19/5/78

10^{-10} / Var / 60 18/5/78 2: Lip painted @ 100°C, cooked 450 × 5 mins.

1+1	2·75+1	?	51	4·8+1	200
640	526	222	227	267	50
550	2·8+1	646	456	220 240	222
524	622	56	456	267 204	
576	2·87+1	536	227	51	5·2+1
000	274	320 625	201	225	441
1·2+1	2·95+1	230	227	225	200
1450	617	4·0+1	212	222 = 22.2	444
1+01	621	222	222	265	220
264	254	52 424	101 101	50	217
1·4+1	272	222 557	461=62		446
221	256	454	200	5+1	451
1·7+1	272	221	461	50	177
520		1120		50	262
541	4·6+1	441	4·6+1	502 = 76·5	323
1·9+1	245 507	221417	220	460	216
530	252	506	226	424	262
2+1	245		224	255	220
212	742	4·44+1	221	50	220
221	226	51 147	271	222 216	222
2·2+1		51 206	454	277	202 216
250	1·9+1	231 226	224	222	121
221	242	224	226	441	262
405	230	227 462	474	256	50 264
2·5+1		57 227	225	215	67 202
404	4·1+1	202		262 220	222
405	226·457	227		50	50 221
213	445	456		215	61
	405	272		47 261	222
	222	462		216	216

5·4+1
46 215
202 225
212
261
260 436 =64-2
212
277
212
217
212
215
264
261 212
47 217
202
275

5·6+1
255
210
256
252

46 257
274
274 210

5·8+1
256 211
46 254
215 271
430
253
273
261
202
45
272
430
252

6+1
202
252 202
202
46 171
204
254
252

6·2+1
46
200
62 =22 200
252 201
200
250
46 247
200
204

264

6·4+1
407
44
210 254
44
261
1524
10 241

—flushed,

Ir tip painted while cold, vacuum pumped cold, cooled.

1+1

321 360
1160 1320
2261
1240
724

1.2+1

710 1326
1121
1120
727
761

1.5+1

1000
1017 1370
740 1110
711
1060
777
776
351 501
707 1126
477 600
344
1014
1125
1377
550

1.6+1

770
474 = 32

1.8+1

740
671
435
1050

2+1

1050
420
724
1251
673
420
717
642
421
636
422
421
420
424
721
424
425
424
422
427
422

425
1270 178
425
420
313
420
552
424
435
447
422
420
616 58.45
422
424
427 = 28
420
317 = 16 761 = 78.8

2.2+1

411 566
407 602
400
476 512
322

2.5+1

665
660
1050
561

2.7+1

372

2.8+1

462

3.44+1

441

4.2+1

247

4.5+1

467 = 65.4
614 106
571 80.5
317 28.9
245 18.4

4.8+1

404

5+1

307

5.2+1

353
50

5.2+1

576

5.4+1

257 24
566 110

5.5+1

612
772

5.8+1

305
210

6+1

226 19
211 16

6.2+1

444
460 82
276 540 104.7

6.4+1

257 27.8
377 45
406 62
457 80.2
762

6.83+1

702 711
201
410

1+ 192
2+ 96 +0 = 104
3+ 64

Ne in — align

6·63 KV (blank)
1 ½ ¼ DW

6·6 + 1
~

6·9 + 1
2706
116
44

7·1 + 1
372
200
1026

7·3 + 1
231
507
370 62
232 28
176
177 16.5
574 112
176 246
210 332
3231
232

7·5 + 1
423
351
176
174
264
257
175 260
42 505 ≈110
243 456 ≈95.3
206
1063
43
175 260 ≈32
174
227 ≈24
176
170

7·7 + 1
252
173
173

7·7 + 1·2
316
463 103
255 32
42
276 28
173
254

114 6.3
173
461 102
3371
210 462

7·7 + 1·4
443
42
41 443
456
2405
42

7·9 + 1·4
3153

8·2 + 1·4
40
172
41

8·4 + 1·4
449
164 532 ≈144
230 431
446
40
166 11.8
432
171 444 12.6
443 ≈102

163
430 94.5
447
427
40
1357

8·6 + 1·4
441
440
40
40

8·8 + 1·4
37
422
1246
437
436

9·5 + 1·4
156
156

Ne inc
— [illegible] @ 7·83?
1½ ¼
gas out
9·5 + 1·4
36
37
36
36 — [illegible] M

9·8 + 1·4
406
36 — ½ log
154
35
36
36
37
406
1053
406
36
36
36
420
36
155

10 + 1·4
36
36
35
36
154
36

10·2 + 1·4
416

10·2 + 1·5
153 400
35
400

10.2 + 1.6

10.7 + 1.6

10.4 + 1.6

10.9 + 1.6

11 + 1.7

11 + 1.6

$62.6 = 16$

Blank Helm

DIV x 4 10:45

- spotty/clarity 'clean' lr

11.2 + 1.6 until

206
207
206
206
145 206
207
206
205
205
206
206
12 205
206
206
207
207
210
220
64
262
144
204
206
207
206
144
206
205

207
206
205
206
207
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207
206
206
205
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110
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206 262
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006
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265
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261
207
205
210
205
206

207
201
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145 210
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205
207
206
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206
261
207
204
205
210
261
202
207
206
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206
207
221
202
201
205
206
207
207
207
261
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264
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206
207
204

205
204
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207
205
207 221
206
210
211
207
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205
262
206
203
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210
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206
262
207
205
206
261
207
205

261
211
205
210
210
207
001
206

25/5/78 some Ir tip 3.10^{-10}/60/He

9.96+2.7

200

44 Atoms per plane for Ir tip @ 10.63 KV
25 in 4.10^{-8} He with channelplate
on and alignment & lens adjusted for
optimum catchment with c-p on (i.e not perfect-
alignment-)

from 200 plane
100

~~45~~ 88
96 => ≥ 100 atoms per plane (Ir^{2+} & Ir^{3+}
100 with He ch- gated out-).
94
86
90 10.63 + 2KV pulse = 12.63 total KV

= 93
- = 5.2

100/brite zone axes
125
146
107
119
132
125

125.6 ±11

- Extract tip & paint- (again).

Richard Oldman phoned to say green paint- (and bottle) is off
- should be brown. (!****!!!)

- pins for probehole size

24 + 8 = 32
+16 = 40

Sat 4 June

Ir tip painted paint 1 + acetone, cold, cooked 450 × 5 mins

1+1 740
765
1.3+1 1160
1.45+1 453
460
1.53+1 451
441
1.80+1 545
424
537
344
432
434
614
1.93+1 432
2.14+1 421
663
2.24 276
424
415 455
2.27+1 326
564
2.35+1 425
405
446
422
2.5+1 273
474 =43
267
410
377

426
461
410
410
454
300 [288]
407
273 [15]
373 =28
374
455
270
621
320
400
375 [27.5]
452 =38.7
421
372
417 =31.6
372
426

3+1
356
431
441 =41
254 441
241 356
372
616

356
333 356
355
365
317
353
352

3.2+1
261 273
— break.

3.2+1 again
321
431

3.3+1
353 =29.2
302 [20]
242 [14] 274 [19]
376 [26]
256
1263
420 = 39.1
344 [27.4] 512 [57.5]
345
547 [68.2]
3154
364
357
373 =33.5

243
250
364 =31.4

3.5+1
431 [43.7]
237 433 [44]
237 [14] [28]
337
507 [59]
342
420 [40.9]
1166 [220]
242
256
337

3.7+1
633 =28
245
252 351
260 420 [42.7]
1256
245
473 =55
301 [22] 477 [59]
232 352 [32]
247
401 [38.2] [51.2]
470
345

245
324 352
326
246
355
329
404 =39
350
412 [41]
245

3.8+1
1530
243 255
405

3.9+1
337
327 342
264 413
406
325
451 =53
502
227 324
226 302
230
467
400
345 463
403
326

— gas in, Ne, no pin.
— align (to best gas signal)
top up cryo, pump out.

4.1+1 still
233
222
427
231
231
232
236
241
232 =15
231
233
450
72
232
234
237 =34.8
232
232
232 235
232 225
232
240
233
73
273
332
52
324

331
324
336
325
240
70
232
234
240
327
407
225
405
73
324 =30.4
235
233
332
426 =48
263
505
321 406
233
236
240

4-21+1
233
243
326
617
55
245
324 712
324
52
322
325
74
370
326
323
231

4-2+1
327
227
227
334 1127
317
73
3603
227
53
322
416
325
52

323
323 462
236
333
222
320
360
360
230
401
315
316
234
405
3001
316
226
234 402
315 =27.3
226
322
226 322
226
226
254 455
455 =59.1
315
376
340
224
334
333
321

316
315
321
315
2002
316
305
51
323
52
51
51
317
315
57
333
315
316
324
330
231 261
316
235
235
51 266
403
321
51 374
330
315
2720
315
251

4.4+1
322
227
314
323
220 314
315
314 401
371
317
220 321?
316
313
314
227
220 232
312
220 324
317
315
313
322
316
315
317
446
230
316

4.5+1
211
212
51 247
222
213
214
216
215
210
216 228
222
217
52
215
214
225
213
217
215
267
217
215
215
213
217
215
222
225
270
226
226 =15.2
212

275
221
217
217
215
221
221
262
451
217
221
606

4.62+1
257
257
210
52
223
211
217 273
260
261
211
272
245
220
216
407
261
214
50 210
51 216

520
251 442
50 216
216 204
226
212
216
216
443 721
275
214
214
445
466
215 226
261
215
220
220

4.7+1
227 323
220
213
210
215 405
214
442
52
457
51 204
221
226 516

50 215
227 325
50 216
325 454
227 207
410
222
207
51 216
254
671
255
206
255
225
453
325
270
270
441
215
440 456
441
212
215 255
50 407
256
227 443
207 441 =60
203
274
1433
227 210

221
574
226
57
2514
220
406
226 443
621
491
224
223
206
407
226
50 226
57
206
257
224
126 222
207
227 446
243
516
226 324
206
206
206
561 =95
213
263 = 41
400

51
150
216 227
206
212
220
215
261
51
517
220
217
257
213
215 270
51 444

4.8+1
214
226 267
205
445
51 217
214
50
51
403
440
51
322
226

4-9+1
320 364
50
224
52 214

5+1
321
261 432
213
362 431
216
372 =46 445 =63
4 7
211 433
50 223
50
320
326

5?1+1
235
303
315 361
57
313
277
223 301
314
277 435
556
400
277

240
223 301
244 313

5-2+1
221
424
223 321

5-3+1
322

5.5+1
177
601
gas in, discharge, ok
- ? popped

- no more cts
Argon in → bw 7.9kV
- pix ×3 blank (7.98)

7-9+2
431
37
40
145
106
36 — lot of H

8+1
752

8-2+1
421
37/162
106
35
37 416
111
416
34
37
36
37
6172
37
105 416
40
104
423
422
407
36
113 160
40
160
37
160 =14
422 =85
416

No cts @ 9kV

- bw 8.64 ×2
- dirty bw
→ ~~cl~~ r
→ cleaner, pix
- end of film.

Calibration from lr

12.1+2.5

242	245	244	244	150 271
150 272	26 277	157	275	242
152 244	151 244	252	150 244	157 272
151	152 244	274	72	157
152	26 244	155	151 245	152
245	150 242	151	244	150 240 = 94.2 (95.6 / 96.6)
151 271	161	157	274	157 245
1161	151 272	150 272	1074	246
246	246	160 244	272	157 244
1775	274	154	152 244	157 272
150 244	26 272	156 244	272	151
247	150	272	245	150
274	245	342	247	157
247	151 244	247	2775	152 272
152 272	242	215	272	152
150 242	275	245	2004	242
150	151 272	150 242	150	157 242
151 244	26 272	156	156	272
250	26 246	150 242	244	152
271	274	273	152 272	244
245	151	157	152 245	247
274	245	150	156 272	242
147	162	151 272	242	1252
272	26 272	245	252	242
270	272	151 244	152	272 = 62.7 (63.6 / 64.8)
245	26 146	244	152	272
150 242	26 272	141	245	146
150 247	26	72 157	151	152
157 272	242	156	242	157 272
151 275	146 270	150	156	152
	246	157	152 245	152 272
	152	145 244	157 245	272
	245	245	154 244	244

Manipulator modified => S-S EN58J spring & also endplate on pulley to stop wire jumping off.

M.c baked => cryostat leaked.

Recharged.

" — leaked.

"

" — filling of ss tubing where solder would'nt melt

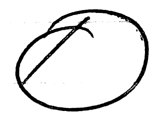
— rebaked => 1.0^{-10} cold 2.0^{-10} warm. 14/6/78.

4/6/78 R Dragovich's specimen 10227 - 23 (GL alloy)
Fe/Si 3 wt% + 100 wt ppm P 100 S 1 ppm D 20-50 Mn
12 μm grain size 20-30 C,
+ grain bdary near tip,
50 K $5 \; 10^{-11}$ background $2 \; 10^{-5}$ Ne.

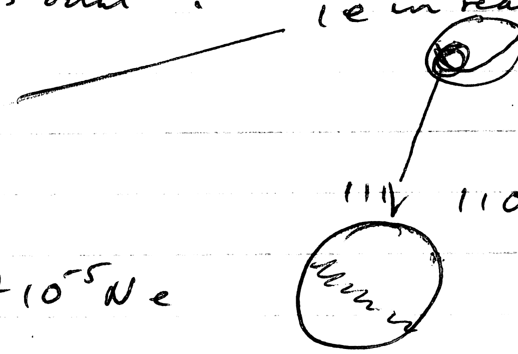
<u>Nofilter</u>

6 shots @ DIV @ 5.87 KV
n 5 pulse 1 KV
6 " @ 5.95 KV

Match -> 6 @ H DIV 5-27 KV
Ne in ~~6K~~ 6.61 ×6

6 + DIV 7.26 KV Ne - bdary 

align on IAP Fe^{2+} 28 => 65 ostial
$\therefore Si^{2+}$ 14 => 375 ns = 46-45 ostial.

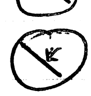


7.31 KV ×6 DIV 

Dack to IAP
11±124 DW 7-71 $7 \; 10^{-5}$ Ne

Move slightly 6 × DIV  @ ~6.8 KV

~~6.87 +4~~
7.6 + 1.4

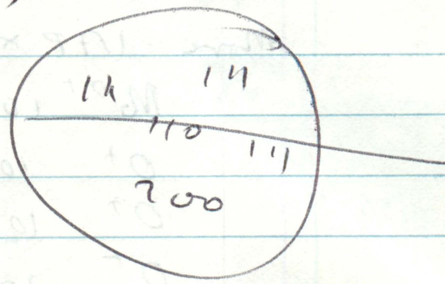
Fe^{2+} 30 sec 65
Si^{2+} 70 sec 40
DIV ×3 
Move DIV ×3 

Fe 20
~~Sa~~ Si 20
Fe 20
Si 20 grapid

Cp noisy

N filter (pentax) DW × 6.
— bdory gone — Melt — none seen.
except to 10KV.
back to IAP
? × DIV, 200 centre (200 centre of top now, not 190)
9-?? + 2KV.
— flushed

15/6/78 Mo gb 2 10^-10 (leaky He valve)
50 He 2 10^-5



8KV DIV ft × 2 & +1.8 × 2

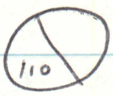
1

1AP 110 DIV ×1

N filter 2

1AP 110 DIV 8KV

" gb DIV



7.6 + 1.4 $^{92}Mo^{2+}$ 65 = 520

$^{48}Mo^{2+}$ 102 = 670 = 680 calc.

∴ $^{16}O^{+}$ = 275 ⇒ 46

260 8 = 265 = 32

6 = 220 = 27 25

12 = 325 = 41

He^{+} 4 = 187 = 22

1AP ×2

Mo $^{2+}$ 10 planes 20 secs

O^{+} ~ 20 " 44 v little

8.4 + 1.4 O^{+} ~ 30 "

1AP ×2

Mo $^{2+}$ 10 planes 10 secs

O^{+} ∠ dud – wrong time

8.4 + 1.5 O^{+} ?

O^{+} 42

1AP ×2

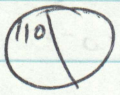
Mo $^{2+}$ 10 planes

9,1.05 O^{+} ~

O^{+} ~ v little

IAP × 2

More IAP × 2



M_0 ↑ 10 pulses

O↑ 10

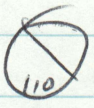
O↑ 10 v little

O↑ 20

1

IAP × 2

More IAP × 2



5

short- M_0 ↑ ~12 pulses

charging time O↑ "

2KV pulse O↑ " more 10.9 + 2

Myth 3

IAP × ± drug

M_0 ↑ 10 100Hz 50↑

O↑ 10

O↑ 30

O↑ 10 more rapid

Husband

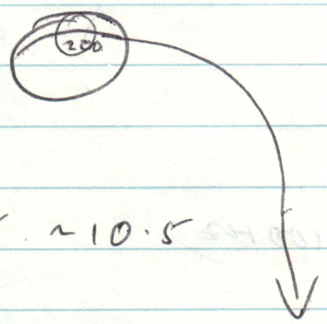
Dosegraphs Fe/Si /gb   2 10^-10

4 10^5 Ne   160

6 × DIV   ~9kV

Helical

g-b



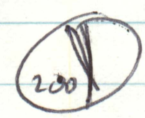
6 × DIV

Helical

6 × DIV ~10.5

9.48+2

IAP 5 × DIV



— annoying electronics — change to old delay line.

H2↓↑   DIV × 3.

Fe^{2+} 20 secs

Si^{2+} "   26

1

IAP DIV × 3 or 4

HC grotty again — fix

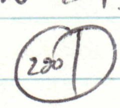
blank

Fe^{2+} 60   30 secs

Si^{2+} 40   "

IAP DIV × 4

PHB DIV × 4 _ end of film.



IAP DIV × 4

Fe^{2+} 25 secs   C

Si^{2+} 30 " Si

Si^{2+} — pop.

