IACHEC Timing Working group

Crab campaign in Mar 2024

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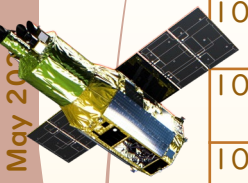
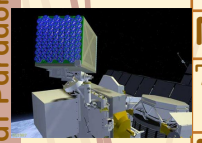
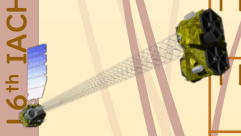
(Timing WG chair/co-chair)

with XRISM CAL-IP Timing group, NinjaSat team,

Crab Simultaneous campaign in Mar 2024







OBSID0	Obj Name	RA	DEC	Roll	Start	End	Exp (ks)
XRISM							
100007020	Crab_stray_weak	82.59063	21.75217	241.89054	2024-03-20 14:57:04	2024-03-22 03:29:04	64.423
100007010	Crab_stray_strong	82.5906	21.75153	293.31136	2024-03-20 10:10:04	2024-03-20 14:57:04	7.737
100006050	Crab_SWoffset	83.6203	22.00251	269.99998	2024-03-20 04:39:04	2024-03-20 10:10:04	13.102
100006040	Crab_SEoffset	83.64819	22.00182	270.00225	2024-03-19 18:11:04	2024-03-20 04:39:04	13.289
100006030	Crab_NWoffset	83.62066	22.02802	270.00059	2024-03-19 11:46:04	2024-03-19 18:11:04	7.989
100006020	Crab_NEoffset_1	83.6479	22.02734	270.00172	2024-03-19 03:46:04	2024-03-19 11:46:04	12.031
100006010	Crab_NEoffset_2	83.66076	22.04336	270.00189	2024-03-18 13:31:04	2024-03-19 03:46:04	19.813
NICER							
7013010101	PSR_B0531+21	83.632625	22.015167	N/A	2024-03-19 03:41:09	2024-03-19 10:02:00	1.228
NuSTAR							
11002303004	Crab	83.602500	21.971667	332.0072	2024-03-18 23:01:09	2024-03-19 05:16:09	4.983
1002303003	Crab	83.613750	21.971389	332.0597	2024-03-18 22:11:09	2024-03-18 22:12:13	0.064
NinjaSat							
N/A	Crab	83.6	22.0	267.6	2024-03-20 09:36:43	2024-03-20 12:19:17	2.3
N/A	Crab	83.6	22.0	267.6	2024-03-19 13:02:53	2024-03-20 09:08:00.	17.6
N/A	Crab (scan)	83.5<RA<83.7	21.9<DEC<22.1	267.5-267.6	2024-03-18 13:20:22	2024-03-19 09:26:00.	6.3

Jodrell Bank ephemeris in Mar 2024

See https://www.jb.man.ac.uk/pulsar/crab/crab2.txt

JODRELL BANK CRAB PULSAR TIMING RESULTS - MONTHLY EPHEMERIS

Date	MJD	t_JPL	t_acc	nu	sigma_nu	nudot sigma_	nudot DM	DMDot	tau_408
		sec	usec	Hz		10-15sec-2	pccm-3	pccm-3yr-1	musec
15 FEB 24	60355	0.022416	180	29.5639216030	3	-366727.76	0.49	56.7584	0.26300	100
15 MAR 24	60384	0.028390	110	29.5630027537	1	-366709.10	0.24	56.7518	-0.63630	100

