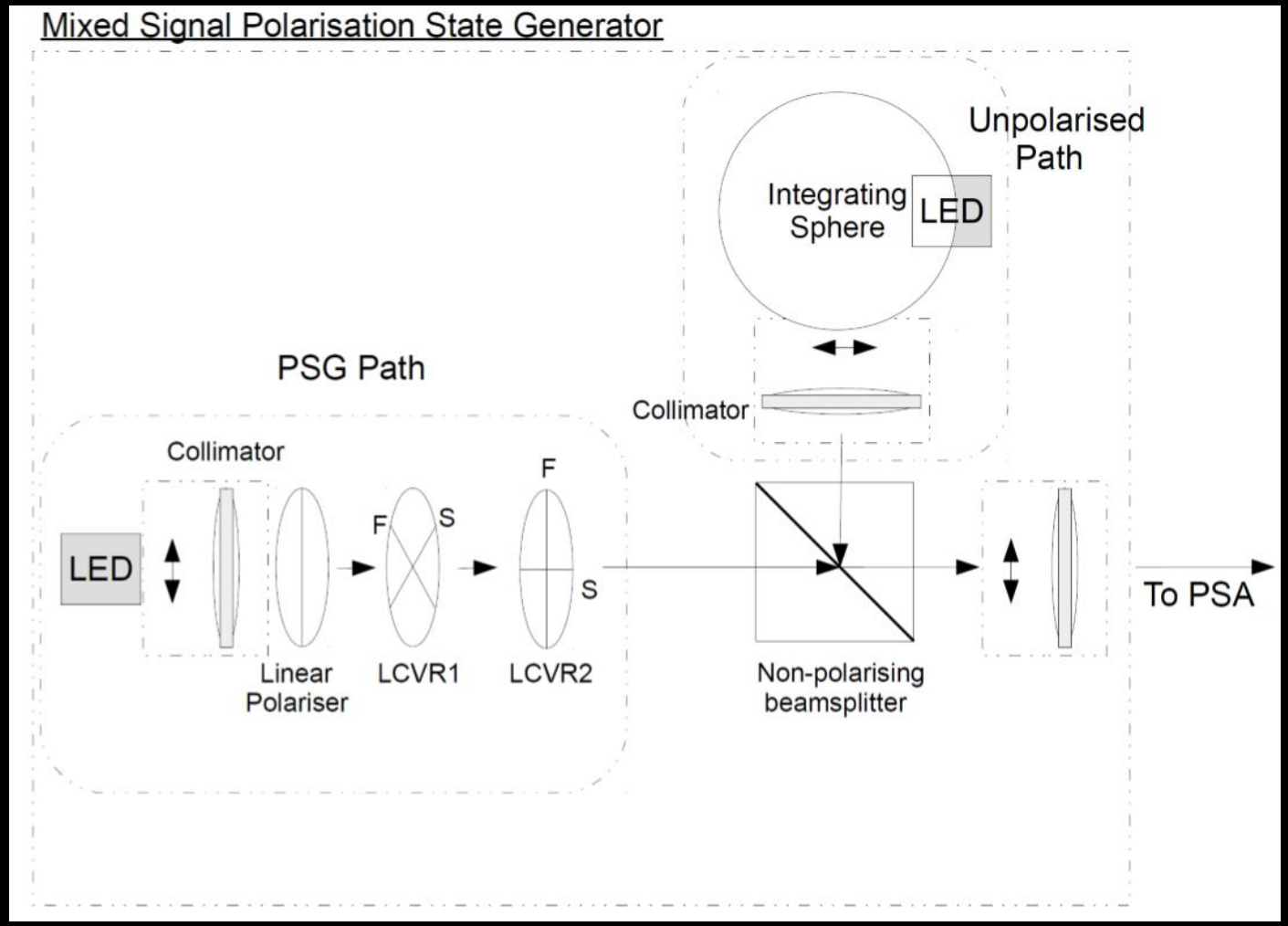
Why Galway?