IAP DIV

New film

2

IAP DIV × 3

Fe   53   So ? = 450nS = 55

Si

? ? @ 21

Si 35 ... ,

IAP DW

7e 2+ 20 secs

Si 4

Si 2

Si – pop "

10KV+2-2 IAP DW

7e 20 secs ea (K) 100 Hz

Si 4

Si 4

Si 4

7e 4

Si 4

IAP < DW

" > DIV

" < DW

7e 20 secs ea

Si "

Si 1

Si "

7e regime

Si "

IAP DW x 2

endoffilm.

2 x N films

pth cp lots x DW – flare at corner

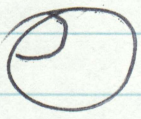
→ Blank

IAP (⊖) I think

741 250

7e
Sc slight pos
Sc
Sc sp
7e
Si sp
IAP DW ⇒
2 shift more DIV ⇒
7e
Si
C 2+ } little seen (2)
C 2+
7e
Si
Si 47
IAP DIV ⇒
IADIV ⇒
7e
Sc
Si
7e
Sc
Si
IAP DV ⇒
end shift
Shift DW 4
Sc
7e
Sc
Si
DIV

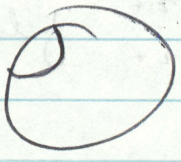
Si
Fe
Si
Si
DIV × 2



11.5 KV + 2.6

Next day 16/6/78

IAP { Dlunch
Scrubs @ DIV, 11.92 KV



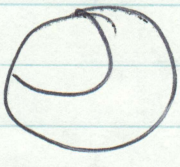
IAP Night

IAP DWKers
as DIV × 2

11.38 + 2.6

Fe^{2+} 40 sec
Si^{2+} 40 "
Si^{2+} 60 "

IAP DIV } 6 or 7
IAP DIV



Si^{2+} 40 sec
Fe^{2+} "
Si^{2+} "
P,S^{+} " } ie tail of Fe^{2+} pk
P,S^{+} "

IAP DIV × 6 or 7

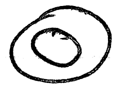
More IAP DIV ×3
Si 60 sec
Fe "

Si 50

DIV ×2

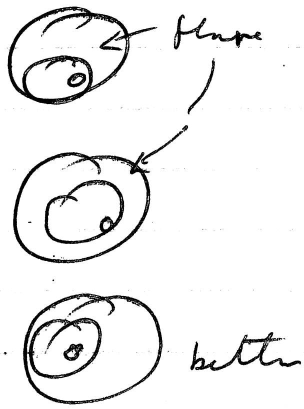
IAP [illegible]

IAP [illegible] @ Dav



ph cp 12·32×2 .

ph

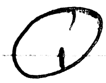


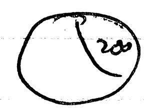
ph DW

extract ~ 12 KV

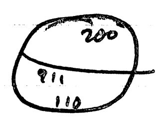
16/6/78 Contd

FEM's Fe/Sn $6\,10^{-10}$ (H) 160/Ne.
blank

phep ~1 ½ 2 DW 10KV
+2 DW
+ 2 DW 11KV
? the dislo loop 
+2KV 3½ DW
— flashed.

<u>Newtip</u> Mo/O gb ex some.
$5\,10^{-10}$/50/He (some Ne/H_2) 

pop ⇒ 8KV – 10KV
ph 10KV DW ×2

IAP DW ×2/10.67KV 

IAP ½ day @ b/v small evap

10.5 + 1.1
$^{32}Mo^{3+}$ 57
$^{48}Mo^{2+}$ 71
∴ ^{16}O = 332 = 41
^{20}Ne = 271 = 45
^{4}He = 166 = 21
^{1}H = 83 = 10
Mo^{2+} 20 secs 57
O^{+} 20 secs v little 41
(lots of Ne^{+} @ 45)
IAP bw ×2
Mo^{2+}
O^{+} <u>v little</u>

DIV × 2 11.69

More, pulse to 1-5.

IAP DW×2

12.07 Mo^{2+} 54 = 540

Mo^{2+} source 53.

O^+ 4

O^+ ~55-56

IAP DW

" Myth 2

IAP <DW

" move <DIV 12.7>

" and DIV

Mo^{2+} ? - gap.

Husband

26/6/78 P7Ms 7e/Sn ex PST a/p g–b.

$4\,10^{-10}$ (H leak) 60K

Ne $3\,10^{-5}$

4 + DIV 12.09 KV (N filter) ph cp $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{2}$ 1

+ ph × 2

5

1AP DIV × 4

11.5 + 1.8	$7e^{2+}$ @ 53	= 430 ns		
∴	$^{6}C^{2+}$	= ~~143~~ 199	= 24	22
	$^{12}C^{+}$	= 281	= 34	
	$^{20}Ne^{+}$	= 363	= 44	
	$^{56-62}Sn^{++}$	= 618	= 76	
	$^{112-124}Sn^{+}$	= 890	= 131	117
	$^{75-81}Sn^{2+}$	= 713	= 107	101
	$^{37-41}Sn^{3+}$	= 507	= 63	55

1AP $7e^{2+}$ 40 secs

C^{2+} 40 little

" 30 some

" 40 "

Sn^{2+} 40 secs – some

1AP × 3

$7e^{2+}$ 30 secs

Sn^{2+} " 72

40

C^{2+} 30 secs – little

~~1AP DIV~~ Sn^{2+} 30 secs long changing line

~~7e~~ 2' 1AP × 3 DIV pretty

lunch

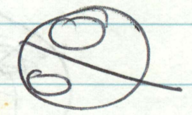
D lunch

DC exp in Ne 12.12 kV.

pulse to ~~F2~~ 2 kV / 1AP × 2

More slightly towards edge

diff DW



1AP × 2

1AP Nufilm

2

" DW × 2

Fe^{2+} 40 sm 52

Sn^{2+} " ~74

Sn^{2+} "

C^{2+} 20 22–23

C^{2+} 40

1AP DW × 2

Sn^{2+}

Sn^{2+}

Fe^{2+} 20 sm

Sn^{2+} 20 rapider ~72

Sn^{2+} 20

1AP × 2

~~Sn~~

~~Sn~~

C^{2} 40 sm.

C^{2} 40

Fe^{2} 20

Sn^{2} 20 ? in tail of Fe^{2+} peak

Sn^{2} 20

Sn^{2} 20

1AP × 2

More across centre to RHS

~ 12 kV DW 1AP × 4 or 5

Fe 2+ 50

Sn 2+ 71

IAP Nuclear.

DW ×4.

probe to 2-3. HDKV

Fe ?

Sn

Sn

Sn ?

DIV ×3.

HT ~~dep~~ set dodgy - swap

Fe 2+ dust

Fe 2+ 30 secs

Sn 2+ 30

Sn 2+ 30

Sn 2+ 30

Sn 2+ 100

Fe 2+ 30

Sn 2+ 50

IAP DV

Flushed.

rapid - note bit of Sn

q rapid

≈ 5 planes / thick

C

28/6/ Pochantting works! I think!

T247 Mo // 10^{-5} He / 60 / $2\,10^{-9}$ bkgnd

9.4 + 1 → 1.10

~{200} region

T248 Mo / vac / 9.4 + 1.32 kV

— $5\,10^{-10}$ bkgnd

30/6 Mo $/ 1 1 0^{-9} /$ 60 postheating

1st spectrum 10 kV, +1.35 pulse $4 / 0^{-7}$ He 60

Postheating aligned ⊙ detector

−2.26 +1.95 (≈) T 249

from VG set 'b' hump.

2nd spectrum 10 +1.52

No gas same analyser settings

PDM modified program so plots time bins as well as mass to eliminate bin-ities.

Lot of spurious characters on tape — ? electronics buff.

3/7 Same Exp ~ 1 10^{-9} / 60

H pages new turn ± ht-psu on potentiality.

T 280 a 110 He 6 var ~ same alignment as before.

T 281 a 110 He 6 var on bright area ~~IIO~~ O
— realigned so on axis of detector (at RH side).

isotopes
Mo 92
94
95
96
97
98
100

$\frac{dm}{m} \triangleq \frac{2}{96}$ or $\frac{1}{96}$ $= \frac{1}{48}$ or $\frac{1}{96}$

$t = 2.6\,\mu s$ 3^+
or $3.2\,\mu s$ 2^+

$\Delta t = \frac{1}{2}\frac{\Delta m}{m}$

$\therefore \Delta t = \frac{2600}{2} \times \frac{1}{48} = 26$ ns for 37
or 32 ns for 2^+ peaks

or 13 & 16 for other isotopes,

∴ Can't resolve properly with 100 MHz clock.
(± 10 ns).

∴ Limit to timer => 200 MHz timer or
phaselocked clock.

4/7 Same Exp $1\,10^{-9}$

T282 a He/rapid with detector pulse now 50 ns long
to try to avoid ? filter in lines.

5/7

Rebuilt mic to fix HT insulation, remove loose ends of braid, & put ss wire rope onto manipulator. Rotheating left alone.

Bake 10 hrs on bakeout 1 only (dirty!!)

6/7 ~ 2×10^{-9} cold (5×10^{-9} hot)

T 283 New Mo Tip ~~Old~~ Dirty
a He 12KV + 2.04

Readjust amps to get less afterpulses.

b var $1 \times 10^{-8} \Rightarrow 5.0^{-10}$ eventually
some pulse (? dirty, gas present)
DIV 14KV.

Lots of ions at $m/n \simeq 20$ — ? leaky Ne bottle or Ne in the helium

Try again tomorrow to see if still there

PFM's prog apparently putting zeros into time spectrum (adding some adjacent bins together).

7/6

10^{-10} cold, 60

T284 a He 10^{-8} same place as yesterday ~14 KV

b ran ~200 or more pulse.

1000 + 1000

T285 a He 10^{-7} same place as 284 12.5 + 2.18 KV

1000 ch

↳ analyser voltage slightly higher than before

b ran 10^{-10} same condition 1000

Peak @ ~20 still there

∴ T 286 Ne $5 10^{-8}$ 60 ~12.5 + 2.18

b see if new ~20 peak or same one.

background $< 10^{-10}$ 1000 ch

1 thinks 591 / 13.15 KV // Typ hyp 517 pulse 2.18

T 287 Through-focus series a 305 on HT pot ratio 4.91 300 ch

b 310 " "

c 315 " "

d 320 " "

e 325 " "

f 330 " "

Pressure 10^{-5} Ne (inadvertently!)

T288 ~~13.5 + 2.23~~ Typ hyp 546

~~328~~ 565

HT set running - abandon type

607 to 1172
15.63 KV => focussed
15.98 = 556

14.16 + 2.18 = 16.34

=> ~~Focussed~~

T288 a 14.05 + ~~2.23~~ = 16.28
b 14.05 + 2.30
2.35
17.05 + 2.45 = 16.5

Twin prism
ratio
318 Hz 565
320 "

bestfocus at this ratio at 15.98

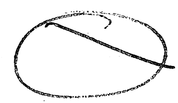
320	565	6 × 10⁻⁷ ...
324	585	=> 3 × 10⁻⁹ ...
322	605	1 × 10⁻⁹ ...

Tip HT 8·31 = 319 on helipot
Deflector 167 / 591 ratio
$5\,10^{-10}$ / 60 / $1\,10^{-8}$ He

T289 7·30 + 1·13 167/591 – v patchy emission, bursts of ions
? too close to 110 centre

600 cons

grain boundary coming in from top,



Nafth

Pics – not all on frame.
more common around
more DIV,
p.h over b'dary.

dodge forms obtaining

Specimen 9KV + 1·25 235 – 545
Tape 290 – broke after 180 cons – restart.

check after 400 cons ⊖ still $1\,10^{-8}$ He
tape kept breaking

T291 9.4 + 1.5
900 cons, still under p-h ⊖

10/7/78 Same tip 5×10^{-10} 60

heating

blank

He 10.54KV 3 × DIV c-p ph

T292 267 = 9.45 + 1.58 229/575 ratio

(below 3×10^{-9})

Inspect @ 1200 ion - still under ph

collect 3000 total - still under ph

blank

DIV × 3 ph

more on axial - bkr ph × 4

IAP DIV × 4 11.14KV He 60

30' 3+ 60 = 480

44 2+ 70 = 590

∴ 16 = 40 = 348

20 = 47 390

24 = 50 425

He 21 170

Mo^{3+} 50sec

O^+ 50

O^+ 50

Ne^+ - similar 20

IAP DIV × 3

" " × 3 slightly more

Mo^{3+} just 40

O^+ " " v little more

O^+ "

? O^+

IAP × 3

more IAP × 3

Mo^{3+} 40sec doing c-l

~11+2 .

O+
O+
O+
} long c-l ~ 40-41

IAP ⊃ : ~ 11·5

Mo2+ 40 short-cl
O+ 40
O+ ? 100
O+ 40
Mo2+ 40m 8 planes counted

IAP DIV
IAP Myth
IAP ⊃

pk bnl ⊃
IAP ⊃
Mo2+
O+
O+
O+
M2+

Mo2+ ← Mo2+ 40 mins
4
4
1
- thwarted -

New Mo spec $3\ 10^{-10}$

T293   5:26 + 1KV   121/595
2 93

200 ions only.

wound tip up to ≈ 14 KV – no boundaries
– flashed.

T294   Mehmet's round robin tip
– v odd fim picture   Ø bright
line down tip ? g-b ? overlapping poles ? time

Probehole over bdary – analyse
9.4 + 1.3 KV   216/560.
@ 300 ions realign over boundary.
384 – – – .
DW ph
DW – axes
– ppt ! s

Tantalum carbide + nitride

500 ion gradient = T294

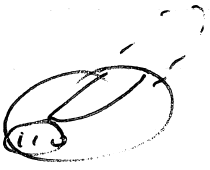
Next day

10^{-10} / 60 He(+Mo)

Dlamb

IAP Div x 4 @ 11.5 kV

10.05 + 2 empty ppt



? Mo_{39}^{3+} 60 = 510 ns

∴ He 22 = 183

C_6 26 224

C_{12} 27 217

N_{14} 42 242

Ne_{20} 51 409

Ta_{60} 107 709

Ta_{90} 127 868

Dlm

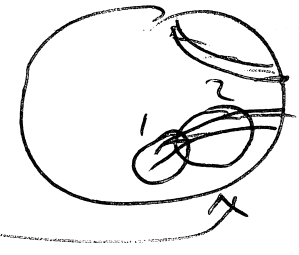
Ta^{3+} 60 secs

Mo^{3+} "

C^+ "

N^+ 100 secs

IAP x 3.



More IAP x 3 or 4

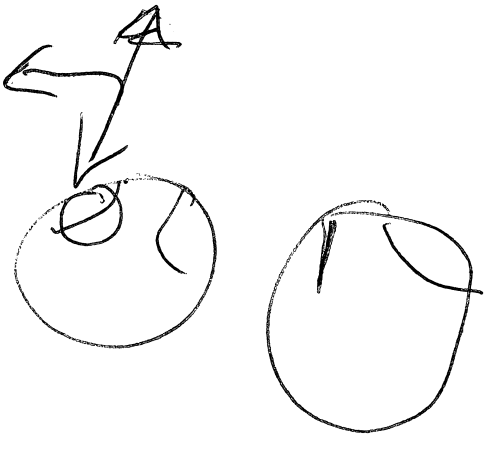
Ta^{3+} 60 secs

Mo^{3+} "

C^+ "

N^+ 80

IAP x 3



ph cp Mph

3 Div x 3 or 4 12-15 kV

< Div x 2

ph cp bin xover
ph just outside ppt.

T295 11·41 + 1·52 266/561
" 452
~ 500m

+ inadvertently 2·10⁻⁹ He during first 500m

Turn round head docks - fixed.

T296 Matrix away from ppt
11·60 + 1·70
" 456 4·10⁻⁸ He/Ne 273/561
~600m
ppt @ 310 m.

14/7 Same Exp Mo V Zn

2.5–3 10^{-10} background cold, $5 \cdot 10^{-10}$ warm

110

T297 12-31 + 1.43 (≃10%) $3 \cdot 10^{-6}$ He+Ne ($\simeq 1 \cdot 10^{-5}$)

485 78 K 284/561

15/11 %

T298 13.67 + 800 ≃5% $3 \cdot 10^{-6}$ He/Ne

511 317/561

T299 12.47 + 2 ≃1%

492 300/561

15 – 23 July IFCS Albuquerque

– paper on combined IAP / Poschenthung.

26 July 78 Same MoV Ta Tip 4×10^{-10} 78

evapt 15-16 KV in He/Ne

Spectrum T300 13.80 + 1.60 320/561
2×10^{-7} He/Ne 78 " 542

T301 14.00 + 2.00 320/561
" 550 var ↑ pump out over bunch
— bit fast! — reduce to 1.70 pulse after 400 cons
HT set unstable, stop after ~1000 cons

T302 ~14 KV new ht-set + 1.8 320/561
14.16
var (ht down & up, evapt ~ 200 cons before spectrum)

T303 14.16 + 2 var 320/561

gas in
More Tip, ~~var~~ blank DIV 1 ± ¼
— defect in Tip
— under p-h ± ¼ ½ 3000+ cons

T304 off defect, 1×10^{-7} He/Ne, 78 348/861
a, b 14.38 − 14.70 + 2.15

stop after 300 new spectrum, prob ×3, always on new ppt
14.7 + 2.15 352/561
Inspect @ 500 cons — continue
— ? ppt or tunny endform.
Tip extracted

New tip 1st polish in cold CaCl$_2$ 2-5 V ac

- lot of ? twin boundaries - pits ~ 5-50 KV

Spectrum T 305 5.2 KV + 1 KV He 3.0^{-8} (+Ne)
124/584

Stop after 300 secs as background noise on eq spectra

T306 5.6 + 1 KV 3.0^{-7} He 128/584

111/581

Same tips sprayed 20 sec in Mondl/Methanol diluted 1:10 with methanol — freeze dried

4.5% + 1 — 111/561 — 480c x 2 min.

