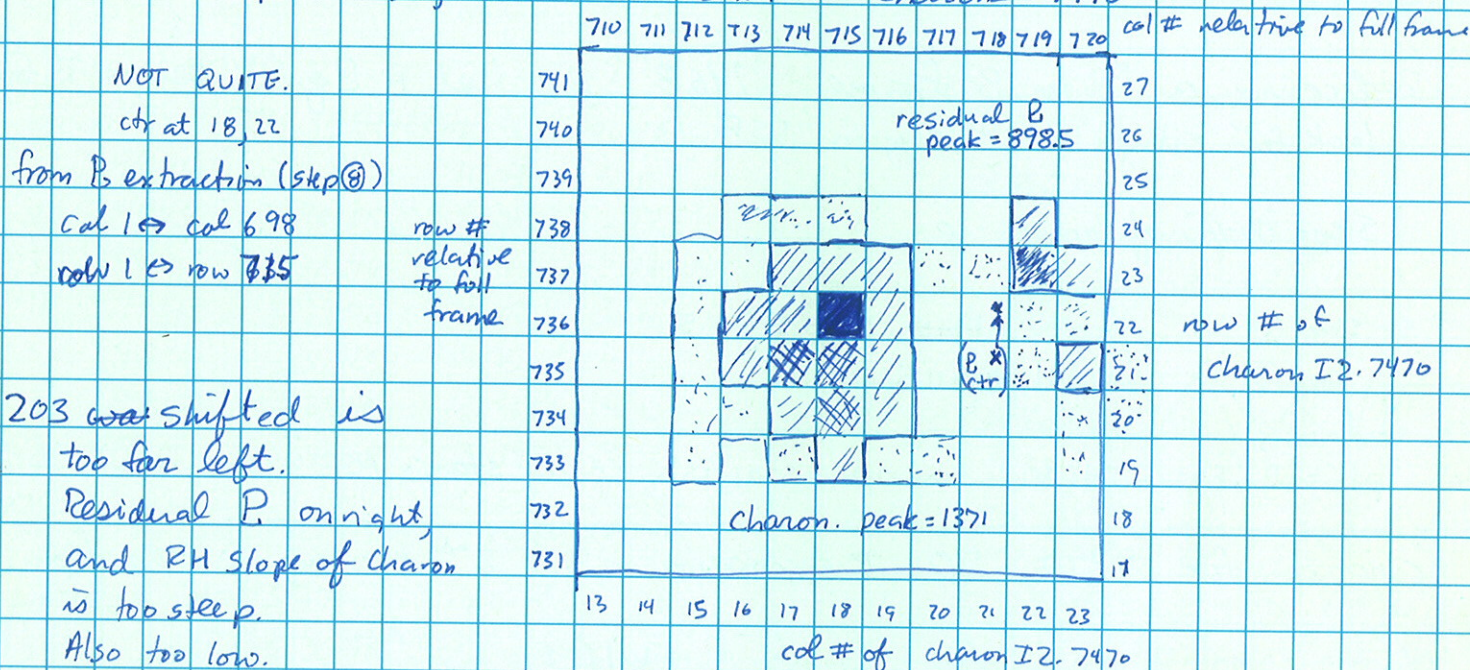


⑬ The moment we've been waiting for: subtract scaled shifted 203 from P

7 im arith ~~charon I2.7470~~

7 im arith ~~pluto I2. bkgd. 7470~~ - 203 I2. shift. 7470 charon I2. 7470



203 was shifted is too far left.

Residual P. on right, and PH slope of Charon is too steep.

Also too low.