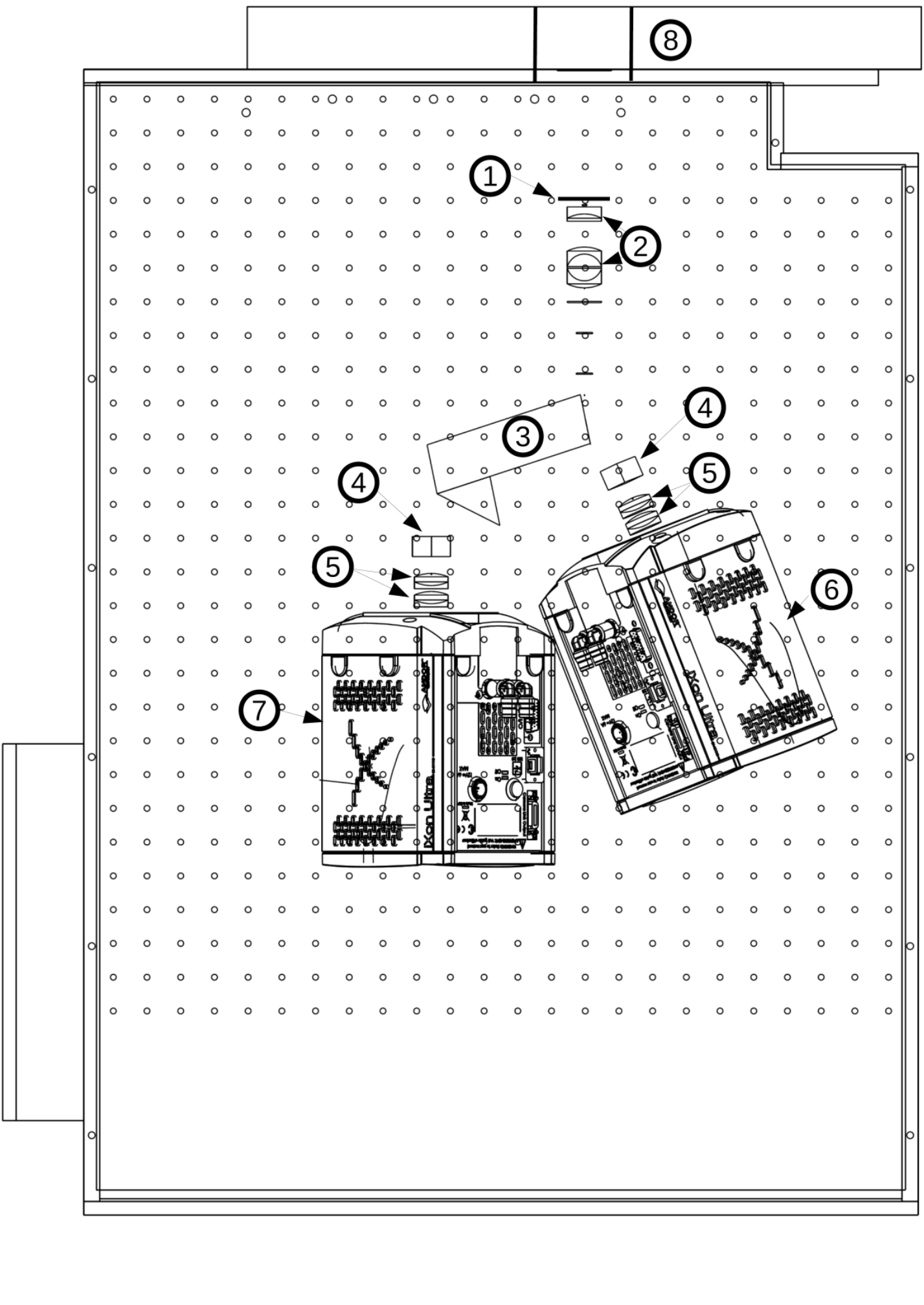
- A proven track record of delivering relatively complex instruments on-time and fully functional.
- Highly educated, experienced and dedicated technical staff.
- All tooling facilities needed for instrument fabrication are in-house:
  - CNC milling.
  - Lathes.
  - Rapid prototyping – 3D Printing
  - Optical Pilot line.
  - Laser machining.