T307 — 115/561

~ 250 ions

— popped several times.

T308a — 12KV + 2KV, HC — 003/570

— chamber — 2.16KV

b — 2.16

— 2.27

↑

— to check energy focussing.

5.50 KV ≈ 110/561 on analyser.

∴ Type in $\frac{5}{2}$ × analyser setting as kilovolts

Pulse volts A.DC => 0.01 sig.

Look up to ≈ 130/561 — 130 cm, bottom H.

Look @ tip in Ne — no image up to ~ 7 KV

- looks as if cap gone, something at edge.
- align ≈ on filament at very edge of tip.

T 310 162/561 6.72 + 1.2KV↑.
→ 180/561 — 7.3

~ 410 cm.

T 311
→ 9.3 210/561
off axis — platinum oxide? ~ 210 cm

1st August

Next day $2 \cdot 10^{-10}$ / 60

same tip 1r/coated

Ne $2 \cdot 10^{-5}$ - DW

Map the phase

DIV × 4 ~ 9.53 (< DW)

↑ ph over outside @ edge, where yesterdays spectra taken from.

— ~~R~~ popped while aligning.

min		found max		
16.72 ~~17.02~~ ~~18.84~~	– 18.76		~~344~~ ~~352~~ 286 / 561	
14.77	– 16.50 –	18.7	340	on axis
12.05	14.56	16.5	300	
11 27	12.66	14 29	260	
9.48	1056	12.07	220	
8 35	9 28	10.80	190	(different plane on tip, off axis

T 312 off matrix of 1r tip $1 \cdot 10^{-7}$ He/Ne/60

~ 7860 counts /200/ near zone lines

@ ~ exact focus 397/561 ~~48~~ ≙ 19.2 kV total

2.76 pulse

SAM's NeoAC / ppts

2 10^{-10} Ne/60

DW ~15 KV

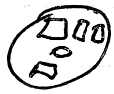
— spotty

align on ~ axial ? ppt.

T313a 14.2 + 2.65 @ 360/561

1 10^{-7} Ne ~1000 ions

— image — no ppt now



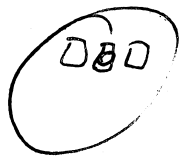
ph @ BIV 14.2 KV x3

ph DW ~16 KV x3

T313b New question 1 10^{-7} Ne/60 14.2+2.65 360/561

2x < DW ph

DW ?



Move to ppt

T314 14.3 + 2.65 360/561

check @ 520 ions — ppt still OK

continue 1 10^{-7}

~1,000 ions

Blank

ph < DW x 3

BIV x3 — pretty!

BIV x2 f1.8

Go home.

Flashed on turning up again

3/Aug/78

Repolished Ni/Al

3 10^{-10}/60
- faint picture

T 315 between 220 & 111 1 10^{-7} Ne
7.41+1.4kV 180/561 4 × DW ph cp 8.9 kV
(hard badge)

1AP D V × 3 (111)
Ni 2+ 40 sec 5 planes "counted
Al 2+ " " "
Al 2+ " "
Ni 2+ " 6 planes
$2 10^{-5}$ Ne gas present

1AP × 3 10, 4, 1 faint)
gas down Ni 2+ 40 secs 8 planes
Al 2+ 40 " "
Ni 2+ 40 " "
Al 2+ 40 " "
Al 2+ 80 "
background between Al & Ni: peaks 40
1AP × 3
→ 220 1AP × 3
Ni 40 sec.
Al "
Al "
Ni "
Ni quicker
Al "
~10+2 kV 1AP × 3
1AP × 1 emitted slightly → ? lumps (T.E.)
Ni 40 secs
Al "
Ni "
1AP Nothing 2

↓ [illegible] ?

1 AP x 3 (2000)

Ni 40

AC ~ 56 secs

AC [illegible] – [illegible]

Ni 40 secs [illegible]

AC 60 –

1 AP x 3

1 AP

pulse 72·2 Ni

AC

— H 7 at [illegible] – [illegible]

Ni

AC

Ni } ?

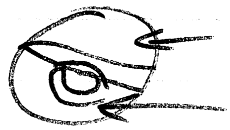
AC

AC

slightly { < AC ? Mg, C

< AC ~ M = 1/2 < AC ? Mg, C

(Turner [illegible])



? [illegible]

[illegible]

1 AP x 3 or 4

ph cp x 2

ph [illegible]

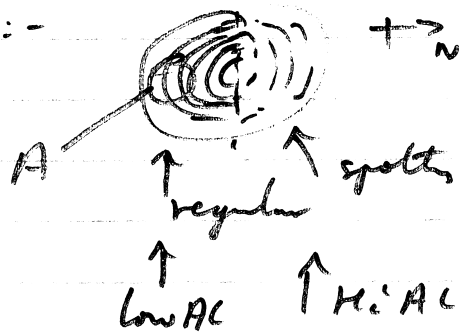
BW x ½ day

< DV x 2 or 3.

go home [illegible]

4/8/78 Same spec $2.5\ 10^{-10}$ /60 /Ne.

— from yesterday's prints 200 crossed by some boundary :-



(200)

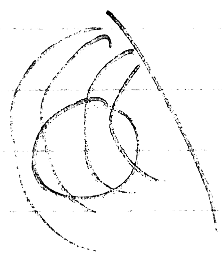
" "

220 "

202

∴ Set up probehole over 200 regular side A

10.68 + 1.9 // 257/290 $1\ 10^{-7}$ Ne



T 316a
— check @ 500 counts, still OK
— check @ 1000 - OK
— print @ < 4 ~ 3 hr

T 316b more ph to dark region — print
10.57 + 1.82

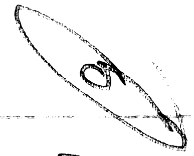
T 317 Over interface
10.06 + 2.50 250/290 $1\ 10^{-7}$ Ne

IAP — [illegible]
DW + 300 [illegible] of 200 (spotty ordered)
Ni^{2+} 40 sec
Al^{2+} " slight [illegible] c-p [illegible]
Al^{2+} -
Ni^{2+} -

IAP × 3
Ni^{2+} 50 s [illegible]
Al^{2+} "
Ni^{2+} "
Al^{2+} -

IAP × 2
More Goodyear(?) 220 (I think) (220) (200)
Ni
Al
Ni
Al
IAP
12h DW × 3 or 4 after polishing
Dark GL HS ? !!! ?
IAP × 2
Ni
Al
Ni
Al - prop
IAP × 2
phys × ½ 1 ½ ¼
empt-DC phys ¼ ½ 1
IAP after ns mass, bottom of tops
Ni
Al
IAP Nifil
IAP × 2
Ni fasted, 30-40 s
Al "
Ni "
Al "
IAP
back to yel - no ppts.
- fast empt -> ? bell shaped, ppt
- back to IAP
IAP × 2 -> Ni - apparently ordered
Al
Ni
Al
IAP × 2

rel b-lunch



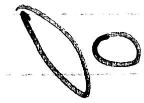
pl

pl x 2

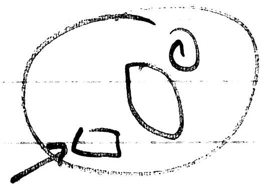
I 218 a ~ 17 + 2   290/570   115 7N

1200 [illegible] from sample

218 b " " " · from matrix



empty -> more 'lenses'



pl DW x 2

IAP of sample on bottom 200

Ni

Al   on hinl. of member — 2.6 kV matrix 18 kV Ga.

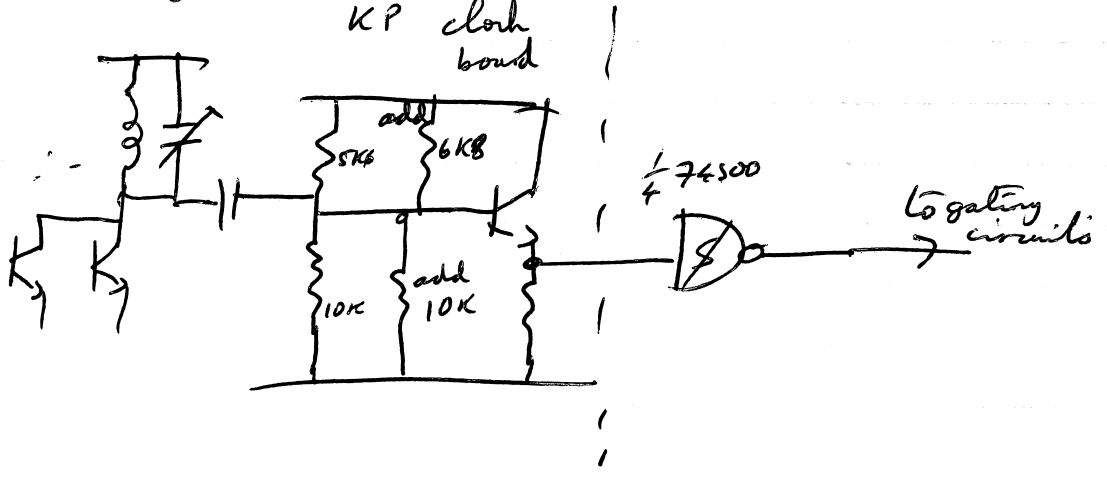
Ni

Al

IAP x 2

7/8 Yesterday activated alumina trapped to backing line of aux diff pump (airlock) & modified airlock so that pumped out separately from top of diffstack.
Al_2O_3 v wet! — needed ~2 hrs baking with Kp trap heater to get < .2 torr

[5/8 IAP liner adjusted, (clock not triggering electronics) so change



8/8 Ir substrate preparation.

1919 'amorphous' (not!) stainless steel Fe/Ni/Cr 20/25,
ex John Wood, as test specimen.
~ 7.5 + 1 KV pulse 180/565 $2\,10^{-6}$ / $2\,10^{-7}$ Ne.
ARW's i/d now in operation. ~300 cms - flanged.

9/8 Ir tip coated while cold (in N_2) with Mond 1/Methanol 1:50 put on by dropping from a syringe.
vacuum dried
– cooked 5 mins @ 450°C in air

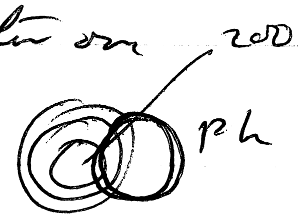
T 320a 8.1 + ~1.3
200/561 $2 10^{-7}$ Ne $3 10^{-10}$/50

~100 ions & pop need to up volts ~ 400

T 320b 210/561 ~3 ions
up volts – nil
260/561 11 + 1.3

T 321 in He/Ne 370/561 390/561 @ ~16 + 3 kV
off layer on peripheral & 111
thro layer after ~50 ions
– rate → much faster 17.15 + 3

T 322 Peripheral 111 with converter on 200
~3 planes evap'td 17.15 + 3
~1500 cond. thru He & Ne
to see no of ~~planes~~/atoms/plane
400/561



9/8/78 Ir provided Mark 5 min / 450

T 223 8 - 12 kV - not marked up for.
2×10^{-5} Ne / 60

T 224 PFM's Fe / Sn g b
3×10^{-10} / 60 / 2×10^{-7} Ne
11 - 11.5 kV + 2 kV 270/561
a on boundary checking each ~ 200 ions — 1400
pulse @ 21 V after working ~ 12.5 kV
b well away from boundary 110 centre of tip
pulse @ 21 V before pushing.

11/8/78 Same g/b 310⁻" 160 / Ne

T 325a off g-b. 2000 cond ~12'·2+2 300/561

keeping H7 constant while inspecting g/b ← phep blank, <DIV, 2W after probing

b Matrix 110 region axial ← probe axial top 2:1

14/8

Fe Sn gh IAP 60/Nb 2 10^-10 cold

<u>IAPD blank</u>

DIV x 2 bottom of gun.

Fe^{2+} 40 secs 46 380 nS

Sn^{2+} ? ~ 50 sec 20

C^{2+} ? ~ 22

IAP x 1

Fe^{2+} 50 s

Sn^{2+} } v little seen

C^{2+} 13.8 kV + '2-5'

<u>IAP Nofilm</u>

IAP x 2

C^{+} @30-32 50 sec

Fe^{2+} 40 s

C^{+} 30 sec, pop

C^{+} 50

IAP x 2

few more Fe^{2+}, C^{+}, C^{++} ?

– v little seen

IAP DW x 2

More IAP DW x 2 top

C^{+} ?

Fe^{2+} long ct

C^{+} – pop

C^{+} short-ed

C^{+} ?

C^{+} 100 sec }

Fe^{2+} 30 sec }

IAP x 2 pretty }

pth DW x 50 rb 14.57

C^+ 20 sec

Zn^{2+} 4

e^+ 4

C^+ 4

(AP x)

Fe^{++}

~~C^2~~ C^+

C^+

Sn^{2+}

Sn^{2+}

Fe^{2+}

(AP x)

8/8 Same Fe/Sn gb

<2 10^{-10} could

T 326 → 13.00 + 2.00 / 320/261

{ ph DW
ph DIV ~~of~~ over b'dowg for 326

IAP x3 ~ 14-86 kV

Fe^{2+}	45-46	60 secs	14 + 2.4
C^+	30-31	<	
C^+	<	<	

IAP x3

C^+	30-31	40 secs
C^+		100
Fe^{2+}	~45	40
Sn^{2+}, Fe^+	65-66	100
Sn^{2+}	66-67	100

IAP x2

More IAP x2

C^+	70
C^+	70
Fe^{2+}	40
Sn^{++}, Fe^+	70
Sn^{++}, Cl	70
C^+	? 70
@218	70 @36
"	70

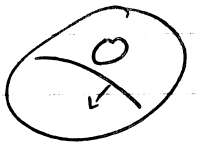
IAP x3 15.5kV

blank, ph x 3

coolabat ph x 3

T 327] off matrix on lower grain

13.00 + 2.35 320/261



T 328 off b'dowg 3 10^{-9} image gone / 320/261 13+2.15

16/8 Ir coated mount 1/450/5 mins
sprayed with N_2 propellant.

T 329 ~ 10 + 2 ~~320~~ 220 / 240 / 581
off stub @ edge of tip (carbon conductive)
- except to 21 KV in He
- Mostly Ne but some ? Ru, Ti oxide lines at beginning of run.

17/8 Some tips received

TJJO 6.J + 1.J 160/561

Holiday / doing advert for New Scientist for new res. stud. for NJSS/ICI etc.

Difficulties polishing Ir with $CaCl_2$ – blunt or etched.

20/9/78 PFMs Fe/Sn 4% single + bil

ex 4 a/p to see if get Fe^+ as well as Fe^{2+} (Fe grain boundary specimen which produced single + t).

T3 1a 11.15 + 2 / 280 / $3 10^{-8}$ Ne / 60 $2 10^{-10}$ old.

— 11.45 280/561

2000 cm

b Ne spectrum same place 11.5 + 2 280 / 561 $3 10^{-8}$ Ne

2000 cm

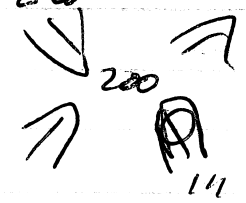
11.5 — 11.9

21/9/78

Same specimen Fe/Sn

$1 \cdot 10^{-9}$ hot $2 \cdot 10^{-10}$ cold

T 332 Off dark region near 200



a 11.5 + 2 / 280/561 60/$3 \cdot 10^{-8}$ Ne.

11.6
11.7
11.8
11.9

2200 cont.

b 11.9 + 2 as b4

back to 200 as 200 now dark/ragged

12 + 2 110 brite

200 → brite by end of sign

T 333 — on (now dark) 110

300/561 12 + 2 300/561 $3 \cdot 10^{-8}$ Ne 60

2000 all @ 12 KV.

T 334 after decreasing Bennett timer's minimum allowed time (RC = 270 : 2n2 => 270 : 1n)

12 + 2

12.1 300/561

12.2 same place / volts => now lots of hydrogen (seen on scope previously but not recorded by timer) 2000

b Back to dark region — now H but little Fe+ (??)

1800

check afterwards, still on dark region, fuller image now.

System baked $\Rightarrow$ $1.5\,10^{-10}$ (cold) on t-g
best $0.2\,10^{-11}$ leak in cryostat (again)

Same Te/Sn single xtal baked in situ.

27/9/78

c-p (chevron) outgassed by putting large Ne^+ current on @ 2.4 KV applied volts, defocussed spot.
for ~4 hrs.

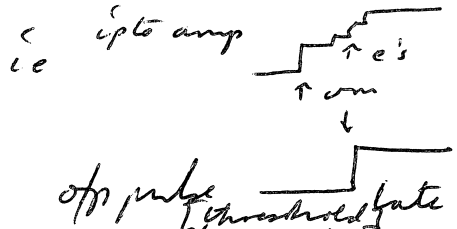
Up detector sensitivity & chevron V from 2.1 to 2.2 KV to restore reasonable delta efficiency.

Spectrum 12.1 + 2 300/581 $3\,10^{-8}$ Ne/HD
T 335 200
still lots of H_2

2000 cts @ one voltage

$\longrightarrow$ it was observed previously to adjust the gain that when putting a brite ion beam onto the detector, & getting a lot of unfocussed 'scattered' signal as well, that the scattered signal could be moved/almost eliminated with a magnet $\therefore$? electrons ? particles ? electrons off c-plate 

Calcn suggests for 10 eV electrons $t_{ion} \approx 3$ ns
so, if extra e's give extra gain, would get a late pulse from amp if distrib triggers on ion



$\therefore$ increasing sensitivity of det amp to just above noise level should improve time resoln

T 226 Same tip same place, gas out → $6\,10^{-10}$ (ugh)
except ~ [illegible] 200 secs before taking spectrum,
HT 12.2 → 13.6 (!!)
So spectrum 13.6 + 2 / 220/561 van . 60+
13.6 – 14 KV – rate is ~ insensitive to V_{tip}
Much less H_2^+ .
? in neon (i.e. H_2 or H_2O)

28/9/78

T337 Same tip used (? 3 10⁻¹⁴) no gas at all
60
13 – 13.7 /320/561 1990 ions
+2

Some H.

