

Reviewing New Pulsars for the Parkes Pulsar Timing Array Project

Introduction

10 low-priority pulsars that **don't** have long term data sets analysed

Considering using these pulsars for our upcoming data release

Need to analyse their **suitability** against an evaluation criteria for the PPTA

MSP Demographics

P_0 range (milliseconds): 1.7 - 39

Black widows: 2 | Red backs: 1

Relativistic binaries: 1

Isolated pulsars: 1

$P_b < 2$ days: 4

$P_b > 2$ days: 5

Cross-reference DR2 MSPs: 5 (additional)

Methodology

Analysis of UWL data from 2018 onwards

Analysing New sub-band templates; ToAs; orbital phase; profiles; polarisation; dispersion measure; rotation measure; pulse widths; flux densities; signal-to-noise

Evaluation Criteria (so far)...

RMS timing residuals $< 5 \mu\text{s}$

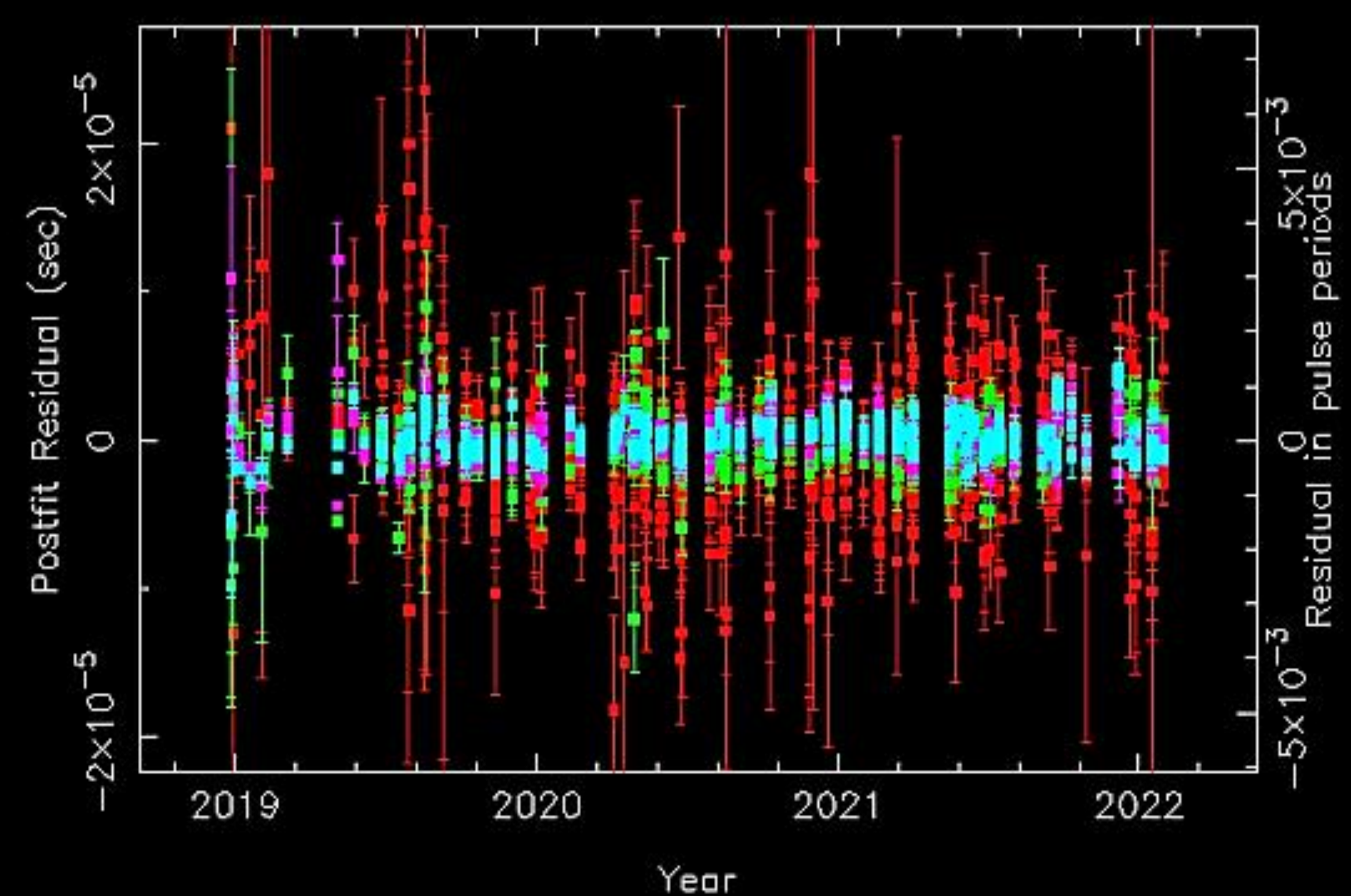
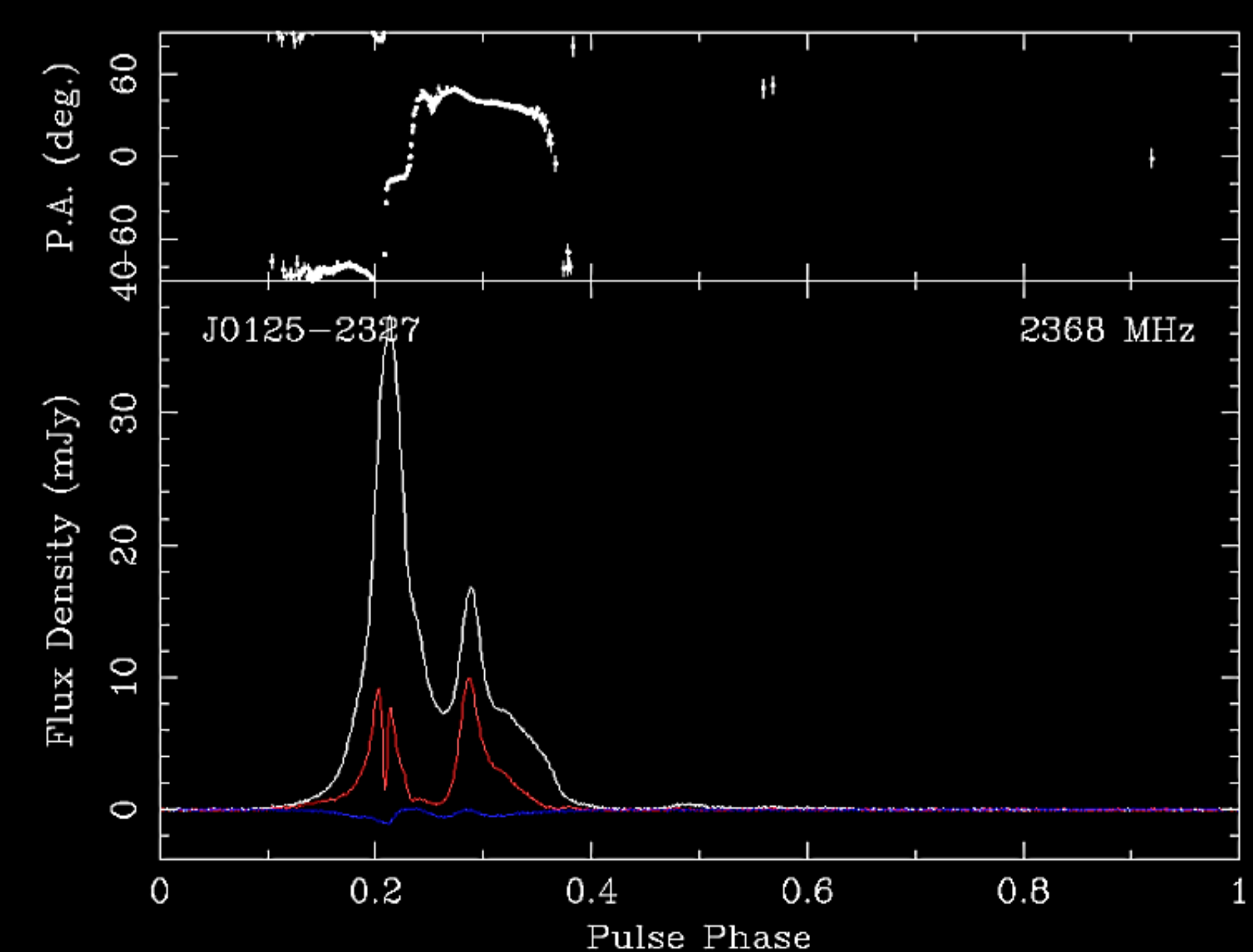