Ephemeris on 15 Mar 2024

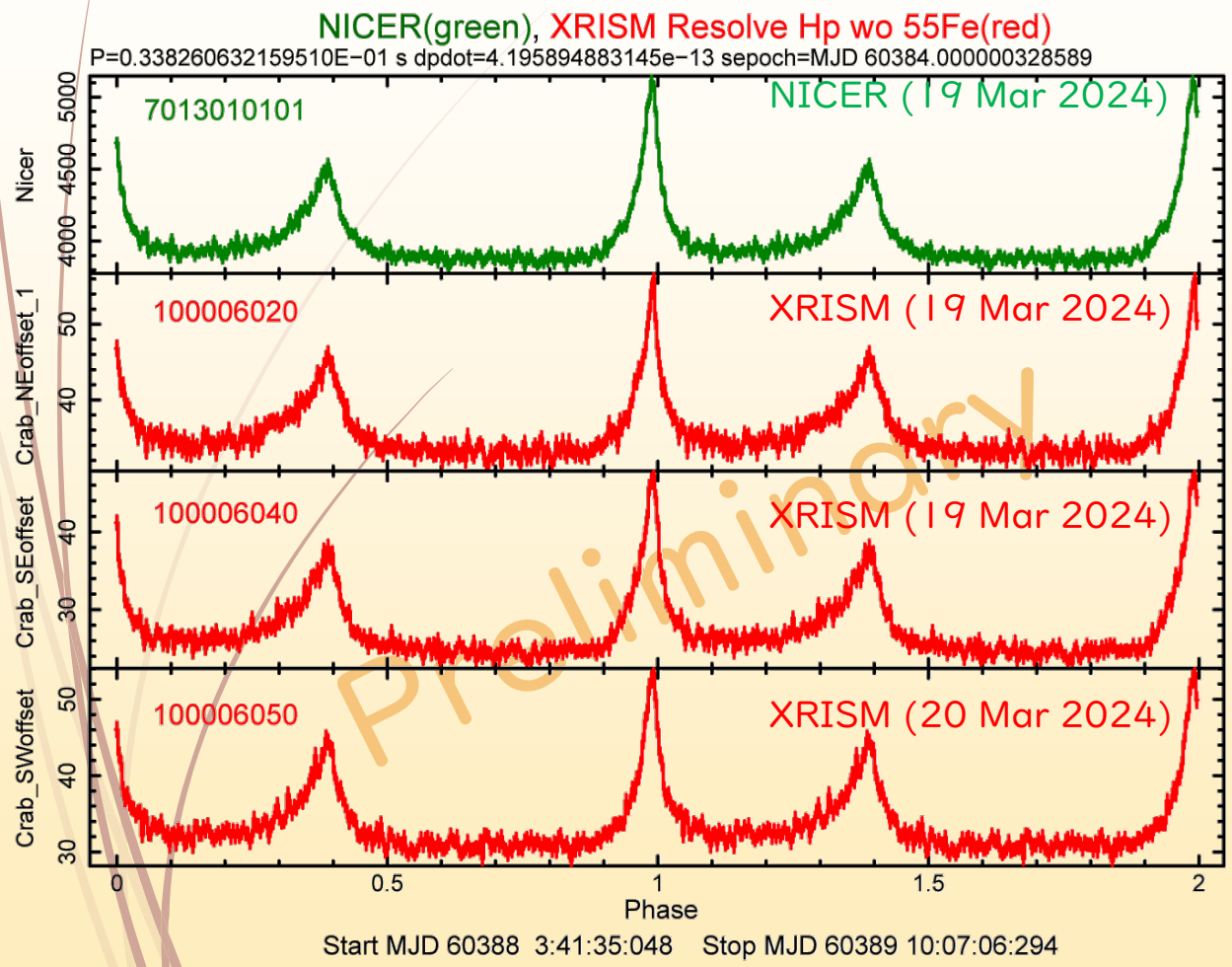
- P = 0.033826063215951 sec
- Pdot = $4.195894883145 \times 10^{-13}$ sec/sec
- Epoch = MJD 60384.00000032858952

Jodrell Band barycentric position

- RA = 05 34 31.97232 = 83.633218
- DEC = +22 00 52.0690 = + 22.014464

Solar system ephemeris: FK5 (DE200)