T338 13.8 +2 /320/561
–14.2 1450 ions

q. rapid → less H
– flashed.

3/10/78 PFMS Fe/Sn

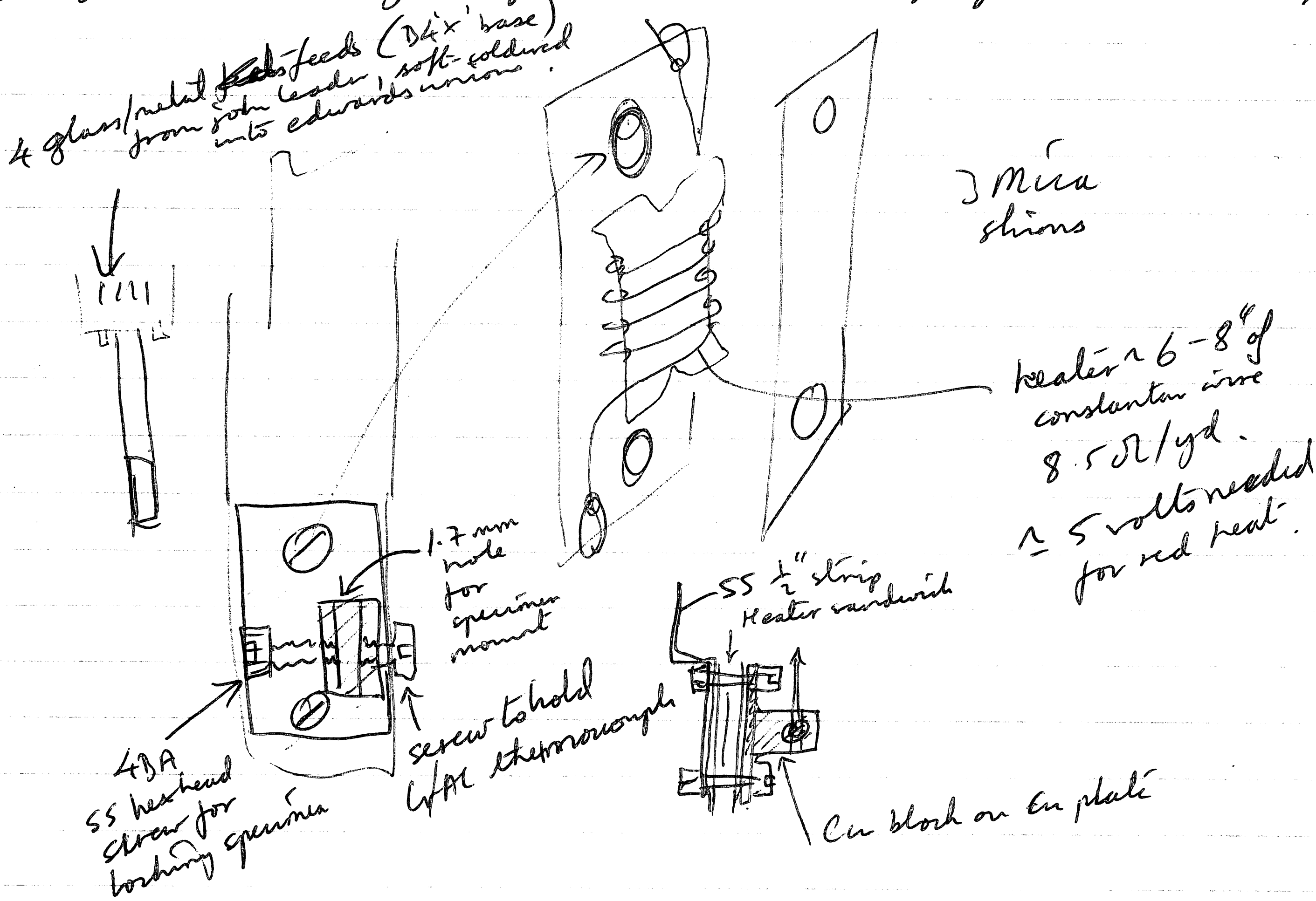
g-b ex PJTafp $< 1 \cdot 10^{-10}$ background.

T339 330/561 350 2.2 pulse/14.? – 14.8 KV $3 \cdot 10^{-8}$ Ne /60

~~evaporation~~ off grain boundary, mostly Fe around & hugely over boundary.

Refurbishing Edws a/c – putting lines into sub-pump chimney
– new filaments
? rad shield.

Hydrogen outgassing rig completed (Edws onto oil diff pump on 7-P autochanger)



6/10/78

Fe/Sn gb as before . 110^-10 60/Ne

ph D W {Dlank} 15.06 KV 1½ phover gb

ph Nufild

ph ½ ¼ 1½ ¼ axial

$\frac{1}{2}mv^2 = \frac{1}{2}m\frac{d^2}{t^2} = neE$

$t = \sqrt{\frac{\frac{1}{2}md^2}{neE}}$

$\propto \sqrt{\frac{m}{n}}$

IAP Nufild

Fe^{2+}_{28}	44 =	260
C_6	27	166
C_{12}	30	
Sn^{2+}_{60}	65	
Ne_{20}	36	

Fe^{2+} 40 secs

C^{2+} "

IAP DW ×1 sec

Fe^{2+} 20

C^{2+} 60

C^{+} 60 } v little of anything at all.

C^{2+} ~50

Sn^{2+} 60

Sn^{2+} "

Sn^{2+} " 65

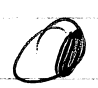
Fe^{2+} 30 q rapid . 42

IAP ×2

More slightly IAP ×2

Fe^{2+} 20

Sn^{2+} — lt? sparking over — stripe at side of picture



.
.
.

Last one dead blank

DIV x 3

More DIV x 2

UAPMgh

IAP x 3

Sn^{2+} x 2 or 3 60 sec

black

C^+ 2 m 3 , white →

Fe^{2+} 30 sec

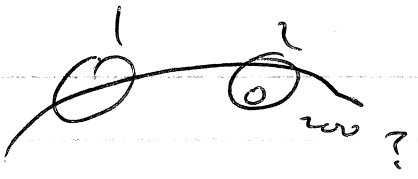
Ne^+

~~as~~ ? Sn

IAP x 3 ,

ph DW + 2 days or so 17.6 KV , - pretty!

extracted



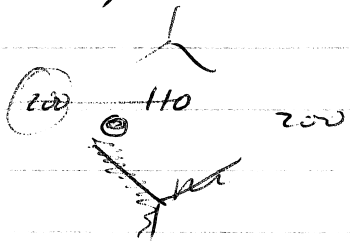
3/10/78 Sat Stefans PSW 3rd batch 30 mins @ 200
110^{-10}/60/No

T340 200 cm² mostly H ~5 KV + 500–1000 V 110/561

T341 a 4·7 – 5·1 +1KV 120/561 ≥ 500 + 500 off ? dark lines

b 5.1 – 5.35 130/581 New plane, dark

ph blank / DIV x3 where ph was



ph DIV x3 axial

ph DIV x3 ph aligned better with beam spot

T342 5·35 140/581
5.75 150/581 → (400 cm²)
6·00 1000 cm² ~~total~~
ph DW x3 6·15 KV .
blank

9/10/78 Same spec 110 10/60/No

Same dark hole 200 110
T343 & carefully aligned.

150/561 a 5.8 + 9
6.16 + 1.18 800 cps
Cracked off – ? carbide gone
b off matrix adjacent to previous spectra
160/561 6.2 + 1.2
6.34 + 1.35 630 cps.
Mostly Fe
ph DW x3 above b
a " x3 axial
a " x3 over dark area top left.
move to line of original dark hole 200 110

T344 a 1100 of 'boring'
160/561
b 600 off other dark hole on bottom 110

T345 a 6.76 + 1.3 170/561 off dark line 200 110
1.6 2000 cps - -
b 6.8 + 1.7 dark line, 1 ph diam. south.
6.8 – 1.75 3000 cps
ph Bin x1
ph Mn Kβ
ph DW x3 7.60KV
ph axial ph x 3
ph dark spot on RHS 110 region x3

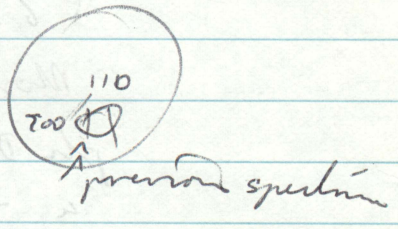
T346 a 6.90 + 1.75 140/561
1.85
blank
ph x3 as after 346a 7.49KV
190/561 b axial 110 away from dark area 6.90 + 1.9 1000 cps

ph BW ~ round →
back to original blank hole →

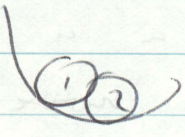
T) 47 ph ≈ sing of hole 7 + 1·9 190/581

at 2447 ions check — ⊙ - dark centre
— realign ph over dark hole
4000 ions total ⊙ ⊙₂
blank
Σ ph BW ?? Σ

IAP blank



IAP → 200 bottom left.
shift with IAP →



Fe^{2+}	64/64 = 520ns	
C^{2+}_6	30	241
C^{+}_{12}	42	340
$C_3^{2+}(18)$	52	417
$C_2^{+}{}_{24}$	60	481
N^+	45	367
N_e^+	54	440

Fe^{2+}	50	
C^{2+}	50	
C^{2+}	50	
Fe^{2+}	40	
C^{2+}	"	
C^{2+}	"	
C^{+}	"	
C_2^{3+}	"	8·07 ± 1·8

IAP →

Move right IAP ×) 8.62 KV DN

Fe^{2+} 40 nm
C^{2+} 40
C^{2+} 40
C^{2+} 120

IAP ×)

IAP Mask 2

IAP ×)

move to axial 110 IAP ×)

Fe^{2+} 40
C^{2+} c
C^{2+} c

IAP ×)

move right IAP ×)

Fe^{2+} 40
C^{2+} 20
C^{2+} 50

IAP ×)

ph DIV × 5 ph blank 8.75 KV

IAP blank

cont'd

Tues 10/10/18 same spec 60/110^{-10}/No.
IAP (blank)

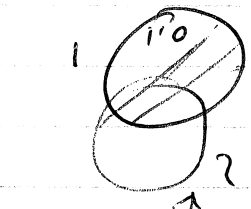
Fe^{2+} 28 /60 = 480
C^{2+} 6 25 = 220
12 36/52 = 314

IAP ×3 110 crucial ⊙
Fe^{2+}
C^{2+}
C^{2+}

IAP Mg

IAP ×)

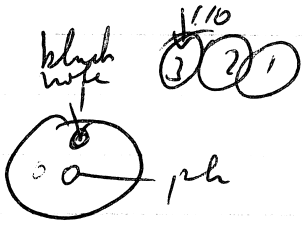
move IAP ×)
Fe^{2+})0
C^{2+} "
C^{2+} "
C^{2+} '
IAP ×)



move down IAP ×)
Fe^{2+})0
C^{2+})0
C^{2+})0
C^{2+} 60)

IAP ×)
blank hole @ t. of centre (110) ⊙
IAP ×)
Fe^{2+}
C^{2+}
C^{2+}

IAP ×)
sequence IAP
Mg DIV × 5



↑
9+1.67

T348 off dark hole (? exact or not point ?)

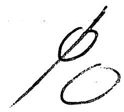
a 220/561 8.48 +1.7-1.8...

No C after 500 cons - check

- dark hole gone - move to adjacent dark line

b 8.48 + 1.9

T349 dark line near 110



a get to 2000 cons - prds

ph blank

ph DW × 2 8.94 KV

~~move~~ ph N after

ph DW × 2

move to bigger dark line ph DW × 2

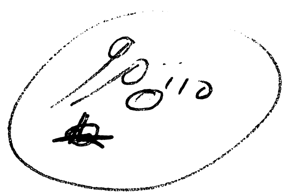
b 8.2-8.6 + 1.96 2020/561

ph DW 1 ½ ¼ 9.52 KV

as axial ph DW ¼ ½ 1

T350 8.8 + 1.95 2020/561

off small dark hole, bottom left



1000 cons

ph blank

IAP × 2

Fe^{2+} 30

C^{2+} [illegible]

IAP N after

Fe^{2+} 30

C^{2+} [illegible]

C^{2+} [illegible]

IAP × 2

Move slightly IAP × 2

Fe^{2+} 30 s

C^{2+} [illegible]

C^{2+} [illegible]

(119) Øa Øb

VAP × 2

pH × 2

T 351 Spectra a 800 off bdary in previous des pics near 110
b 800 " " " " " " nextawry
a < b < carbon in des & ph cfs.

— try to get spectra off dark
zone — no curs
— ph pics of tips ? vacuum evaporated — clean
D < empt → spotty — pics.

11/10/78 Same tip blank ~~hole~~ line RVCS 115°° /60/Ne

T352 9.80 + 1.5 240/561
−1000 cont 60K
leave to pump out over lunch
except 350 cont
T353 a same place 9.90 + 1.8 240/561 60K
P 7.10⁻¹¹ acc. to t-gauge.
1000 cm 2
b same again 100 ^ −
ph blank
M D.V × 2 10.22 kV

T354 dark line LHS. ~~9.8~~ 8.8 − 9.5 / 240
− 400 cm

b − rapid 9.6 + 2
− tape run out − rejoin at 1800 on counter
− 6000 cont → 19.65 + 2 240/561
a cut off → T354 b only.

12/10

Ti $1 Co^{-10}$/60/Ne

T 355 130/561 5.4 to 6 -> 1 KV

a 140/561 5.6 - 5.85 +1

150 - - ↓ +1

160 6.3 +1

b

Neutrons @ 600 cm

6.45 +1 160/561

170

7.3 +1 180/561

Stop @ 1300

T 356 7.3 +1 180/561

170

a 8 + 1.23 200/561

2000 ions ↑

b 8 + 1.33-1.35 200/561

resolve check. ~ 50 volt change only

1300 cm.

1)

T 357 W painted with Mond ~~No~~, No Ti on it.

18/10 T358 Ir painted Mond 1 (no Ti)

T359 Ir substrate

T360 378/600

2200 ions from 111 Me(+Ne)

2.2 + 4/6 (?) all at 1 voltage to see how resoln depends on voltage ratio – set to give symmetrical spot on detector as nearly focussed as poss.

18/10

T361 8.51 + 1 200/561 ~ 30 rod

off-shoot of a Fe/C PSW 30/200° (SP) wire

- flushed

T362 More PSW, same 30/200° Ardkatich.

Spectrum off black region at side of bright / crust —

? Carbide or ? oxide

5.9 + 600 } 140/561 210^{-7} Ne

6.0 + 1.00 } 78 K

6.30 + 150/561 c

~ 500 cm.

good home time

19/10/78 Subgroup filament gone (TSP valved off overnight to keep it clean)

T363 Same oxidised PSW,
6·5 + 1 160/561
a ~ some plum
b a bit further away from metal.

T364 @ the metal oxide interface
- more back to ~ ... after ~ 600 ions

T365 8·4 + 1·5 200/561 oxide
a bit further out than 364
reglow
ph DVV offaxis ×3
on axis ×3

366 Black line in matrix
2000 ions after fixed amp cable - boring
ions + lots of bursts.

ph DW ×3

367 a 2000 more off black line
ph ×3 220/561
Move to black hole @ bolton
ph ×3
b ~ 9·3 + 1·6 ? 230/561
ph ×3

~~368~~ Del ph ×3 centre
12L ×3 off black hole
@ bolton left

368 ~ 9·8 1·8 240/561

no C in last 200 Ma

- realign @ 650 mya → increased carbon capture
onto black hole — 10000

ph → 3
aerial ph → 3

goodbye Earth

T J ~~6~~9   off oxide @ bottom of tip
~4K cts

260/561
270/561

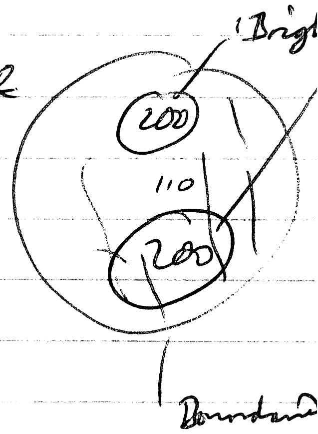
ph ~~axial~~ ph blank ×3
ph on dark line ×3

T J 70   4200 cts off dark line   270/561
~11+2   280/561

Series of pics @ various orientation

No film
More pics, evaporting up to ~14.5 kV @ end.

Some below ~3 kV showing orientation & low-angle nature of boundaries



Attempted to extract tip for em pics, manipulator broke - rats.

to lip, much painted, looked @ in electroscope — no ½ drop pts
— few bits of paint, but no signs of a coherent layer.

~ 10^{-9} after bake - ??

31/10/78

T371 Mo/10^{-6} He ~ 6.2 + 0.8 KV 150/561

H2 set dodgy - quiet.

a 500 b ~ 50

Chinese visitors

Neil Bradley says vac system for Culham in 1-2 weeks.

1/Nov 78

Order for repair/calibn of Marconi scope £165 ≈ 3wks. OK.