Scale is good: $[21, 21] = -22.47 \approx 0$

Highest residual is $\sqrt{(1.75)^2 + (1.75)^2} \approx 2$ pixels away.

$$\Delta f = \frac{\partial f}{\partial r} \Delta r \quad \Delta f = -900 \quad \Delta f = +898.5 \quad \frac{\partial f}{\partial r} \approx 7.513 / e^{-(r/w/2)^2}$$

If $f \approx$ gaussian, $f(r) = p \exp[-\ln 2 (r/(w/2))^2]$ $p = \text{peak} = 7313$ $w = \frac{FWHM}{\sqrt{2}} = HWHM = 2.3$

$$\frac{df}{dr} = f \frac{-\ln 2}{(w/2)^2} (2r) \quad \text{so } \frac{df}{dr} \Big|_{r=2} \approx (4320) (-0.52) = -2270$$

So, more r a. $\Delta r = \frac{\Delta f}{df/dr} \approx 0.4$ pixels

7 im shift 203 I2. scale. 7470 203 I2. shift 2. 7470 -0.02 94

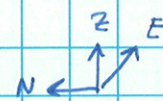
new resid peak @ 22, 19

7 im shift " " shift 3 " -0.02 76

7 " " " shift 4 " -0.02 68

looks good.

7470 looking at surface plots

epa simexam $\rightarrow$ angh = -90 gives a plot w/ N 

Charon is detectable on all 4 B's.

BUT - all psf's of stars also seem slightly asymmetrical.
This agrees for asymmetrical, numerical PSF's.

Reducing a Pluto B frame 7468 the last B Equad before I frames.
look for starfish + asym. PSF

Steps ①-⑤ of pp 19-20

step ① $\rightarrow$ mean ~~1716~~ 6087 ± 1.5

step ⑤ $\rightarrow$ mean 6115

pluto B . flat. 7468 $\rightarrow$ no starfish and star's PSF's are round (to the eye)

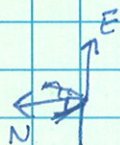
Charon for 7470. 20's I exposure - the 2nd exposure in the frame.

	col	row	sky	clip	peak	FWHM
Charon	17.83	21.11	6.18	0.090	1391.72	4.99
Pluto	21.42	21.34	0.72	0.017	7328.38	4.58
Δ	-3.59	-0.23	-	-	0.19	-

from 203I2.shift 4.7470

$$\text{separation in pix} = \frac{3.5 \text{ pix} \times 0.22''/\text{pix}}{\sin \theta} = 0.79$$

$$\theta = -\arctan\left(\frac{-0.23}{-3.59}\right) = 356$$



	PA	sep $''$
This messy method	356	0.79
the ephemeris	354	0.86

Seem like a method for X-by-eye is

- in examine and r to get peaks of B and PSF. First order guess
- scale PSF.
- shift PSF, subtract, and look (contour + disp)
decide what direction to move.
- new shift, subtract, look.
- repeat ③ and ④, homing in on the shifts

star fish shape in background of Flattened I image, photo I. flat 2.7470
 min (near ctr of chip, 519, 504) $\sim 10814 \pm 58$
 max (near corner, 50, 19) $\sim 11554 \pm 61$

OBSERVING: FEB 28 1992

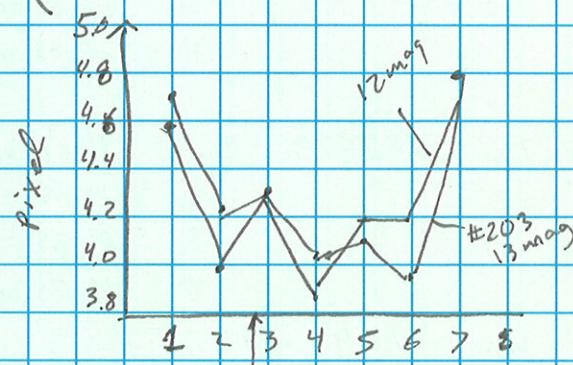
halley df 152918 / 2193 = 69

hex 70942 32

focus 4956 = Stockton's focus

1	4910	13 37 42	4.71	4.60
2	4925	13 38 05	4.24	3.97
3	4940	13 38 40	4.28	4.24
4	4955	13 39 02	4.02	3.92
5	4970	13 39 25	4.15	4.20
6	4985	13 39 49	3.96	4.17
7	5000	13 40 18	4.79	4.70