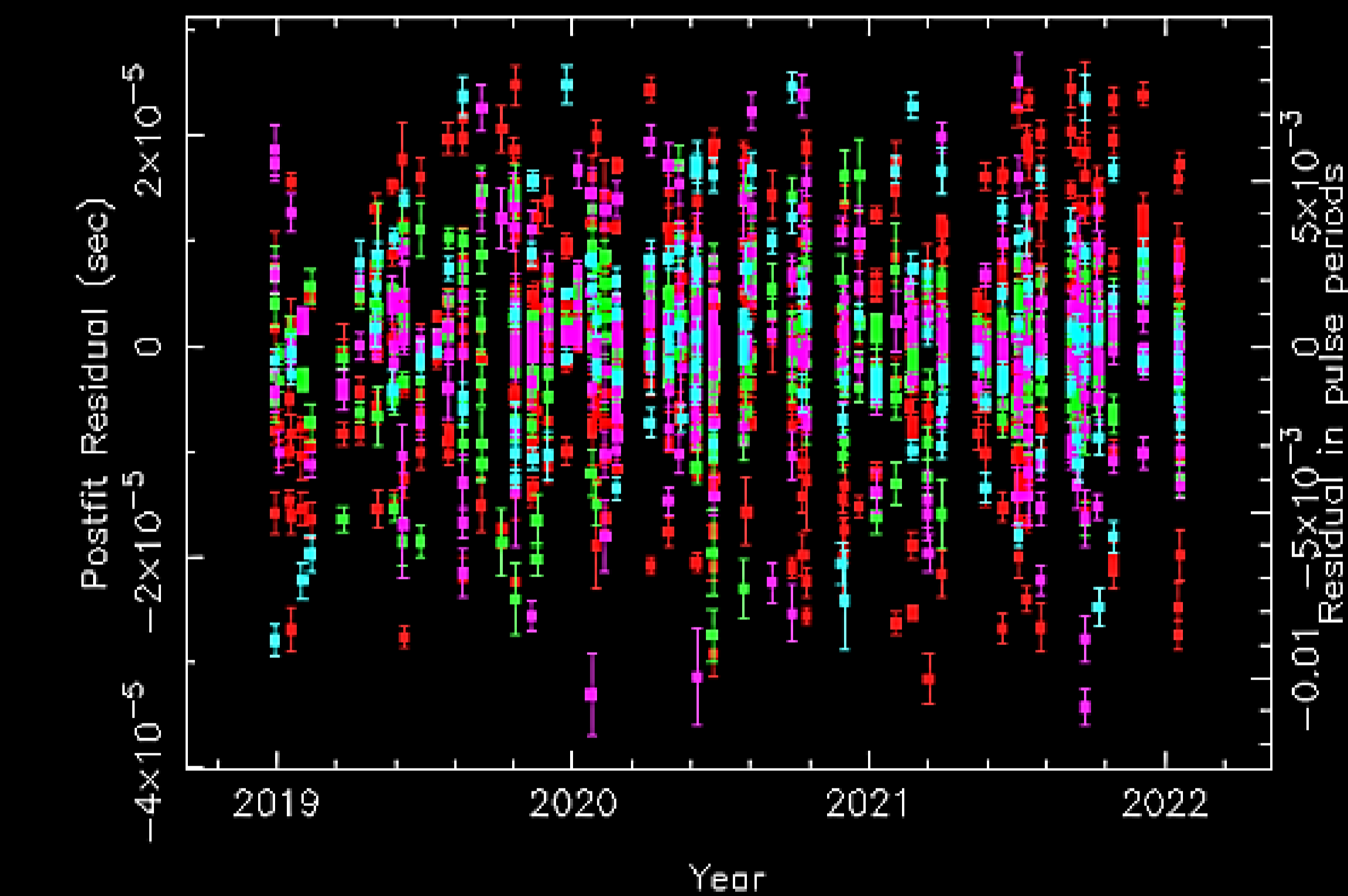
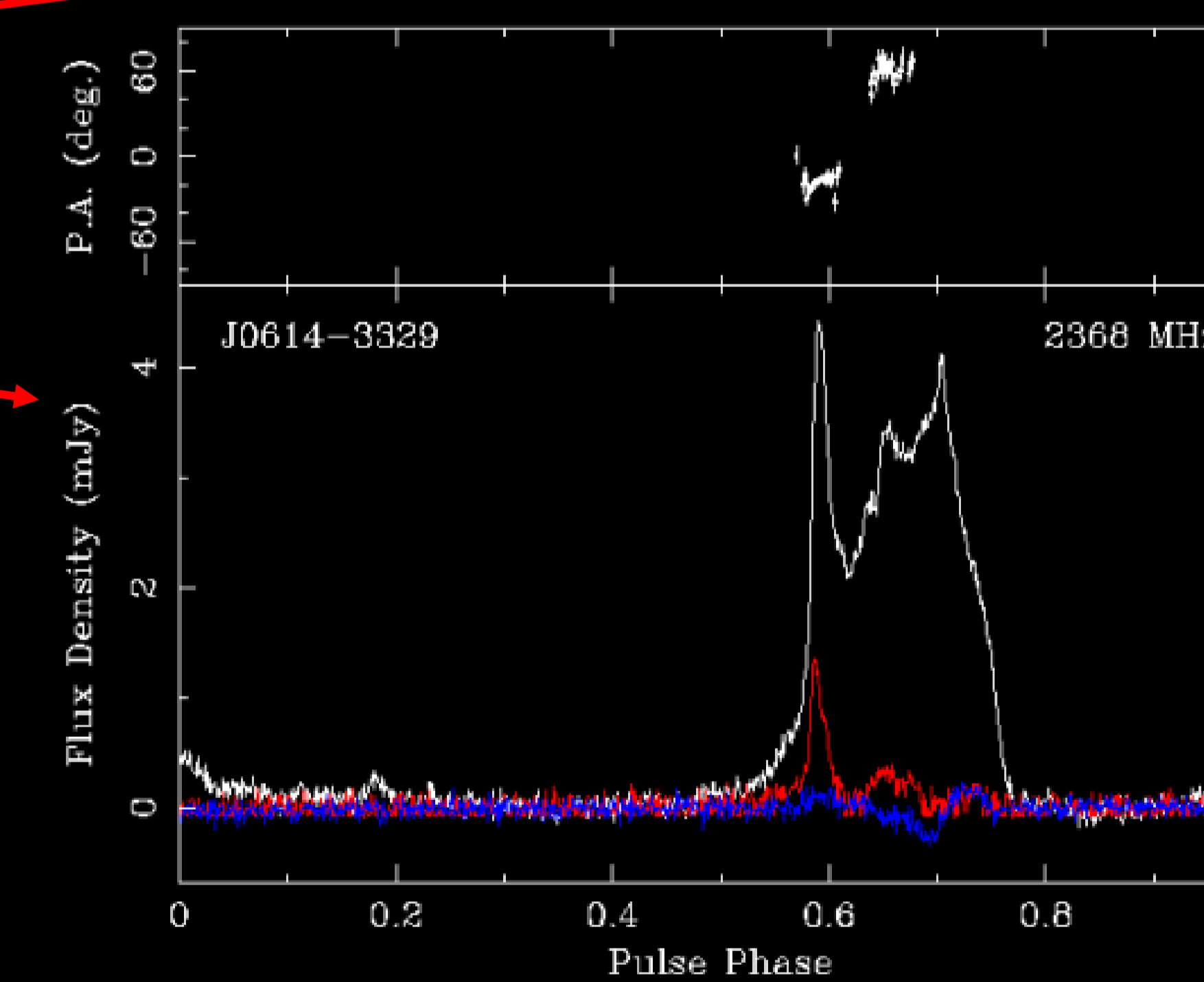
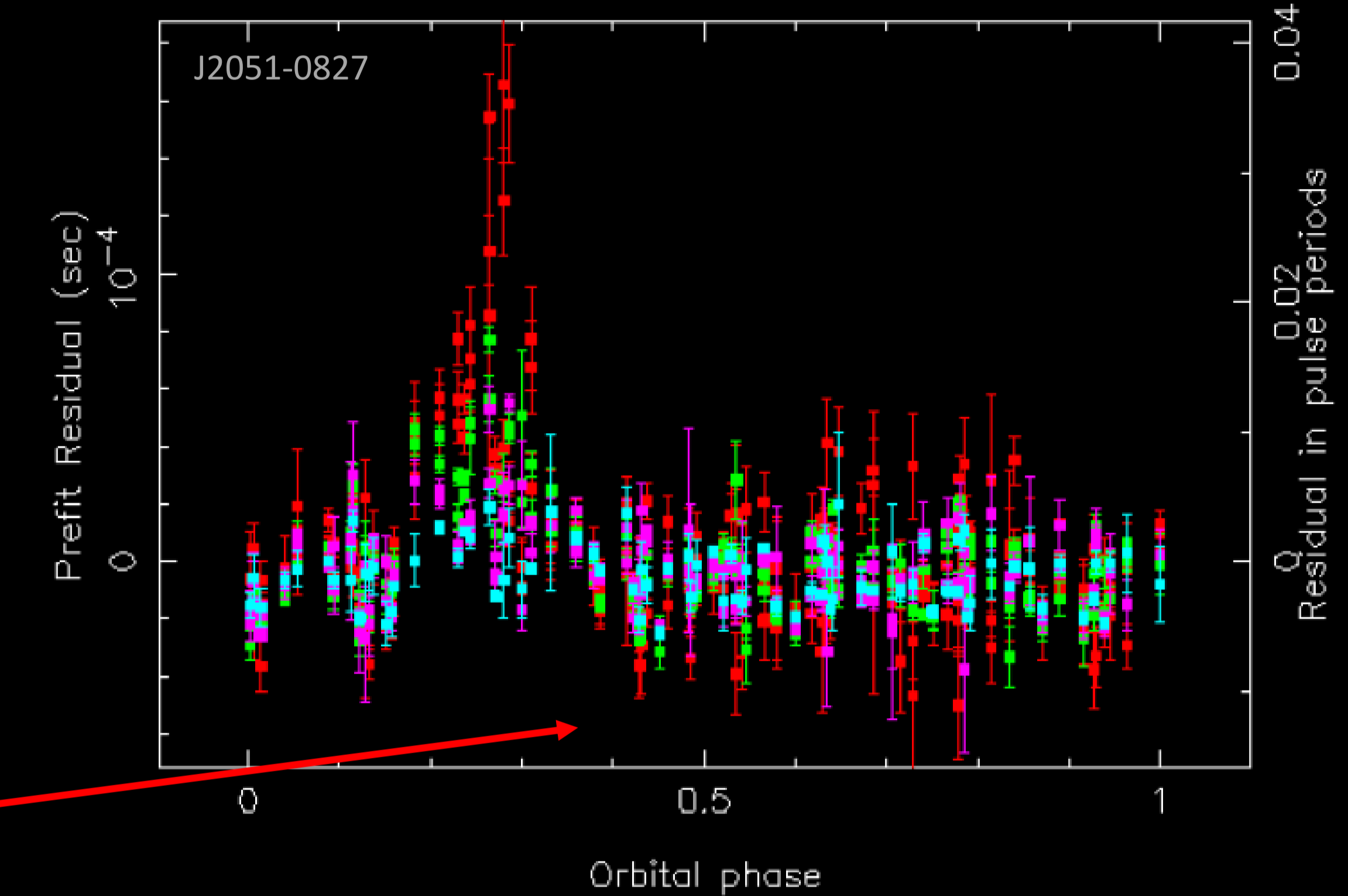
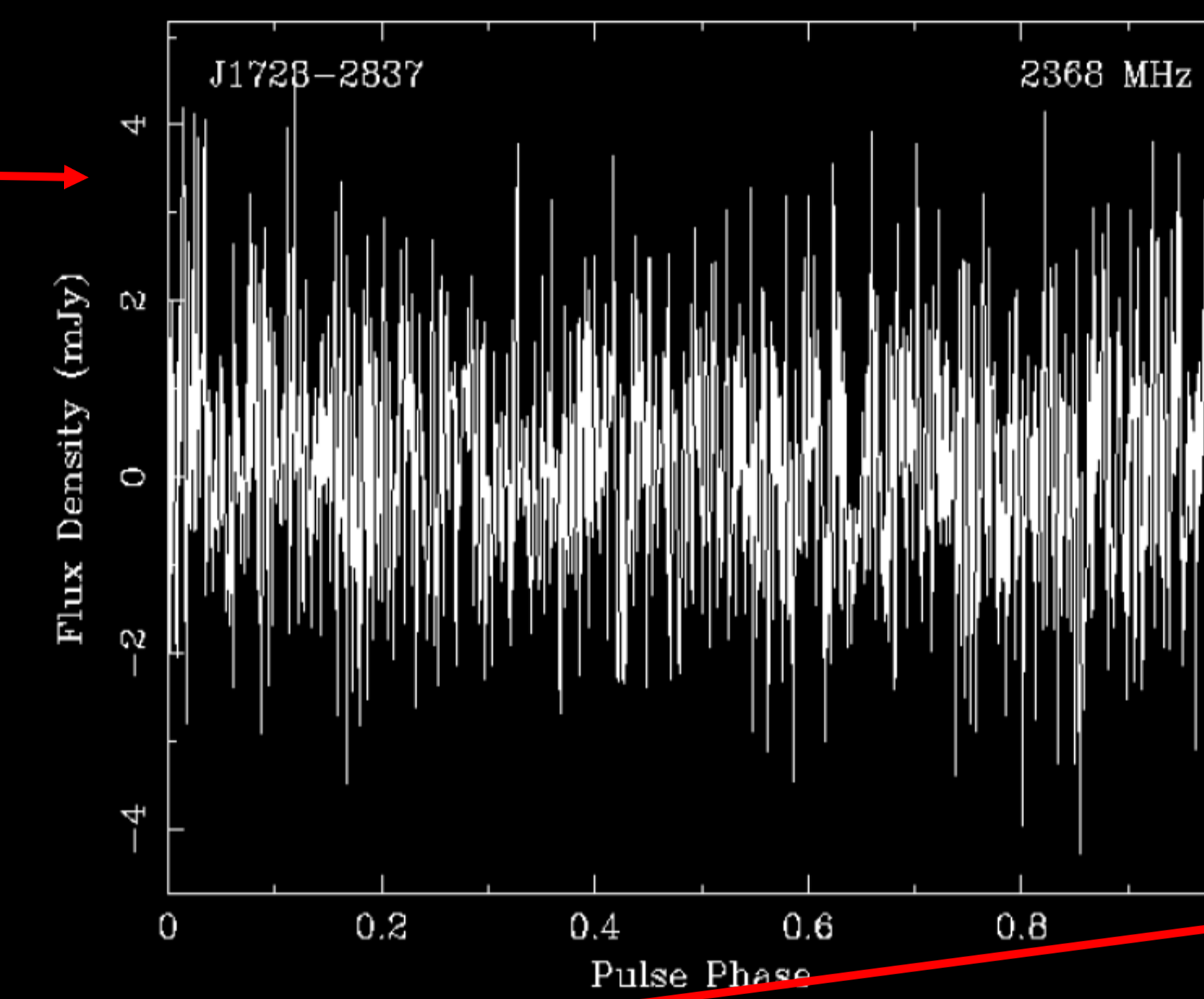
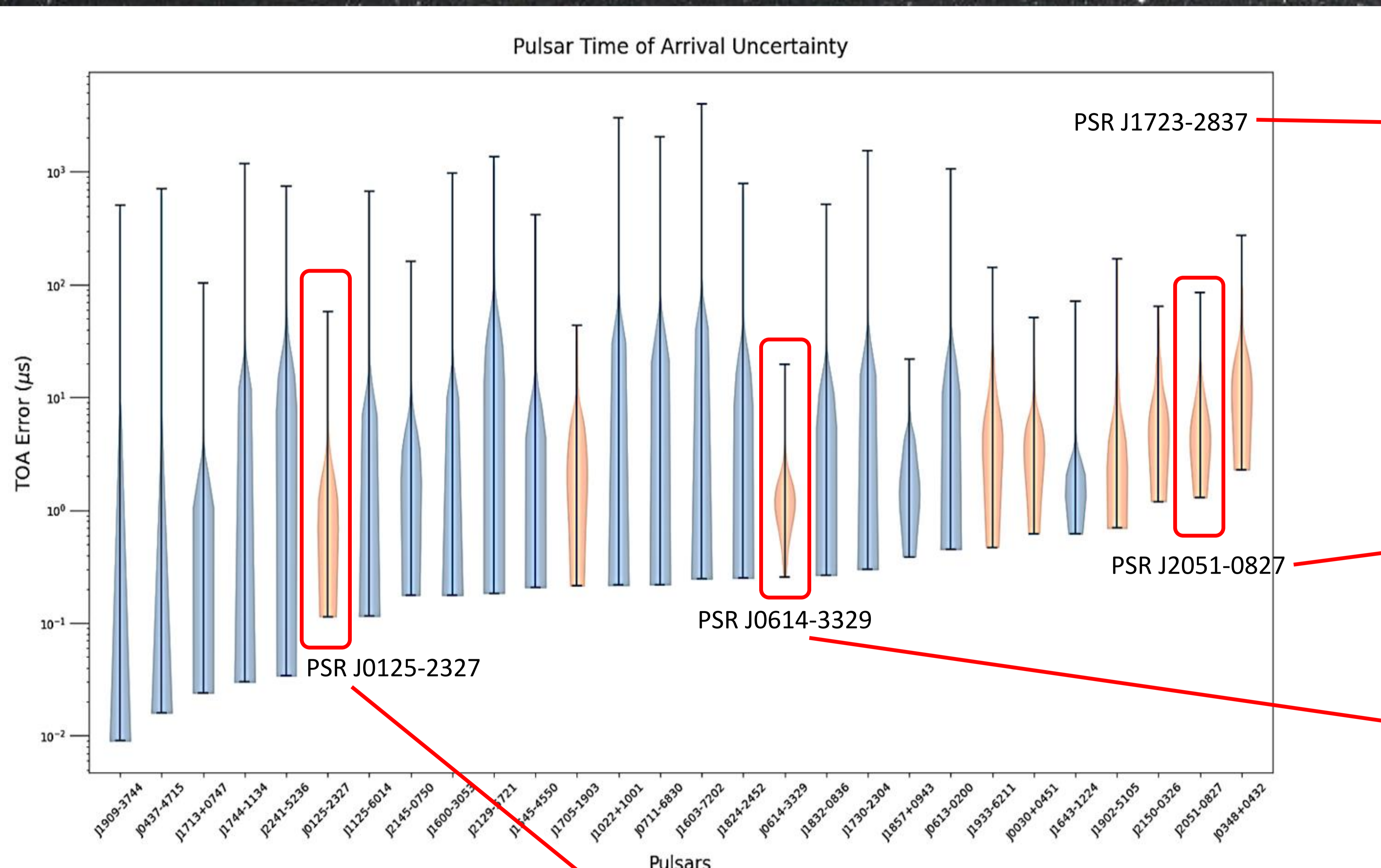
Jittering? Intrinsic red noise?

Dispersion or rotation measure events?

Eclipsing binary?

S/N high enough? Telescope sensitivity?

Brighter at certain frequencies?



Next Steps & Conclusion

Using PTASimulate to simulate the GWB signal both **with** and **without** these 10 pulsars to quantify overall impact on observing strategy

Analysis is still underway, but overall direction is trending towards continuation of observations for many of these pulsars, with the removal of a few outliers