TJ72 160/561 Mo 6·5KV+1 /$5\cdot10^{-7}$ He

same open $6\cdot10^{-10}$ pressure ig

H00, last 200 @ 1·05 pulse

[ion gauge (off ods 7-[system' now replaces trigger gauge, shld shorted out internal (metallic gauge collected by field inside)]

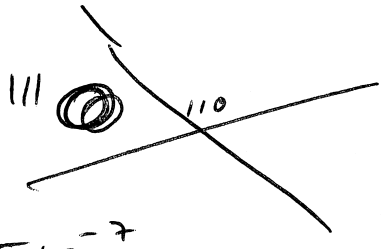
2 Nov 78

T 373 Mo var 170/561 same region as yesterday for comparison, to see if tail on Mo^{3+}

a $MoHe^{3+}$ 6·8 + 1·1 − 1·2 a 10000

— excellent resoln 6·8 + 1·3 b

T 374 a



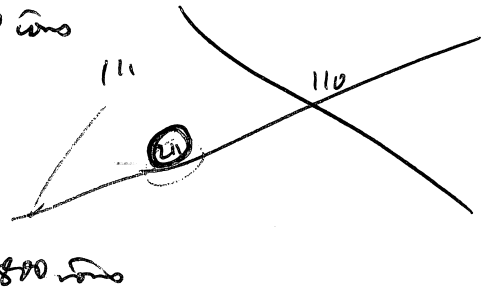
7·4 + 1·1

in He $5\,10^{-7}$

800 torr

180/561

b

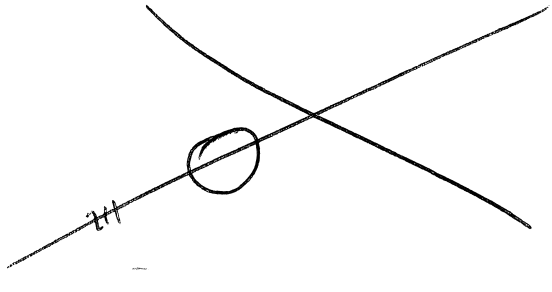


7·4 + 1·13

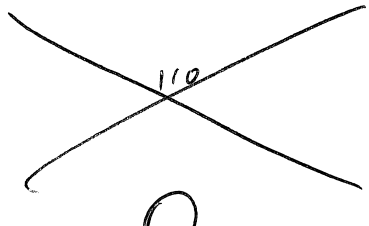
T 375

7·4 + 1·3

180/561 a



b



7·4 1·4

10/11/78 Same Mo

T376 Var 60 (210⁻⁴!) 205/561 a 7·83 + 1·37 1200 cons
−7·85

205/561 b 8·00 + 1·37

T377 " " 8·15 → dropped below 8 during run
cos HT set unstable 2000 cons

HT down, then up again

T378 205/561 8·15 + 1·37
−8·19

Stop @ 500 cons to change HT set – still drifting
HT ↓ ↑ – pulse clean

T379 a 8·30 + 1·37 rapido!
2200

b 8·45 + 1·37 "
2400

T380 8·60 + 1·37 1780
(New tape)
Inspect-change, evapt-some.

T381 tape labelled 381 vac
8·80 + 1·37 1,000
evapt some

T382 9·15 + 1·37 1500 rapid
evapt-

T383 9·15 + 1·57 1300
evapt

T384 9·6 + 1·57 500
Stop.

8·8 − 11·2 = 2·4
9·3 − 9·82

14/11/78

T 385 Mo/60 110° var.
600/240 10.3 + 1.6 (~ best tons) 1000
600/255 " + 1.63 1000

T 386 230/600 10.3 + 1.65 800

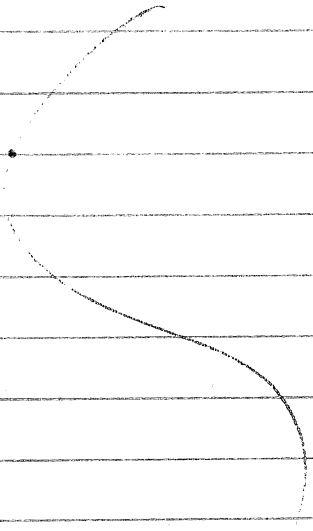
11.37
690 230

11 KV

600	197 222 255		610	200 219	255
590	196 223 254		620	214	
580	194 224 254		630	202 218	256
570	226		640	217	
560	192 228 252		650	217	
550	231		660	205 216	257
540	192 236 252				
530	240				

T 387 a 580/245 10.5 + 1.6 1000
580 264 " " "

T 388 a 630/237 10.5 + 1.7
b 540/262

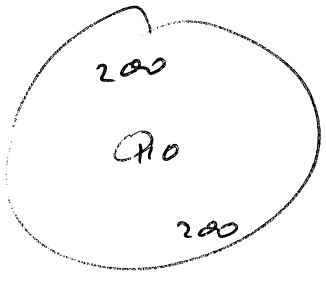


31/1/79

Daimyaku Fe/Si specimen (polished August last year!)

Ne/160/5×10^{-10}

(IAT) ph cp 7·5KV $\frac{1}{4}$ $\frac{1}{2}$ 1 2 $\frac{1}{2}$ 1 DW assist



Specimen 110 using slow. 703 + 1075 ~ 1/sec.

190/561

~~1900~~ 1900 cms specimen — gas 2×10^{-5} Ne during run

Time	No	T	N	T	N
0	1	258	1	311	1
61	2	259	4	2	1
62	49 [1·25]	260	5 [−20]		
63	101	261	1	429	1 [55·3]
64	10	272	1		
		273	1		
96	1				
		298	2		
112	1	299	10		
215	2	300	27		
216	2	301	5		
217	30	303	1		
218	45 [14·3]	304	41		
219	2	305	327		
221	2	306	296		
224	1	307	16		
225	2	308	11		
232	1	309	3		
233	1	310	4		

88

745

Blank

ph DIV × 4 7.9KV

move off 110 towards 200, realign

DIV × 3 ± 12

(2) [7.7 + 1.4 190/561 7×10^{-7} Ne

7.7 − 1.5 −1200 Cmb

T	N
0	1
61	3
62	67
63	178
64	4
65	2
87	1
216	4
217	45
218	11
219	1
221	1
224	1
298	3
299	41
300	17
302	1
303	16
304	212
305	542
06	83

307	11
308	5
311	1
669	1

63 6.33 ± .80

932

blank

Move to 200 DW × 4

7.8 + 1.65 − 1.85 Spectrum 190/361

③

10	1
11	3
61	9
62	75
63	123
64	3
86	2
121	1
141	1
215	1
216	9
217	29
218	8
221	3
225	2
298	10
299	44
300	10
301	3
303	61
304	424
305	302
306	27
307	11
308	7
309	1
310	1
313	1

52 5.28% ± .73

93²

Dark 6110 — ph x 4 8.1 KV

8.2 + 1.7 200/561 5.0^{-7} No. 60

→ 2.0 KV — 380 coincidences, so

realign & continue @ 8.2 + 2 — 8.3 + 2

0	3	~ 1000 ions.
10	1	299 8
11	3	300 3
60	27	303 1
61	142	304 1
62	29	
63	2	307 1
		311 1
210	1	312 1
211	19	317 1
212	5	328 1
215	1	386 1
		417 1
256	1	
289	1	
290	12	
291	23	
292	6	
293	1	
294	2	
295	87	
296	429	
297	202	
298	21	

26

748

Blank

ph 1 2 9.2 KV

going home time

3.16 ± .62

1/2/79 Same Fe/Si

LAP Dlumb

IAP DIV x 4 or 5 ~ 9 KV

pulse 8.85 + 2.0 (delay cable)

DIV x 3 or so

1 ons @ 67 ordal, 105

550 ns

690 ns

Nb start pulse direct from pulser, so have to subtract τ_d from these time to get-tite lim

Require $\frac{690-\Delta}{\sqrt{28}} = \frac{550-\Delta}{\sqrt{14}}$

$690-\Delta = 778 - 1.4\Delta$

$.4\Delta = 88$

$\Delta = 212.5$ ns.

$\therefore \tau_{Fe} = 480$

$\tau_{Si} = 340$

$\therefore \tau_{H_2} = 90 \Rightarrow 300 \Rightarrow 36$

$\tau_{B_{11}} = 300 \Rightarrow 510 \Rightarrow 60$

$\tau_{C_{12}} = 314 \Rightarrow 525 \Rightarrow 65$

$C_6 = 222 \Rightarrow 435 \Rightarrow 54$

$B_{10} = 287 \Rightarrow 500 \Rightarrow 62$

Fe^{2+} 60

Si^{2+} a

Fe^{2+} 30 quicker ~ 1 plane / 10 secs. 100 Hz.

Si^{2+} 30

C^{2+} (54) 30

noise (57) 30

((? DIV))

Syn ⊙ 4017-19-6 1 blank

Fe^{2+} 60 rapid
Si^{2+} "
Si^{2+} "
IAP Div × 4 or 5
IAP Blank.

~ 1 plume / 10 secs

Move to LH 200 IAP × 3
IAP N fish 2
200 × 3
pulse — popped
— reacquit
IAP × 3 or 4
— ?slipped
IAP × 3
ph × 4
up volts ph × 4
shift slightly ph × 1 or 2
ph N fish
ph × 4
acquit ~ 2 × 180 ph × 4
~~IAP × 4~~ IAP blank
IAP × 4

110
200

Launch, HT down (unstable, cool off)
ph blank
ph × 4 ~ 12-2 KV
ph × 2 while slowly pulsing.

- Flushed
ph blank IAP blank

New Te/Si Lips ex Dayspring FS14-5 [1 thick]

Spectrum, axial, ^{610}Ne 6·80 + 1 — 1·35 MV (60/56)

1500 ions

	No.			
T	0	1	225	1
	2	1	226	2
	66	3	227	1
	67	28	228	1
	68	40		
	69	4		
			253	1
	71	1		
			465	1
			466	1
	225	27		
	226	33		
	227	4		70
	240	4		
	243	1		
	244	1		
	281	1		
	284	1		
	324	9		
	325	35		
	326	10		
	~~327~~ 327	1		
	329	3		
	330	209		847
	331	458		
	332	105		
	333	6		
	334	6		

(1)

S

7.63 ± .91 %

6.8 + 1.35 − 1.55 175/561

T	N
63	1
64	2
65	111
66	76
67	1
89	3
90	4
225	4
226	22
227	21
229	1
230	6
231	2
234	1
310	1
311	13
312	24
313	8
316	50
317	309
318	405
319	33
320	8
321	10
322	1
446	1

1140 ins (2)

57

6.20 ± .82

862

ph blank

ph x 4 7.62 KV

good home time

2/2/78

Same tip   IAP DW ×3 or 4   O?¹10

Fe^{2+} 60
Si^{2} 60
? [Fe^{2}
Si^{2}
Fe^{2} 45 pop — These @ 200 Hz — faint

reduce to 100 Hz → brighter spots @ low cps [illegible]

Si^{2} 45   71–72
$?^{2}$ 40   ↑
Si^{2} pop
Si^{2} 40   ~10 sec/plane

IAP ×3

ph ×3

move to 200   IAP ×3

Fe – ?, pop)
(Fe
Si   ?, pop
Si
Si   20 sec

IAP blank

Fe^{2+} 1/8

IAP [illegible]

1/8 sec Fe^{2+}
1/8 Fe^{2+}
10 sec "
3 " "
10 sec Si^{2+}
10 sec Si^{2+}

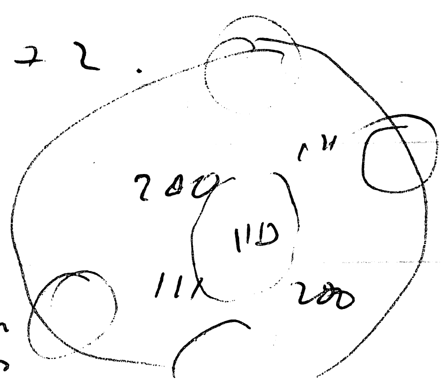
? varying length exposure to relate concentrations of different species

7872.

IAP | Blank / DIV ×3   ~7.8 RV

ph × 4   1 2 ½ ¼

ph ×2 after pops
Flashed when turned upon monitors



6/2/78

Mo/He /10^{-5} 60 4·9 + 0·8 − 1·0 KV 130/561

0	1
142	6
143	12
144	16
312	1
335	2
342	2
343	4
346	4
384	1
385	13
386	45
387	27
388	3
389	1
390	23
391	32
2	49
3	57
4	61
5	46
6	49
7	51
8	68
9	74

400	12
1	11
2	26
3	17
4	12
5	4
6	9
7	7
8	1
9	1
10	3
470	4
1	8
2	14
3	6
4	2
5	1
6	5
7	10
8	9
9	23
80	18
1	15
2	23
3	12
4	12
5	11
6	16
7	21

488	7
9	3
90	2
1	11
2	7
3	4
546	1

a

75	1
142	1
143	2
144	11
209	1
42	1
2	1
4	1
386	10
7	21
8	2
90	6
91	15
2	12
3	13
4	23
5	18
6	10
7	13
8	17
9	22
400	3
1	9
2	6
3	11
4	2
6	5
7	6
8	2
10	1

b

145	1
204	1
5	1
7	2
9	1
40	3
1	1
2	3
3	1
4	2
5	2
384	2
5	26
6	74
7	25
8	1
9	15
90	24
1	22
2	53
3	41
4	57
5	21
6	26
7	41
	72
	20
	4
	10
	24
	22
	6
5	4
6	8
7	5
9	1
10	4
11	2
346	1
9	1
50	2
55	1

a

11	2
71	3
2	3
7	3
9	2
80	6
1	2
2	6
3	4
4	2
5	1
6	3
7	4
8	6
91	1
2	4
3	1
4	1

b

468	11
70	2
71	23
72	11
75	1
77	6
78	18
9	9
80	22
81	8
2	15
3	12
4	8
5	12
6	5
7	24
8	30
484	1
90	2
	1
	11
490	6

Gas pressure down 10300 pulse

74 ~~8~~54 2
5 6

142 1
3 2

333 1
4 1
7 1
8 1
9 1
40 3
1 2
2 1
3 1
4 7
7 1

382 2
3 25
4 52
5 23
6 1
7 16
8 35
9 35
90 56
1 43
2 75
3 34
4 48
5 36

396 88
7 18

99 9
400 33
1 8
2 1

468 2
7 13
470 3
1 2
473 5
474 13
5 3
6 7
7 14
8 9
9 18
80 5
1 6
2 5
3 15
4 24
5 7
488 4
9 5

490 5
1 1

848 1
903 1

Wed 7/12/79 <u>ph Blank</u>

Deggys 3rd Fe/Si gb spec DW

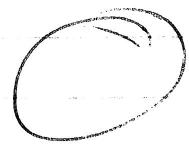
<u>ph Nafish</u>

4-5 ph DW 11.55KV Ne 160

New HT set - old 1 unstable

ph DW × 4 14KV

Flashed @ ~ 16KV

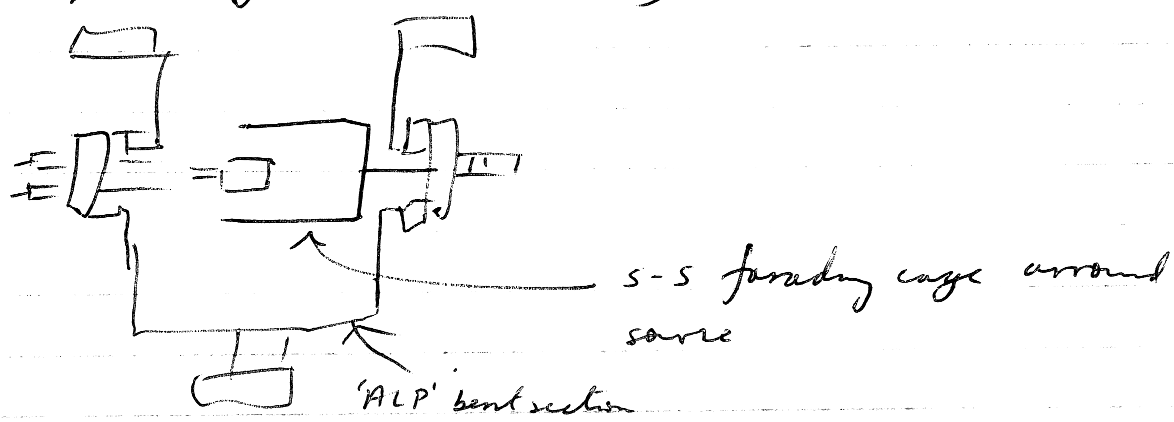


← gb ? just starting to be seen.

<u>ph blank</u>

The Gallium ion source arrived from Culham yesterday (brought by Phil Prewitt).

Put into pumping stn system today :-



Repossessed Keithley 602 electrometer from D. Ashlund (has had it since 1973!) Serial No 20395 (Bought by Ed Boyes 1972 or 73).