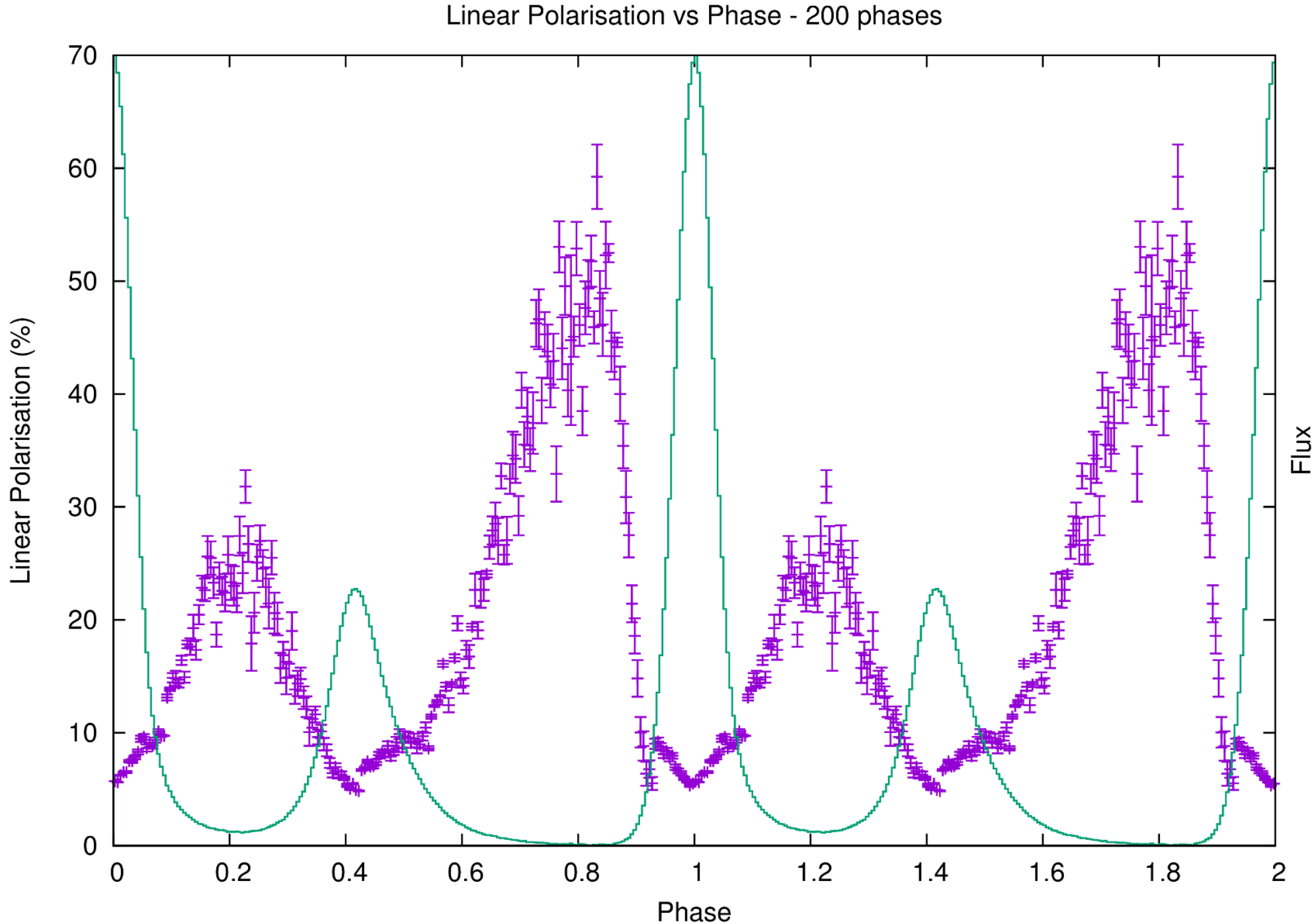
Currently working on:

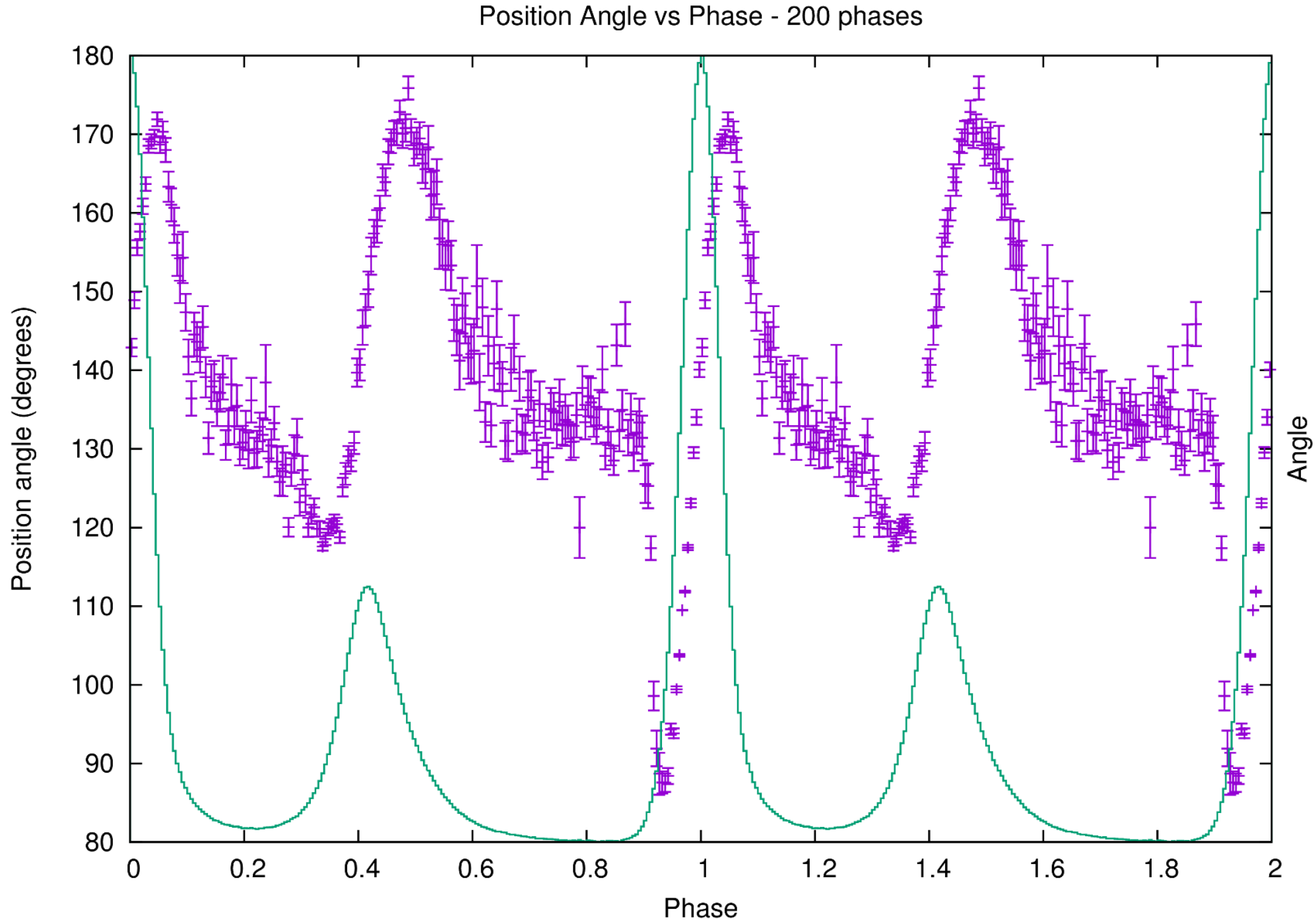
Opticon H2020 WP3 JRA3 - *Emerging Fast Detectors*

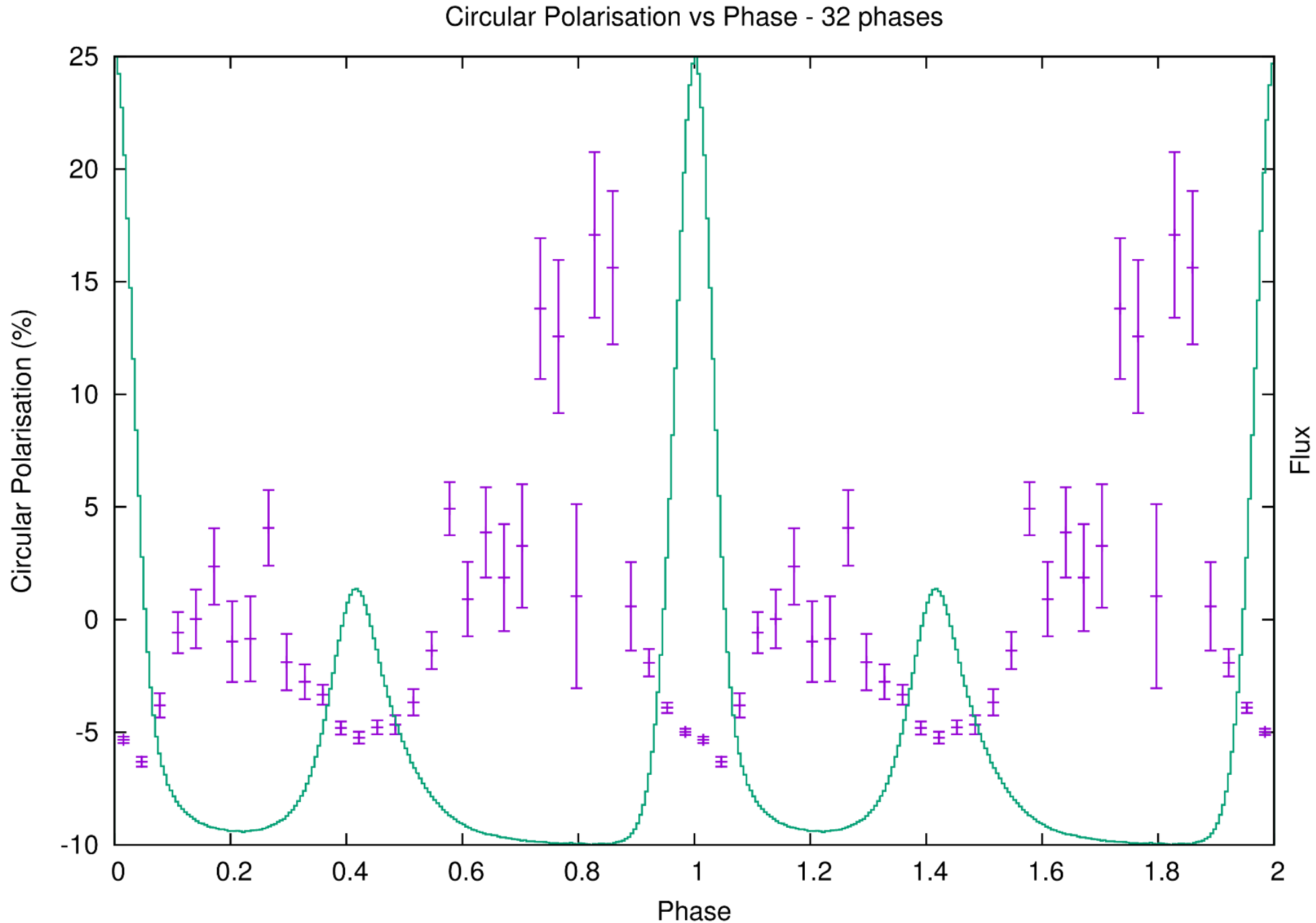
Development of a mixed-signal polarisation state generator to