NICER – XRISM Resolve



NICER XTI

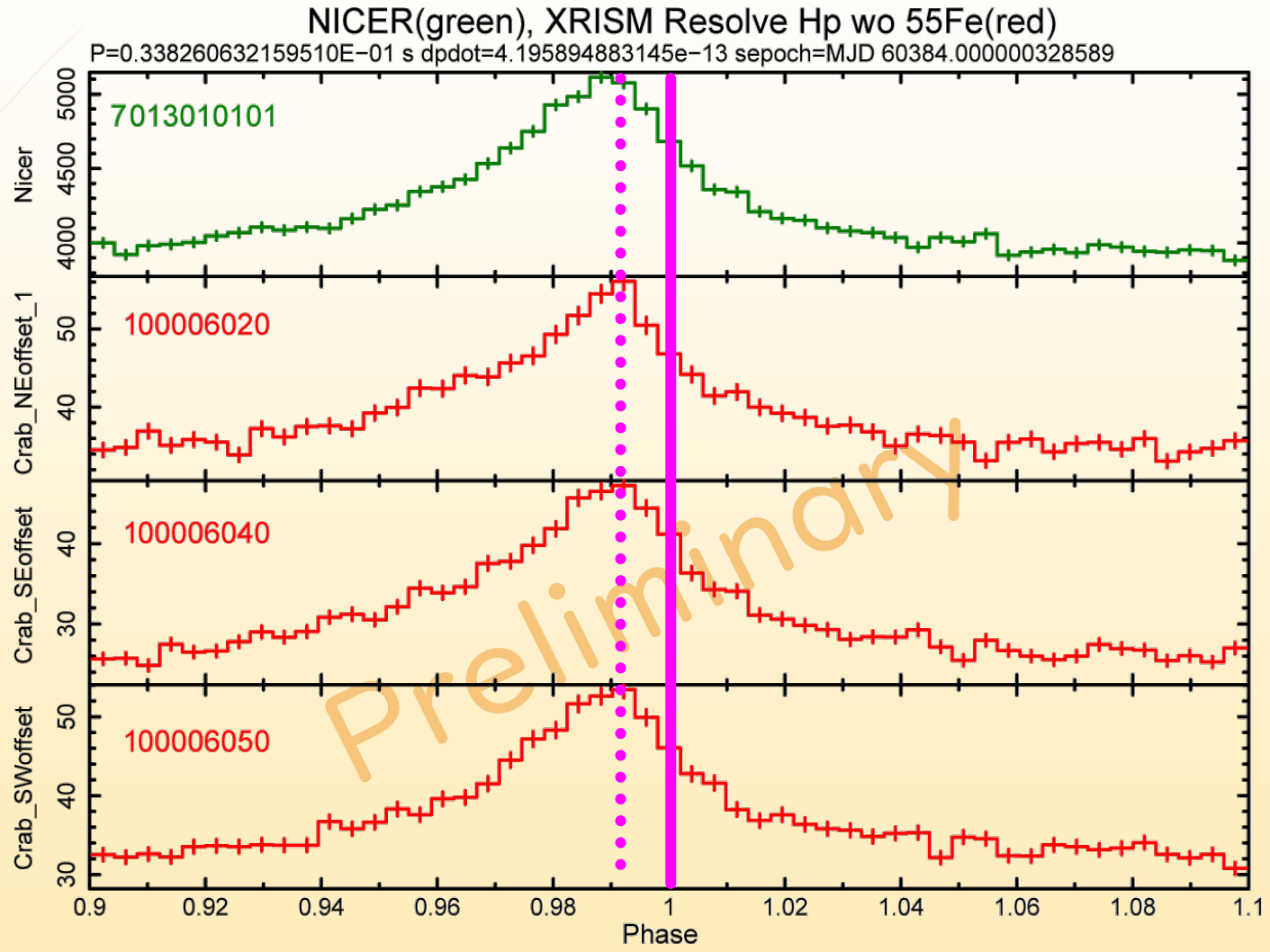
- barycorr infile=ni7013010101_0mpu7_ufa.evt outfile=ni7013010101_0mpu7_ufa_baryDE200.evt orbitfiles=ni7013010101.orb refframe=FK5 ra=83.633218 dec=22.014464
- ni7013010101_0mpu7_cl.evt was empty.

XRISM Resolve

- Grade Hp events
- all pixels except for Cal Pixel
- Excluding 55Fe lines
- CALDB: ground information (not tuned yet)
  - xa_gen_qclocka_20190101v003.fits
  - xa_rsl_coeftime_20190101v004.fits

Note that the XRISM time assignment is still preliminary.
Please do not distribute the figure.