Stop press ↓

Stefans PSW 300 mins/200C ①
Ne/60 7.9 KV ph 4×DIV

1000 in Spectrum off black hole 185/561 7.56 + 1 − 1.15

102.0 ph DIV × 4 7.56 KV
ph DIV × 4 8.2

	62	18
	63	101
H^+	64	103
	65	8
	69	1
C^{++}	145	2
	146	32
	147	37
	148	2
	153	1
C^+	204	9
	205	8
	206	3
M_{13}??	214	1
S_c^{++}	220	2
C_3^{2+}	248	2
	249	4
	250	7
	251	2
	252	1

	254	1
Ne	263	1
	264	1
	265	1
24 C_2	286	10
	287	6
	288	5
	302	1
	303	5
	304	12
	305	8
	306	1
	307	4
Fe^{2+}	308	58
	309	237
	310	279
	311	28
	312	7
	313	7
	315	2

C_3^+	350	1
	351	1
	355	1
Fe^+	437	1
M_{130}	678	1

$C^{2+} = 74$

$C^{+} = 21$

$C_3^{2+} = 17$

$C_2 = 21$

$C_3^{+} = 3$

$Fe^{2+} = 649$ ∴ 216

$C = 74 + 21 + 51 + 42 + 9$

$= 197$

↳ $Fe_{3.29}C$

or if $C^{+} = C_2^{2+}$, $Fe_{2.98}C$

Axial ph Div × 4

More to edge of carbide
lower gas pressure (3×10^{-5} ↑ Ne last spectrum)
7.07 + 1 — 1.22 185/561
Spectrum

ph Div × 4 8.68 KV
axial ph Div × 3

ph Night
axial ph × 4
back to carbide ×3 as not sure if camera focussed
ph Dark.

spectrum overleaf 1020 cm

↓

	62	7
	63	63
	64	74
	65	3
	136	1
C^{++}	146	4
	147	3
	152	1
	189	1
C^{+}	204	1
	205	2
	206	1
	213	1
$\underline{16}S^{2+?}$	233	2
C_2^{4+}	250	3
	251	1
Ne	264	1
	265	1
C_2^{+}	287	1
	299	1
	302	1

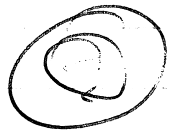
203	15
204	27
205	9
206	3
207	4
208	51
209	325
210	263
211	21
212	19
213	4
214	2
215	1
217	1

$40^{?}$-3 70	1

Going home [illegible]

8/2/79 Same Fe/C PSW 300/200C

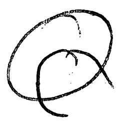
IAP 6 × Div 8.2?
+ 1 8.6 kV



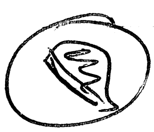
yesterdays carbide

Fe^{2+} = 110 = 720 ms
$\emptyset$ = 210
∴ Fe^{+} = 510 ms
∴ C_6 = 236 = 450 = 55 H = 96.?
C_{12} = 334 = 544 = 66
C_{18} = 409 = 620 = 76
Si, N_{14} = 361 = 570 = 71 S^{2}_{16} = 385 = 600 = 74
C_{24} = 472 = 680 = 104
C_{36} = 578 = 790 = 117

Fe^{2+}
C^{2+}
Fe^{2+}
C^{2+}



? Div × 2
more Div × 4



Fe 40 secs q. rapid
C^{+} "
C^{+} "
? S^{+} "
? N^{+}, Si^{+} "
? IAP × 2

LHS

IAP × 2 9 kV

v little c – edge of top, so
move to ~ centre

IAP ×1

IAP N

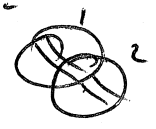
IAP ×2

Fe^{2+} 40,

C^{2+} — abandoned

C^{2+} 4

C^{2+} -



IAD ×2

More IAP ×2

Fe^{2+} 40

C^{2+} 4

C^{2+} 1

Fe^{2+} 20

C^{2+} 40

IAP ×2

ph ×4

ph ×4

ph ×2, over black hole as before – quantum

Spectrum Hcarbide

57	7	
58	45	
59	62	
60	4	
133	12	6
134	48	
135	28	
136	5	
187	13	12
188	21	
189	8	
195	1	13
196	3	
203	2	14
227	1	18
228	6	
229	17	
233	1	~19
240	3	Ne
242	3	
262	13	24
263	14	
264	9	
265	2	
267	1	
269	3	25
277	5	
278	24	
279	32	
280	8	
281	17	
282	69	
283	392	
284	530	
285	71	
286	20	
287	5	
288	3	
289	3	
292	2	
300	1	
320	2	
321	4	
369	1	
370	1	
392	1	

8.69 + 1.8 180/561

< 315

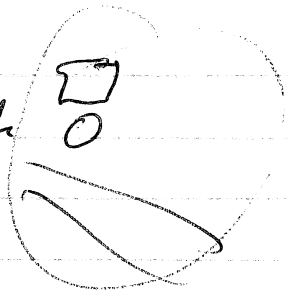
Fe 118 1

393

$Fe_{3.7}C$

ph blank.

ph 4 x DW with ph just under carbide



8	1
57	1
58	5
102	4
103	4
104	3
186	6
187	1
202	1
225	1
226	2
230	1
239	1
259	1
260	3
261	8
270	1
274	1
275	6
276	7
277	1
278	3
279	13
280	104
281	167
282	26
283	6
284	1
285	2
286	1
316	1
324	1
331	1
961	1

338

57

~ 330 cms — stopped detecting, ? end of carbide

0⁺

~~O²~~

ph x 3 where spectrum taken
axial specimen ph x 3   9.97 KV

spectrum — rapido!   ~300 cms

56	13		
57	31	272	6
58	21	273	9
		274	120
		275	405
130	5	276	657
131	15	277	106
		278	35
171	2	279	5
		280	1
182	4	281	2
183	1	282	1
196	1	309	1
197	2	311	1
221	1	389	1
222	4		
233	2		
235	2		
256	4		
264	1		
270	29		
271	42		

2nd spectrum

56	19		
57	44	272	7
58	31	273	8
59	2	274	150
		275	430
130	7	276	567
131	2	277	97
		278	24
170	2	279	6
		280	5
182	2	281	1
196	2		
197	2		
		388	1
222	3	390	1
223	2		
237	1		
256	6		
269	3		
270	32		
271	39		

Matrix, adjacent to dust-spectra

2nd run, 100 v less pulse

9.20 + 2 → 1.8 → 1.85

205–550

56	24	56	27	56	35
57	51	57	67	57	100
58	22	58	44	58	51
59	1	59	1		
79	1	78	2	78	1
182	2		12	182	2
196	2	195	1		14
197	1	197	3	197	1
207	1	207	1		16
234	1	235	1	Ne	234	4
		237	1		
269	1			269	1
270	33	270	36	270	17
271	76	271	55	271	54
272	11	272	8	272	9
273	6	273	3	273	4
274	118	274	66	274	44
275	453	275	394	275	304
276	611	276	619	276	626
277	122	277	126	277	170
276	17	278	33	278	26
279	11	279	10	279	10
280	4	280	2	280	2
281	3	281	3	281	1
282	1			282	1
		320	1		

225

ph blank
ph x3 where last spectra took

ph x3 1 more ph diam's from boundary
9.21 + 2 225/550

55	1
56	66
57	171
58	79
65	1
129	1
197	6
198	1
269	1
270	25
271	38
272	8
273	5
274	112
275	402
276	544
277	104
279	6
280	1
281	2
722	1

55	2
56	73
57	168
58	53
59	1
65	1
78	1
195	1
196	2
225	1
269	4
270	21
1	40
2	8
3	5
4	113
5	413
6	460
7	83
278	35
279	4
280	9
281	3
282	1
286	1
302	1
363	1

55	2
56	57
57	170
58	60
~~59~~	
196	1
197	1
268	1
269	5
270	25
271	40
272	7
273	5
274	145
275	483
276	409
277	57
278	21
279	6
280	4
281	1
282	1
321	1
758	1

ph × 4 where spectra taken

IAP Div ×3

– blank  last spectrum here

Fe^{2+} 60 sec

C^{2+}
C^{2+} | v little, ? intensity

Fe^{2+}	107	= 670	← 210 = 460
C^{++}		52 ← 420	← 210
14 →		65 ← 535	← 325
C_{12}		67	510	201

- Si^{2+} 65 60 sec
  Si^{2+} 4 "
  C^{+} 67 "
  C^{+} " "

IAP ×7

IAP mystery

IAP ×7

Fe^{2+} dud

Fe^{2+} 60,

Si

Si

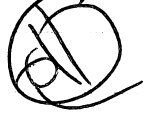
C^{+}

C^{+}

C^{++}

C^{++}

IAP ×7

More shifty IAP ×7  axial 1/0

Fe 2+

Si 2+

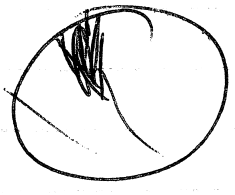
Si 2+

C +

C +

? C+

IAP x >



More to top IAP x >

Fe 2+ all ~60sm

Si 2+ "

Si 2+ "

C + "

C + "

Fe 2+ "

Si 2+ faster, ? time

C + ? time

C 2+ died "

end of pth

IAP Mpth

IAP x >

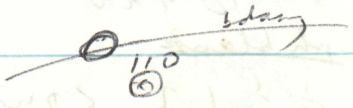
More left IAP x >

More down IAP x >

pth x4 (IAP area top right)

6/2/78

PSW stepper same trip



T 389 off bdary to look @ carbon distribution

10.67 + 1.6 260/550 $6\ 10^{-7}$ Ne /60 ~4000 tons all at same V_{trip}

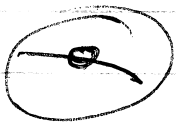
Previously spectrum with blue box (? V_p, V_t, V_n ?) Near 5 110

=>	11	1	267	4
	54	12	268	4
	55	23	269	1
	56	12		
	57	1	240	1
	188	2	451	1
	190	2		
	224	1		
	225	5		
	226	10		
	227	7		
	228	1		
	229	1		
	258	10		
	259	32		
	260	27		
	261	8		
	262	10		
	263	267		
	264	240		
	265	360		
	266	38		

7/3/78 Same tip

ph DIV 10.9 KV

ph blank



ph ½ ½ 1 2 CDV

2 1 ½ ½ DV

where spectrum yesterday (~7 C)

more slightly ½ ½ 1 BIV

1 ½ ½ CDV

7 390 Off same bdary as 389, slightly to right-

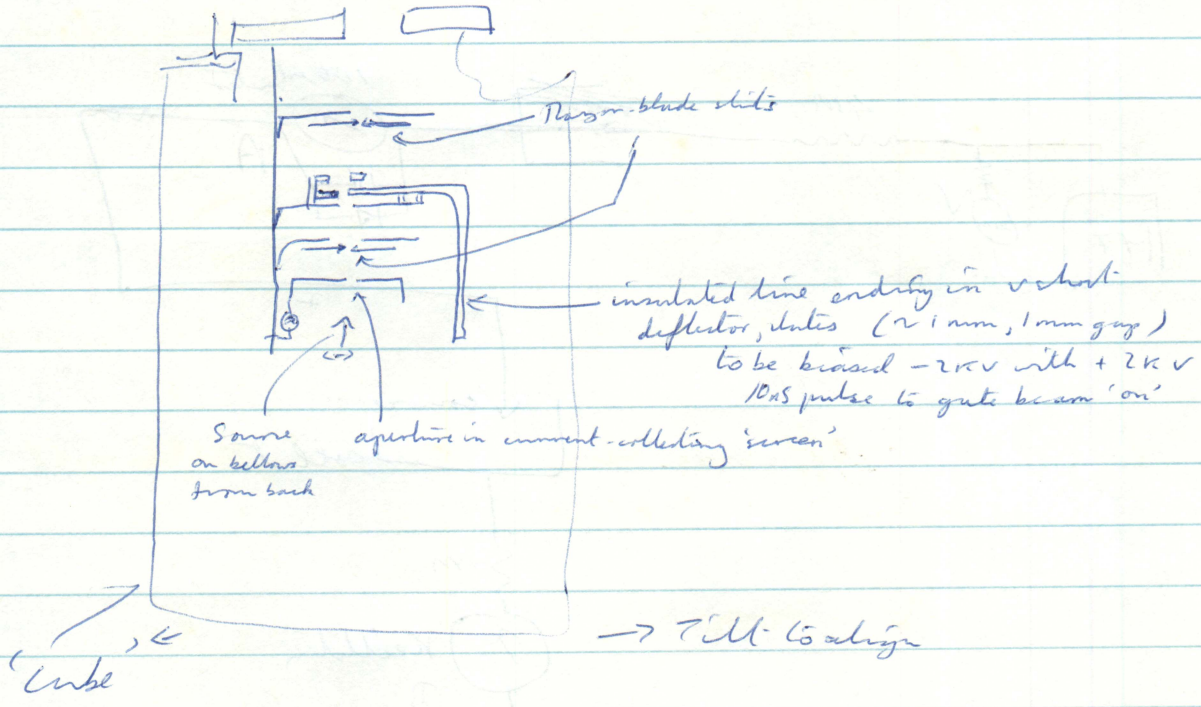
11 + 1.56 260/550

~ 7000 Ω

ph 4 × DIV 11.65 KV @ spectrum place

ph blank

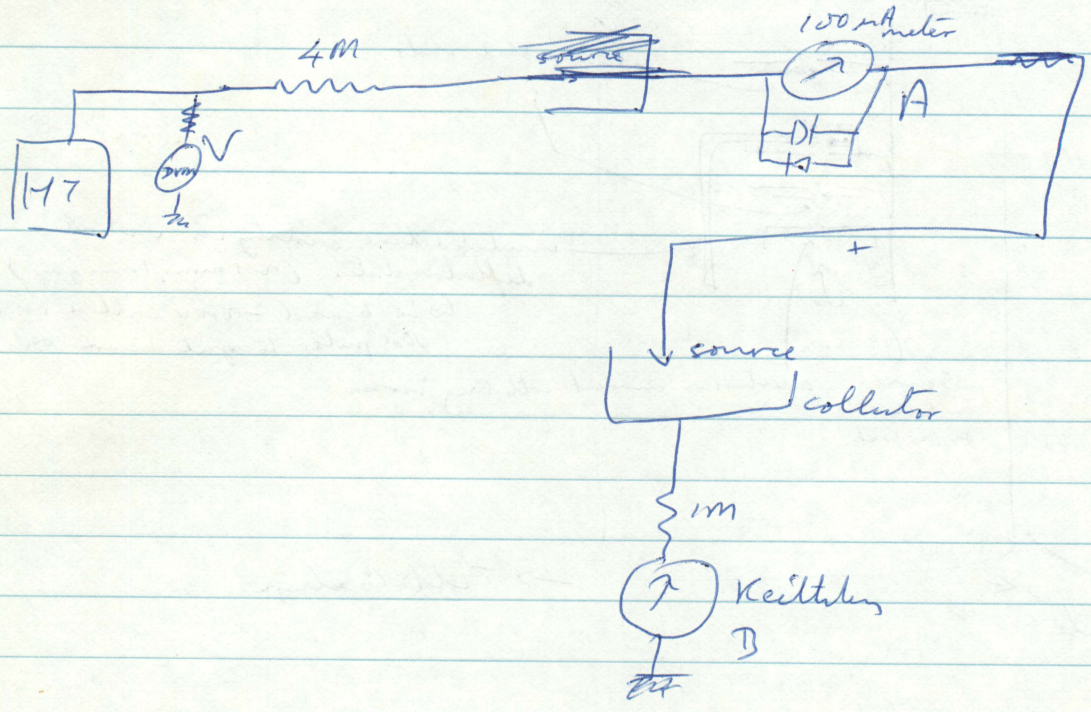
Designing bits of Tri Mass Spectrometer for Carbon Ion sources



& designing interface for KIM

12/2/79

Measuring V/A characteristics of Ga ion source from Kaltman



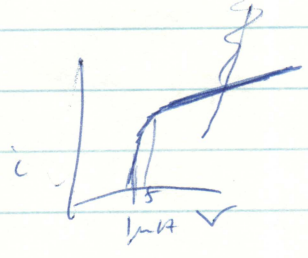
V	A	B
~~8.85~~	1	
9.05	2	
9.26	3	
9.07	4	
8.49	2 μA	$4\ 10^{-7}$ A
8.88	5	$7.9\ 10^{-7}$
9.52	8	$1.5\ 10^{-6}$
9.90	10	7 " — noisy
10.54	10	8 "
9.90	5	4 "

Had to run up to ~ 12.5 KV to get to strike properly.

50 μA meter in HT lead to tip

Kathode to collector via 1MΩ.

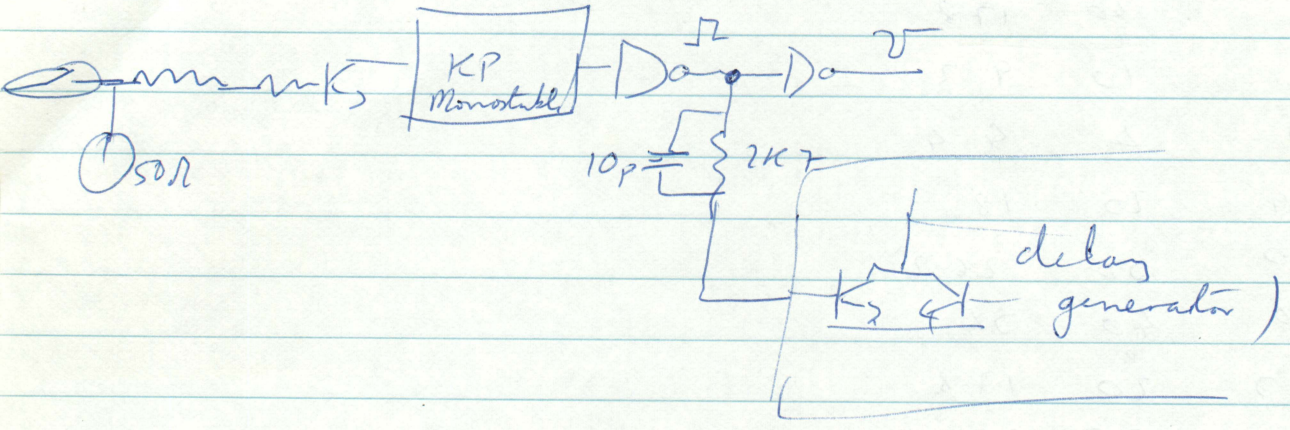
kV	μA	μA
6.60	~~38~~ ~~49~~ 19	17
5.51	~~20~~ 10	9.2
6.64	~~40~~ 20	17.8
7.47	25	22
7.16	20	17.8
8.75	30	26
7.20	20	17.8
6.01	10	9.2
5.51	4	4.4
7.09	20	18
8.80	30	26.2
9.50	40	34
7.27	20	17.8
9.50	35	
9.50	39	
10	48	35
"	45	34
"	47	38
"	41	32
"	45	
6.1	10	
6.09	10	9.3
5.66	5	4.7
5.64	5.5	5.4 after 10 min
5.45		3
5.37		2
5.32		1.5
5.30		1



If approached slowly will run down to ~ 1 μA collector current

Pause for conference (COBS?) at Cavendish – paper + slides.

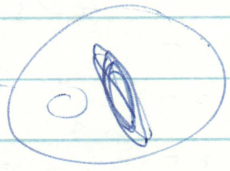
– fixed 1A's electronics (⇒ shorter delay, more stable)



~ 3 April 79

IAP blank
IAP DW < 3 12-3 kV.