test the polarisation sensitivity of MKIDs

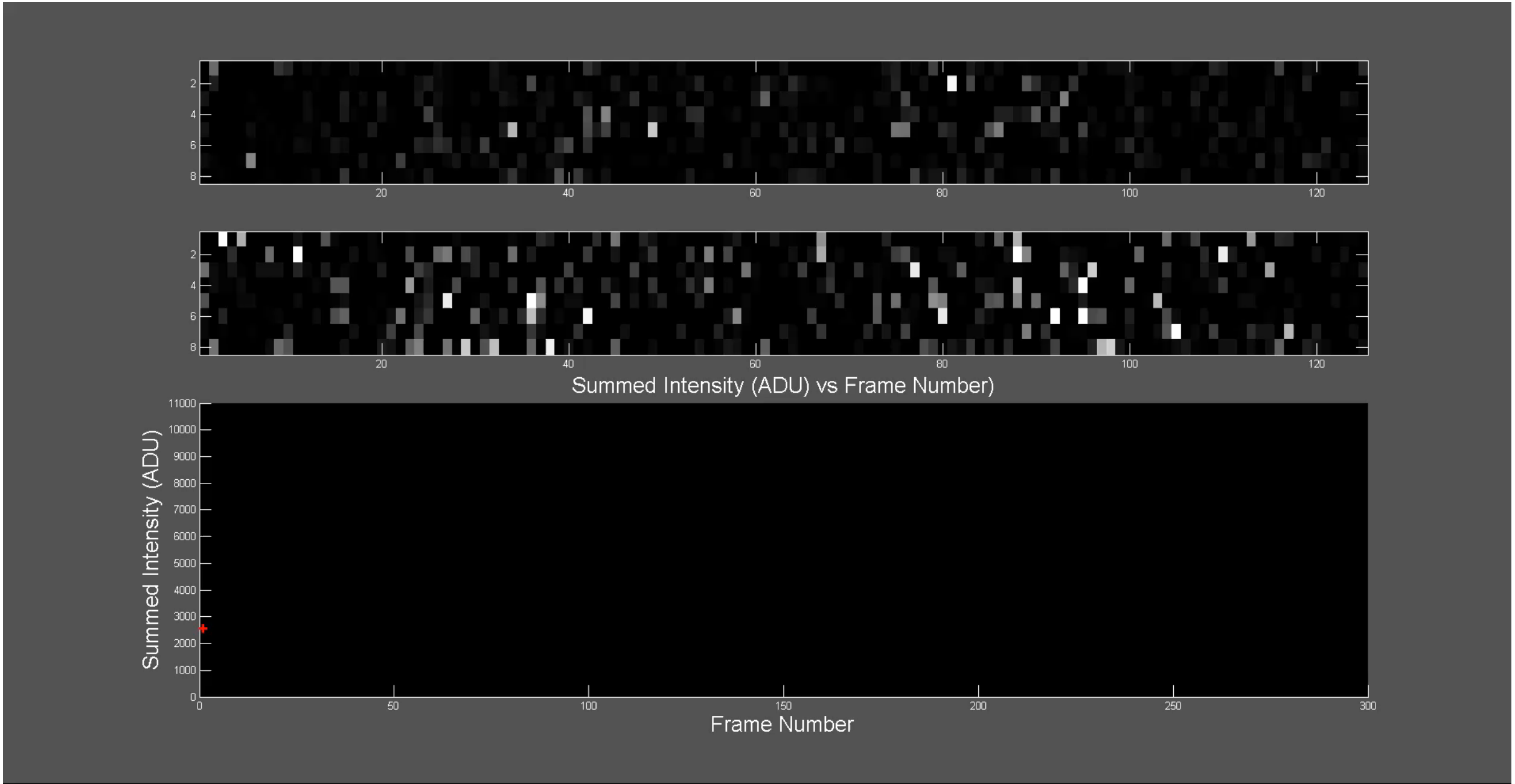



8
1
2
3
4
4
5
5
6
7


Linear Polarisation vs Phase - 200 phases
Linear Polarisation (%)
Flux
Phase
0
10
20
30
40
50
60
70
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2


Position Angle vs Phase - 200 phases
Position angle (degrees)
180
170
160
150
140
130
120
110
100
90
80
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Phase
Angle


Circular Polarisation vs Phase - 32 phases
Circular Polarisation (%)
Flux
Phase
25
20
15
10
5
0
-5
-10
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2


2
4
6
8
20
40
60
80
100
120
Summed Intensity (ADU) vs Frame Number)
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Summed Intensity (ADU)
0
50
100
150
200
250
300
Frame Number