NICER – XRISM Resolve



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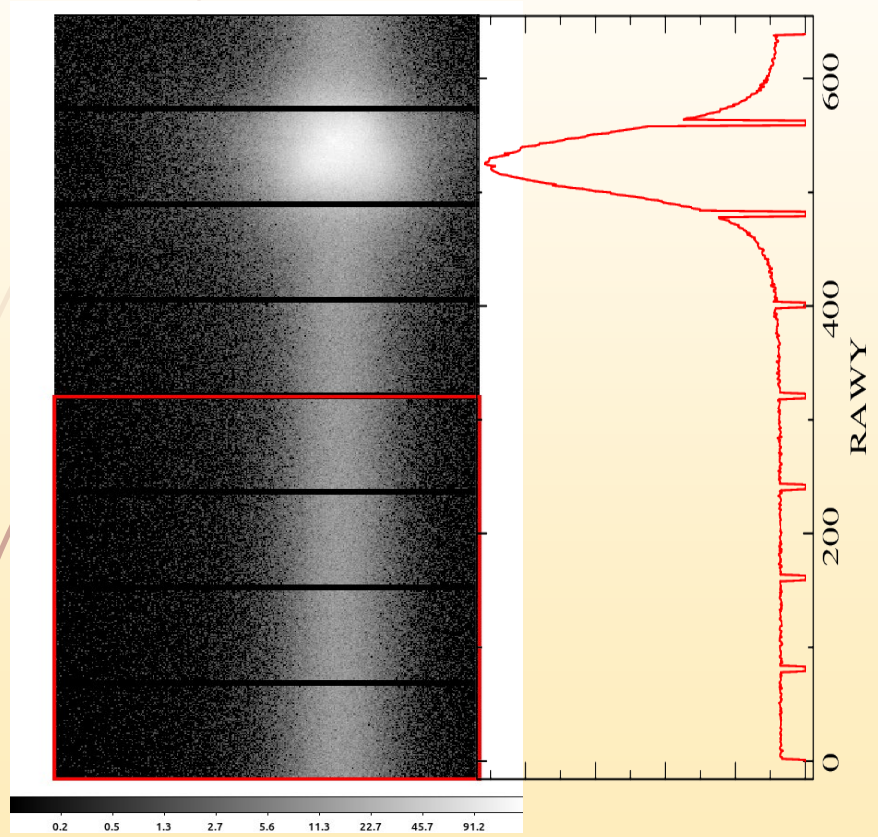
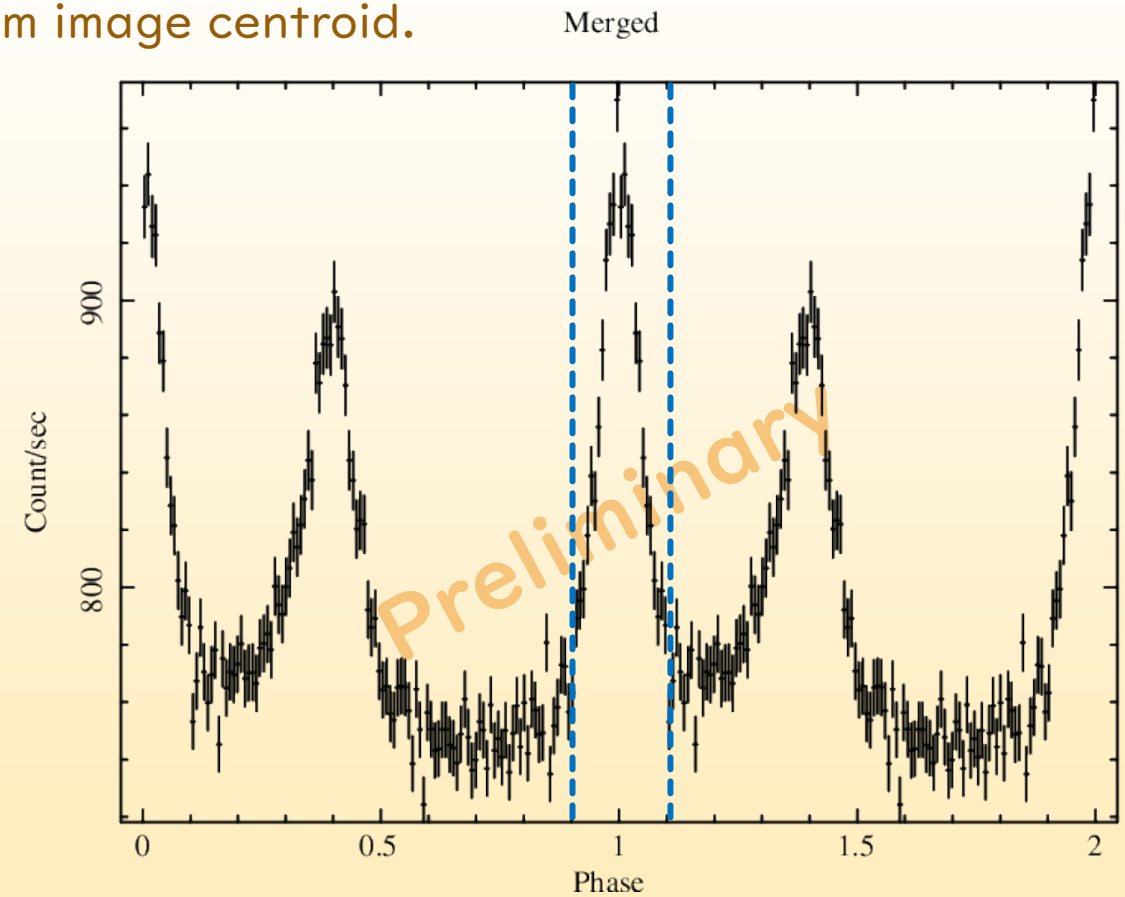
ref) XRISM Xtend