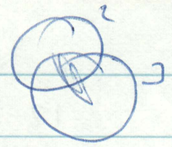
12-3 + 2.6 top of spec —



Zr^{2+} 50s
C^{2+} 50s
C^{2+} 50s 50-57
C^{2+} 60s — slightly quicker
Fe^{2+} 50s — 77-100

640 − 210 = 430 M = 81
C^{2+} = 200 = ≤ 51
C^{+} = 282 = 61
$N^{+}Si^{2+}$ = 304 = 65
C_{18} = 345 = 70
C_{24} = 398 = 75
C_{36} = 488 = 106
PR_{31} = 452 = 102
— ? IAP DIV
Fe^{2+} 30
C^{2+} 40
C^{+} 40
N^{+} 40
C_{18} 40
C_{24} — spoiled (Zr^{2+})
C_{24} 40
IAP × 3
IAP × 3 same carbide
Zr^{2+}
C^{2+}
C^{2+}
C^{2+}
C^{+}
Fe^{2+}
IAP × 1 — IAP N ipln

IAP × 2



More IAP × 2

Fe^{2+} 40 s

C^{2+} "

C^{2+} "

C^{2+} "

Fe^{2+} " — HT sl unstable again.

IAP × 2

More IAP × 4 1 blunt

IAP blank

Fe^{2+} ~30

C^{2+} 4

C^{2+} "

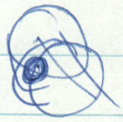
C^{2+} "

Fe^{2+} — ep sparked

Fe^{2+} rapid ~ 4-5 planes, 20 s.

C^{2+} 40

IAP × 2



IAP × 2

Fe^{2+}

C^{2+}

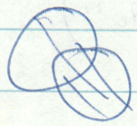
C^{2+}

C^{2+}

Fe^{2+}

IAP × 2

IAP [illegible]



IAP × 2

IAP × 2

Fe^{2+} 40 s

C^{2+} 4

C^{2+} 4

C^{2+} 4

Fe^{2+} 4.

IAP × 3

Dark to carbides @ top of bdary's

IAP ×2

Fe^{2+} 40,

C^{2+} 4

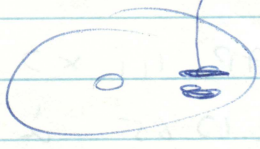
C^{2+} -

C^{2+} 4

Fe^{3+} ^

IAP ×2

ph × ~ ½ dosyn ——



ph blush.

IAP × ¼

Fe^{2+} rapido

- flushed.

IAP Blush.

4 April 19 SAM Ni:Al specs. Spec 9 - broke transferring to mic

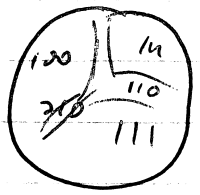
Spec 5 as ground + outgassed 200 C

ph blank

ph x 3

ph Mufish

ph x 4 13.9 KV Ne DW



1 thick

IAP 111 x 3

2.5 + 13.65 in neon.

MAP 111 x 3

Ni 2100 - 640 = 430

Al 60 - 510 = 300

H 80

Ni+ 620 = 830 = 120

Ni 2+ 50

Al 2+ 50

Ni 2+ 40 grinder

Al 2+ 40 -

IAP Mufish 2

Ni 2+

Al 2+

111 still Al 2+

H +

IAP x 3

ph x 4

200 IAP x 3 ordered region central.

Ni 2+ 60s emptying rather slowly.

Al 2+ "

- flashed when tried to increase rate

MAP blank

ph blank

- fell off Ni tube when extracted.

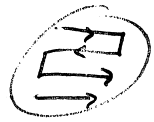
New Specimen

<u>orthodromically dried N. Al</u>

ph ×3   15-2 kV   cumming run.

IAP all around

~ central pole



IAP ×3

~14 + 2·6   — 2 bit up channels

N ²

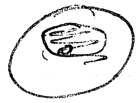
Al ²

N ²

Al ²

IAP ×3

ph ×4   prettier



not whole pattern

15·69 + 2·7.

pulse too small I think,

57 = 470 − 210 = 260 = 32.

no delay line   N ²+   ~50 ← IAP of top of spec, ~420?

13·9 + 2·6   Al ²+   ~34

<u>IAP output</u>   ?

N ¹

Al

N

Al

IAP ×3

IAP ×3 a bit lower

N   20 }

Al

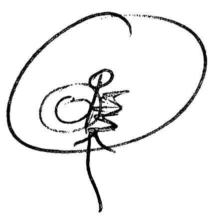
N   faster

Al

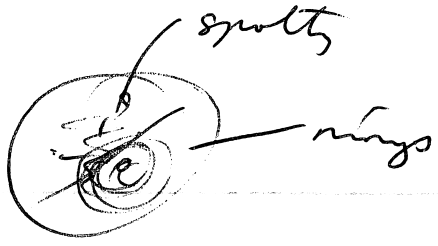
Al

IAP ×3

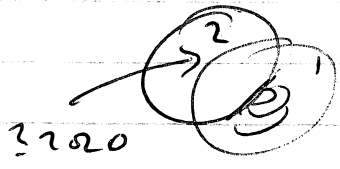
ph ×4



? disordered region



LAP →
Ni
Al
Ni
Al
Al
LAP →
Mn 1/4 1/2 1
LAP →
Ni β
Al
Al
Ni
LAP × 2

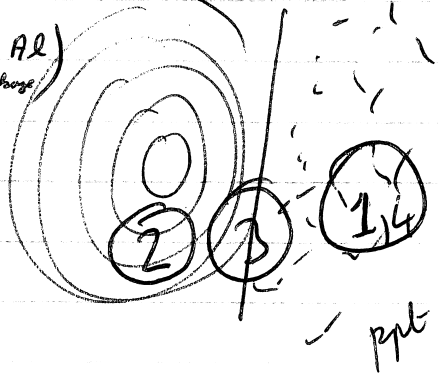


Mean
19.5 + 2.84
Div 17.8

LAP Mg/Ca 4
LAP →
Mn →
Mn →

Spectrum off ragged bit of spec next-door
17.65 + 2.8 420/561 1.10^{-6} Ne/60
Ni^{2+} 325, Al^{2+} 228

4 spectra under identical conditions
1 & 4 off ragged region (⇒ Ni_3Al)
2 off regular region (Ni/11% Al) + garbage
3 off interface



ppt

1 = 27.9 ± 1.9
2 = 11.4 ± 1.2
3 = 28.9 ± 2.1
4 = 27.9 ± 1.5

apparently loosing 45% of initial ion of H.

211 Al
534 Ni
$Ni_{2.57}$ Al
Al 27.9 ± 1.9 %
88 Al
682 Ni
Al 11.4 ± 1.2 %

growth region

Clean Matrix

	①	②	③	④
40	3	12	7	17
44	86	81	85	113
45	127	136	208	208
46	10	6	17	13
67	1	60 1	1	76 2
121	2			99 3
				100 1
				101 1
		144 2		120 2
145	4	145 1	4	122 4
146	43	18	42	134 1
147	101	35	82	145 5
148	67	30	64	146 55
149	4	2	3	147 150
				148 98
				149 2
152	1		1	150 1
153	1			151 1
				154 1
				170 1
156	2			177 2
		178 4		1795
179	1		2	180 1
			2	186 1
194	2			194 2
				1954
		210 1		210 2
211	19	23	17	29
212	100	136	71	140
213	163	203	166	258
214	82	87	79	113
215	21	28	22	29
216	52	74	27	89
217	62	67	50	79
218	14	14	8	6

	①	②	③	④
219	8	8	6	14
220	8	16	8	12
221	5	5	2	4
		222 2	2	1
223	2	1		2
224	1	2	4	4
			225 1	
			227 1	
			296 1	
			298 4	
297 1		1		
	298 2		4	
299 2		4	2	10
300 1		4	2	4
	303 1			301 1
				302 1
304 1			2	
305 1		1		306 1
	307 1			1
308 1				
	674 1			

4
314 HR = 27.88 = 1.5
812 NS
1126

320

196 AE
482 NS
678
= 28.9% = 2.1

Thurs. 5/4/?? — same tip

ph blank

ph × 2

ph × 2

IAP bottom left

Ni 80

Al 60

Ni 20–40 = ~~500~~ 530 250

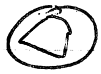
Al 20

? Al

24 = ~~280~~ 60 24 = 270 = 40

24 = Ne 20 +

IAP × 4

IAP × 2 γ' @ top 

Ni – popped

< IAP DW

ph × 2 – γ' visible, pretty

ph Nufilm

ph × lots.

IAP × γ' 22.4 kV

Ni

Al

Ni

Al – dud

Al

Ni

Al – dud ? – arcing & something

Al

IAP Nufilm 5

Ni

Al – pop 28.5 + 2 !!! ↑ run

~~pop~~ IAP × 2 ?

ph.

NB γ' proud of surface, so Ni & Al from ppt, not from matrix, for first few pictures

ph @ DW
ph < DIV] :

ph @ after Ns pulsing in Ne.

→ γ' => spotty after pulsing. 27.5 kV

ph blank

IAP blank

Extract spectrum, still OK.

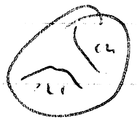
6 April   M AC   Spec 2   10hrs, baked.

15·6KV ph ×> after purge while turning up

ph Manifest

ph ×>

ph ×> < Div



1AP ×> ~ axial ⊘

Ni

Al

Ni

+ 2·5 pulse

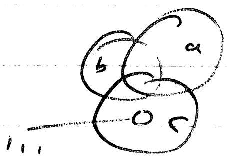
Al

Al

~24 — ~ little .

1AP ×>

1AP



111 1AP × 2   17·42 DIV

Ni   60 sec rapid

Al

Al

1AP ×>

1 AP ×> top left

1AP ×>

Ni   60 sec

Al   "

Al   "

Ni   "

1AP ×>   18·1 KV

~~RMS~~ ~~1AP ×>~~   1AP Manifest 2

~~RMS 1AP~~   ph ×>

(V)

1AP ×>   RMS, γ' @ top of ↑

Ni 60

Al "

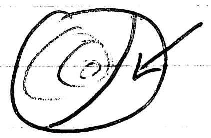
Ni 40 faster

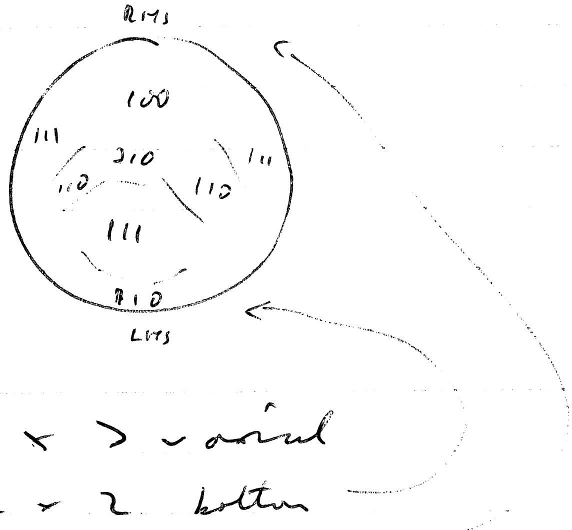
Al "

1AP ×>

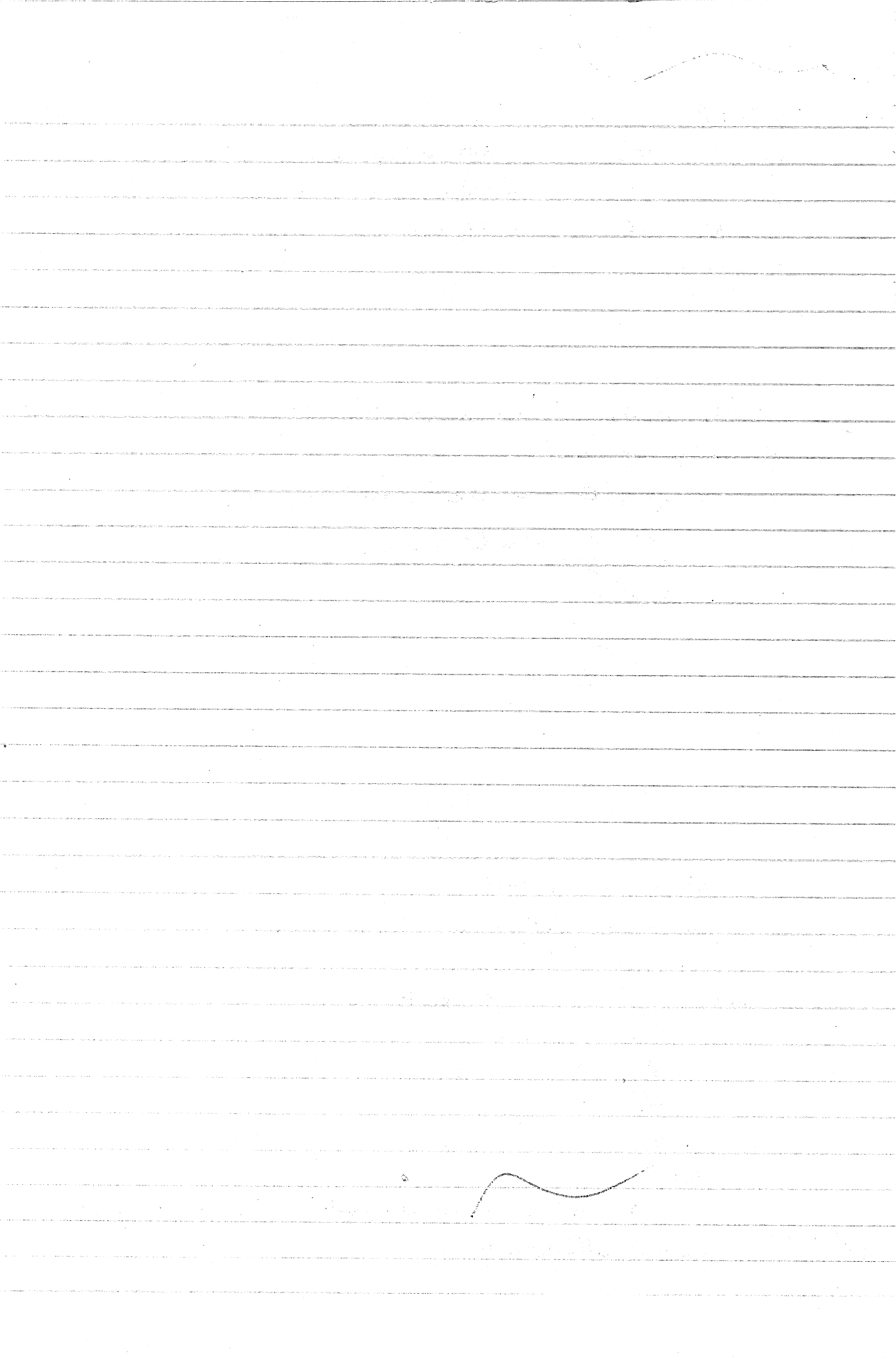
1AP × 2
N_e 50s 2800 v applied to e-p pulses
N_e 50s 4000 v –
N_e 50s 3600 v –
1AP × 2

This to test Walko's theory on noise of e-p of applying large pulse
– set up with mantle vignetting image





ph × 2 – axial
ph × 2 bottom
ph × 2 top
220 1AP × 4 ~ top 1HS
N_e 40s
Al
N_e
Al
1AP × 2
ph × 2 after 45 in a row – 'measles' – dark patches of gl
18·2kV ph × 2 after 2e expo



15/5/79 Ga ion source in TOF machine

V_{Ex} 9.62 KV ~ 5×10^{-7}

$i_{collector}$ 10 μA i_{total} ~ 50 μA

Timebase 1 μS/cm

vert .05/cm + x10 probe = .5 cm

f4 1, ½

Mass (TOF comm) 2

f4 1 ½ ¼ ⅛ 1/16

f 18 1 ½ ¼ ⅛ 1/16

f4 1/16 ⅛ ¼ ½ 1 2 Timebase delayed, 50 nS cm isotopes

f4 2 1 ½ ¼ ⅛ 1/16 1/32 ¼ ⅛ Timebase 2 secs/cm

f4 current measured 6.35 μA i.e. 110 L/s 11.23 KV

set of pics ? Ga_2^+

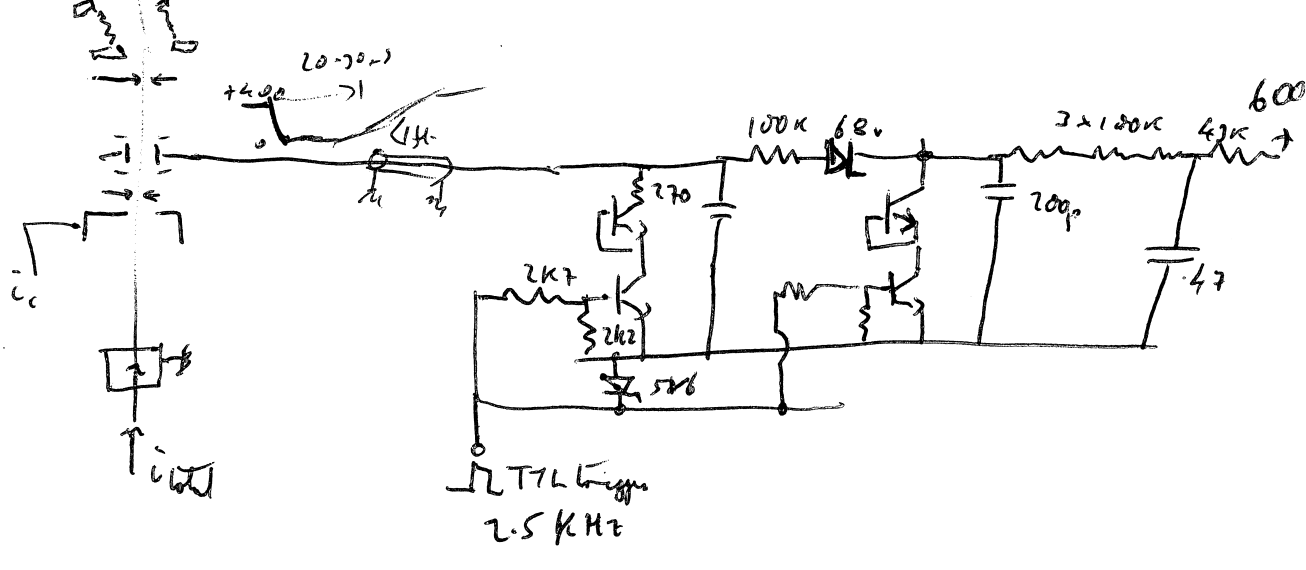
'blank'

Will run down to 7.8 KV at present.