Set at 4930
 focus



12 mag FWHM #203 FWHM

2 C007523 C007524

1	13 45 53
2	13 46 53
1	13 50 18

midas pair
) from not saved - no midas
) not saved

Note: we should always approach focus from below

2

13 55 06
13 56 05
13 57 00
13 58 00

} saved. Midas quad

winds 14 MPH

3 C007525

1	14 03 00
2	14 04 00
3	14 05 00
4	14 06 00

midas quad.
 α , dec same for all

4 C007526

	UT	α	δ
1	14 09 00	15 20 12.46	07 51 42.5
1	14 10 00	15 20 12.5	07 51 43.4
2	14 11 00	12.5	43.5
3	14 12 00	12.45	
4	14 13 00	12.	

may be 1/2 sec later

		#	UT	α	δ	
5	C007527	1	14 18 00	15 20 12.44	07 51 43.4	midas quad
		2	14 19 00	15 20 12.48	42.9	
		3	14 20 00	15 20 12.43	43.2	
		4	14 21 00	15 20 12.47	43.5	

Dome has been on, stays on for midas.
Auto guiding during midas.

		#	UT	α	δ	
6	C007528	1	14 25 00	15 20 12.4	07 51:43	MIDAS QUAD
		2	14 26 00	"	"	
		3	14 27 00			constant α, δ
		4	14 28 00			

7	C007529	1	14 32 00	"	"	midas quad
		2	14 33 00			
		3	14 34 00			
		4	14 35 00			

wind 14.9, @ 14:33

reading out takes longer as disk fills up

8	C007530	1	14 40 00	"	"	midas quad
		2	14 41 00			
		3	14 42 00			
		4	14 43 00			

Auto guider off

45.34 - offset guider irrelevant

slew back to B, 0.0003N dome off

B tracking rate

		#	UT	α	δ	
9	C007531	1	14 48 15	15 35 02.7	-3 50 31.6	B quad
		2	14 49 25	15 35 02.7	-3 50 41.5	
		3	14 50 34	15 35 02.7	-3 50 51.5	
		4	14 51 44	15 35 02.7	-3 50 01.5	

rounder images (by eye). less wind, pointing away from wind.

10	C007532	1	14 55 55	15 35 02.7	-3 50 31.5	B quad
		2	14 57 03	15 35 02.7	-3 50 41.4	
		3	14 58 12	15 35 02.7	-3 50 51.4	
		4	14 59 20	15 35 02.7	-3 51 01.3	

	update done.	Done	UT	α	dec	
11	c 007533	1	15 04 55	15 35 02.7	-3 50 31.3	B quad
		2	15 06 06	15 35 02.7	41.2	
		3	15 07 16		51.2	
		4	15 08 26		51 01.2	

Nominal exposure times			B	V	R	I		
		UT	60	10	5	10	α	δ
12	c 007534	1	15 13 10			15 35 02.7	-3 50 31.2	
		2	15 14 20				-3 50 41.1	
		3	15 15 30				-3 50 51.1	
		4	15 16 50				-3 51 01.0	

Change to V

13	c 007535	1	15 21 00			15 35 02.3	-3 50 30.9	1 st dec - extrapolate from 2 nd of
		2	15 21 20			02.3	-3 50 40.9	
		3	15 21 40			02.3	-3 50 50.9	
		4	15 22 00			02.3	-3 51 00.9	

14	c 007536	1	15 25 30					
		2	15 25 50					
		3	15 26 10				50.9	
		4	15 26 30					

15:29 REBOOT. Did c 007536 get written?

15 c 007536. Reboot, Change to R

Winds ~ 15 MPH

15	c 007537	1	15 38 40	15 33 02.3	-3 50 30.7	
		2	15 38 55			
		3	15 39 15		50.6	
		4	15 39 35		51 00.6	

Ch

16	c 007538	1	15 43 25	15 33 02.3	-3 50 30.5	
		2	15 43 45		40.5	
		3	15 44 05		50.6	
		4	15 44 25		01.5	