- Time resolution of XRISM Xtend is 4.0 sec.
- For Crab, we reassign TIME using RAWY from image centroid.





phase = 1.002 +0.001/−0.002 (90% confidence level)

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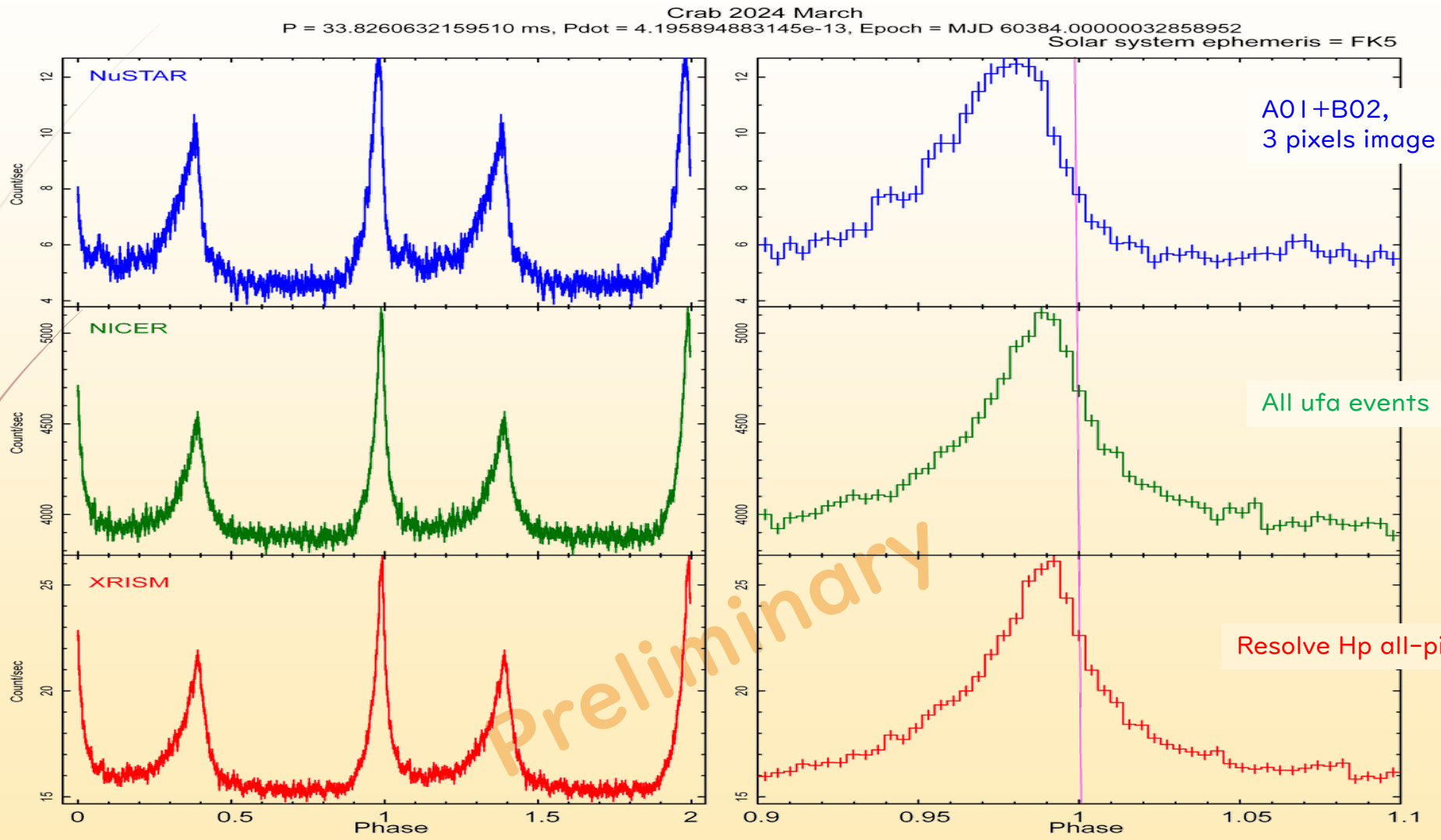
XRISM -NICER-NuSTAR



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