7.8 / 5.6

5.6 / 1.4 / 2.24 / 5.6² / 7.84

These pictures were taken (lens not fitted to spectrometer) with the beam blocked mechanically & chopped across the aperture with avalanche transistor circuit :-



Sodium chromate + acetic acid (Cu 17e polish)
Göttingen

18/5/79 Slit lens added to spectrometer. All @ ~1-2KHz

i_c 5μA i_T ~20μA 11.4KV

$V_{bending}$ -2KV V_{lens} +2KV

ph camera <u>blank</u>

2μS/cm 1 sec f4 vert ~ .8v/cm (???)

½ sec "

<u>ph multi</u> 3

½ ¼ ⅛ 1/16 1/32 2μS/cm

1/32 1/16 1/8 1/4 ½ 1 200nS cm delayed timebase

<u>ph blank</u>

lens 1.85KV tip 10.95 i_c 5μA

2μS/cm, 100nS cm dual

~ max signal 1 ¼ 1/16

less signal 1/16 ¼ 1 better Δm/m

2 1 ½ 1/4 1/16 etc with pulser voltage increased

slightly => no jitter, superb resoln

100nS cm — resolved isotops ~×5

2μS " — overall view.

No sign of Ga_2^+

3 × .5μS/cm.

3 × 1μS/cm.

300nS

4.3μS

$\frac{\Delta m}{m} = \frac{2\delta t}{t} = \frac{.6}{4.3}$

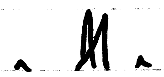
pt Multiplier 4

KV	i_T		
11.57	20	1/10 1/4 1/2 1	
12.12	40	1 ⟶	
~15	100	1/8 ⟶	⟶ Ga_2^{3+}
11.47		8 ⟶ 1	now has Ga_2^+ & spattered ions
12.06	blank 1 sec		
12.06 ~ 80μA		1 1/2 1/4 1/8	

? few others

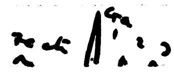
blank.

Now runs @ 8KV (up to 15 KV used)
Dimers persists when volts reduced, i_c ~ 40μA.

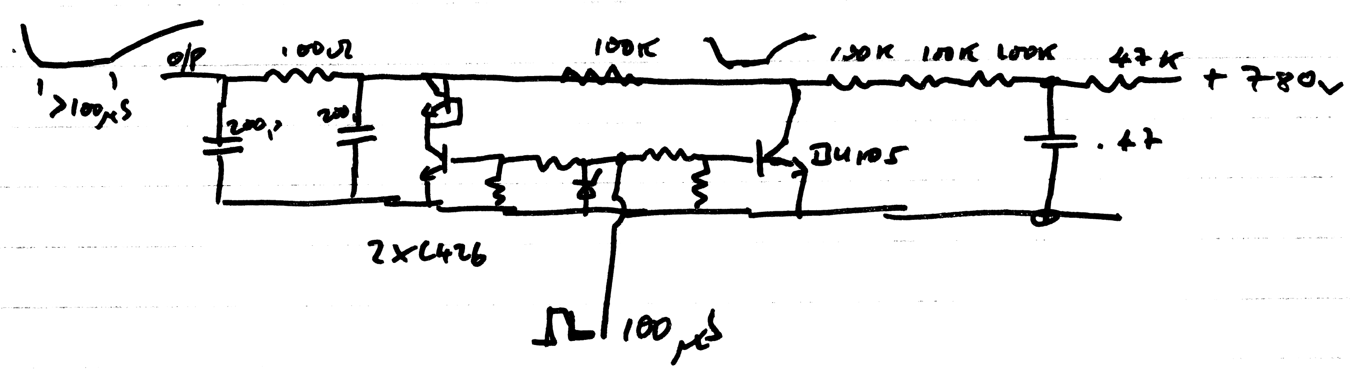
12.06 40μA i_c More of 3 peaks 

(end of film
source runs down to 10.4KV — seems to like getting hot.

Multiplier 5

More peaks 2μS, 1μS/cm of source
running @ i_c ~ 50μA, i_T ≃ 200μA
⇒ Ga_3^+ as well (v small peak) 
— last few peaks with risetime of pulses faster

⟶



Allegedly!

4

19/5/79 | Multi-spun Ru $2 \cdot 10^{-4}$ ~70°

He → no image - ? warm

Ne → image, crypt @ ~ DIV
- ragged surface

ph 3 × (DIV 11.8
3 × DV 12.3

Tip was polished in ± butoxyethanol, 25 v dc (ie just like Ted's)
- etched @ boundaries. If polished in Melmds KOH, or in NaOH,
good & shiny in butoxy.

pop → 144 KV ph × 4

C: 3.6215 -04

13.35+2 320/561

2 (420 179 => 20
(50 320 235 => 20

367 ≥ 48.8 Ru''

49 10	229 26	248 15	329 2
50 68	230 127	249 8	330 2
51 84	231 81	250 4	331 1
52 1	232 20	251 7	332 4
	233 18	252 1	333 2
59 1	234 4	255 2	341 1
71 1	241 5		342 1
202 1	242 59	327 4	
204 1	243 131	324 6	457 1
207 1	244 34	325 3	
2254	245 7	326 10	
2266	246 18	327 1	
2271	247 67	328 2	

KVE² 202 => 28
1.613 × E×E×V

5.029 −04

320/561

3× ph DIV   13:3KV   320/561
13.1 + 2.33

Molto rapido =>

(1)

171	6	328	1
		330	2
225	6	331	3
226	20	333	1
227	39	334	2
228	2		
229	6		
230	94		
231	270		
232	36		
233	12		
234	6		
235	9		
236	1		
242	3		
243	24		
244	67		
245	3		
247	7		
248	9		
249	1		
250	1		
252	1		
254	1		
[illegible]			
325	2		
326	2		
327	2		

0	3
49	22
50	147
51	150
52	1
159 (19)	1
203 (21)	1
204	1
225 (26)	6
226	26
227	16
228	4
229	41
230	361
231 (27.5)	434
232	94
233	51
234	17
235 (28.5)	9
236	1
239	5
241	1
242	49
243 (30.5)	272
244	120

(2)

245	19	459	1
246	18	460	2
247 (31.5)	107	463	1
248	44	499	1
249	13		
250	5	751	1
251	17		
252	4	917	2
253 (33)	1		
255	3		
256	3		
323 (53.8)	4		
324	9		
325	13		
326	10		
327	11		
328	5		
329	10		
330	6		
331	2		
332	3		
333	6		
334	1		
341	1		
342	1		
456	1		
457	1		

225–236	1061	58% a
239–256	681	37% b
323–334	80	4%
341–342	2	
456–463	6	

$\frac{a}{b} = 1.558$

1830

4.824

320/561

Not Ru! – spurs magnetic – spectrum probably Fe/Cr or Fe/Ni
2nd spectrum off dark region (prevents off limits)

49	30
50	243
51	157
52	3
54	2
68	3
69	1
204	2
205	1
206	1
225	16
226	13
227	9
228	3
229	129
230	421
231	122
232	74
233	21
234	14
235	5
236	1
240	1
241	14
242	205
234	197
244	29
245	7
246	60
247	71
248	23
249	6
250	11
251	14
252	3
253	1
254	4
319	1
322	3
323	6
324	11
325	14
326	16
327	4
328	6
329	11
330	2
331	7
332	5
333	2
339	1
340	3
341	2
345	1
347	2
455	1
456	2
459	2
460	1
462	1

3

868 1

Ne 204 – 206 4

225 – 236 856 (5 2%) a

240 – 254 656 (40 2%) b

319 – 333 88 (5 4 2)

339 – 347 9 (1%)

455 – 462 7

$\frac{a}{b} = 1.305$

1620

24.4

Round Robin 55

6·45 + 1

155 / 561

0	1
13	2
67	4
68	38
69	112
70	12
71	3
158	5
159	2
160	1
222	2
238	12
239	46
240	10
242	1
244	1
247	1
251	1
252	2
271	2
280	1
284	3
285	2
286	3
287	1
292	1
297	1

ph blank ph ×3 ~ 6·6 kV

6·46 + 1·16 — 1·35

249	1
300	1
311	1
312	1
316	7
317	31
318	10
319	2
320	3
321	8
322	243
323	562
324	287
325	62
326	66
327	43
328	46
329	161
330	93
331	24
332	23
333	35
334	706
335	1900
336	899
337	229
338	82
339	26
340	54

341	153
342	51
343	15
344	14
345	9
346	27
347	57
348	11
349	8
350	1
351	4
353	8
354	2
357	2
358	1
359	1
365	2
441	1
463	1
464	1
471	1
480	2
491	1
497	1

699	1

end, ph × 1 7·25 kV

end of flight

Going home time (21·25)

20/5/74 Same specimen 160 / Ne $1 10^{-9}$ @ start, cold.

6·96 + 1·15 - 1·25 pulse T 391

60K, $1 10^{-7}$ Ne

170/561

→ 11,100 Ω

all @ same analyser setting

22/5/79 Same spot 520^{-40}

5

TJ92 7 + 1.25 175/561 vacuum 78K

(tip burned up in vacuum, no Ne)

11K ions.

7.J + 1.45? 180/561 78 Vac 29,496 ions 6

0	55	206	13	265	2	312	6044	JJ74		442	1
19	1	207	11	266	1	JJJ	1677			445	1
29	2	208	1	273	2	J14	J87	J091		4469	
62	10			274	J	J15	171	J401		4472	
63	J05	214	2	278	1	316	121	J451		4482	
64	1J00	215	J	289	1	J17	446			4491	
65	1042			29J	1	J18	J·20	J571		4542	
66	12	2211	7	294	JJ	J19	58	J601		456	1
67	4	222	76	295	85	J20	28	J621		4591	
68	2	22J	75	296	JJ	J21	22			4652	
74	1	2247		297	16	J22	118	J701		4661	
78	1	225	1	298	16	J23	175	J941		4671	
87	1	226	4	299	124	J24	38	J952		4691	
88	J	227	1	J00	842	J25	10	4002		4761	
89	1	230	J	J01	1839	J26	12	4021		4941	
98	1	231	1	J02	437	J27	9	4042		5002	
121	2	232	2	J03	201	J28	J0	4062		5141	
134	1			J04	179	J29	6	4251		5741	
139	2	245	1	J05	100	J30	J	4321		5801	
145	2	246	2	J06	J68	J31	2	4341		5982	
147	1	251	1	J07	J51	J32	2	4351		6611	
148	7	252	2	J08	77	J33	6	4372		6871	
153	1	255	1	J09	60	J34	2	4383		7201	
163	1	259	1	J10	296	J351		4392		7231	
192	J	264	1	J11	2675	J361		441	1	7381	

772 | 795 | 819 | 829 | 955 2 1005 2 1006 |

20000 ผิดเร็ว ≈ 3 hrs 225Hz

3 hrs = 3 × 3600 × 10μs = 10^{-1} × 225Hz = ≈20 secs.

Noise level ≈ 1/sec, so expect ~ 20 garbage hits.

ch0 = 55, so ? 2/sec noise on average.

α

Tues 22

ph 8.7 kV 60/Ne

7

7.21 + 2.2 200/580 ~ ...

22,073 wts all at same volts !!! in ≈ 1¾ hrs.

0	54	195	4	275	1	305	22	383	1	618	1
5	1 ??	196	18	278	1	306	63	384	1	620	1
18	1	197	24	279	9	307	141	386	1	630	1
59	20	203	1	280	50	308	51	387	1	639	2
60	309	205	3	281	102	309	20	392	1	642	1
61	1323	210	9	282	29	310	13	394	1	644	1
62	1754	211	63	283	15	311	15	395	1	650	1
63	47	212	114	284	68	312	27	417	1	664	1
64	6	213	23	285	650	313	8	418	2	670	2
66	1	214	7	286	1794	314	5	424	1	681	1
67	1	215	1	287	943	315	1	425	2	715	1
72	1	216	3	288	322	316	1	426	1	734	1
74	1	219	6	289	255	317	9	427	1	785	2
83	1	220	2	290	148	318	2	431	1	795	1
84	2	226	1	291	372	319	7	436	1	804	1
85	2	232	2	292	332	320	2	438	2	820	1
101	1	238	1	293	111	322	1	439	1	875	1
118	1	239	3	294	143	327	1	443	1	903	3
120	1	240	1	295	881	336	1	445	1	919	2
133	1	244	2	296	2482	349	1	459	1	920	1
140	5	251	1	297	5080	353	1	466	1	960	1
141	15	252	3	298	1392	354	1	470	1	995	1
142	4	253	1	299	569	355	1	476	1	1007	2
143	1	254	1	300	212	356	1	477	1	1011	1
164	1	261	2	301	227	362	1	487	1		
181	4	262	1	302	402	366	1	559	1		
182	2	264	2	303	120	372	1	594	1		
184	2	265	1	304	40	381	1	606	1		

Turn down amp threshold to reduce noise ~1/20 secs.

1.49 7.30 +2.30 290/580 again. 60/sec

3.55 −2.43 29,000 odd.

0	22	197	12	283	21	312/23	401	1			
58	2	198	1	284	69	313	6	472	1		
59	1	199	1	285	601	314	6	465	1		
60	239	204	4	286	1916	315	6	467	1		
61	1311	205	2	287	818	316	1	486	1		
62	1627	210	13	288	293	317	3	401	1		
63	28	211	43	289	225	319	1	512	2		
64	2	212	100	240	144	320	2	584	1		
65	2	213	22	291	375	322	1	617	1		
72	1	214	5	292	268	328	1	660	1		
73	2	215	4	293	103	335	2	673	1		
81	2	46	1	294	83	336	1	685	1		
84	2	218	1	295	793	370	2	768	1		
85	3	219	3	296	3936	378	2	889	1		
103	2	220	1	297	4387	380	1	907	1		
106	2	221	2	298	1254	384	1	926	1		
119	2	222	4	299	496	390	1	1002	1		
120	1	224	2	300	160	394	1				
123	1	251	1	301	250	402	1				
140	14	260	2	302	330	404	1				
141	14	262	1	303	147	410	1				
142	5	263	1	304	51	417	2				
147	2	275	2	305	30	418	1				
168	1	276	2	306	86	423	2				
175	1	277	1	307	140	424	2				
183	4	279	9	308	53	425	4				
184	2	280	52	309	23	426	1				
193	1	281	105	310	9	428	1				
196	6	282	22	311	17	430	1				

$5^{10^{-7}}$ Ne / 60 — 7·55 + 2·47 — 200/580

— 7·65 + 2·47

20000 in 1hr 20mins (!)

0	1	235	1	296	4349	324	1
59	3	238	2	297	5761	325	1
60	72	239	4	298	771	326	2
61	326	240	2	299	211	327	2
62	345	244	2	300	109		
63	5	251	4	301	282	344	1
64	1	252	11	302	533	364	1
65	1	253	1	303	98	366	1
66	1	255	3	304	44	378	1
75	1	261	2	305	19	380	1
185	2	273	1	306	98	386	1
189	2	275	9	307	181	387	1
140	2	276	5	308	35	388	1
141	12	279	27	309	17	396	1
143	1	280	76	310	7		
182	1	281	122	311	19	405	1
183	3	282	16	312	25	406	1
195	3	283	12	313	9	407	1
196	13	284	40	314	2	409	1
197	20	285	679	315	4	418	1
198	—	286	2718	316	3	419	1
205	5	287	670	317	9	423	1
210	11	288	198	318	5	425	3
211	30	289	256	319	2	426	2
212	87	290	127	320	1	430	1
213	7	291	474	321	3	432	1
215	1	292	296	322	2	435	2
216	3	293	72	323	1	442	2
218	3	294	76	324	3	443	1
219	3	295	920			451	1

9

Same trip, small probe

12:24
14:00

9.09 + 1.20

60 / 710+ Ne

220/580

10375 Co

0	1	209	1	276	130	308	1
57	3	210	2	277	87	315	1
58	156	211	1	278	156	320	1
59	714	212	1	279	202		
60	151	213	2	280	56	361	1
61	2	216	2	281	54	367	1
63	1	227	2	282	497	375	1
65	2	229	1	283	2039	392	1
80	1			284	2473	396	1
		238	1	285	642	397	1
134	1	240	$10^{20.4}$ Ne	286	258	398	1
135	11	241	6	287	144	399	1
136	1	242	13	288	166		
		243	10	289	194	406	1
174	$5^{10.7}$	244	9	290	62	407	2
175	2	249	5	291	29	411	1
		252	2	292	23	414	1
187	1	255	1	293	78	416	1
188	11 C^+			294	49	423	1
189	6	263	1	295	20	424	1
		264	4	296	4	511	1
195	2	267	15	297	7	708	1
		268	43	298	11	709	2
201	14	269	28	299	5	847	1
202	60	270	7	300	2		
203	54 Si	271	6	301	1		
204	6	272	130	302	2		
205	2	273	598	303	4		
206	5	274	650	304	1		
207	2	275	191				

9.3 + 1.2 220/580 1100 cão 9.14 + 1.2 510⁻⁷/60/16,500

510⁻⁷Ne/60

0	0	271	2	0	3	212	2	275	281	309	1
		272	11			213	7	276	256	314	1
58	13	273	82	58	148	229	2	277	96	332	1
59	64	274	72	59	916	232	2	278	338	324	1
60	13	275	19	60	188	239	2	279	256	365	1
		276	21	61	4	240	12	280	74	369	1
81	1	277	5	62	2	241	22	281	94	372	1
		278	25	65	2	242	25	282	659	373	1
175	2	279	15	81	2	243	7	283	4441	379	1
		280	5	134	5	244	10	284	3301	384	1
187	2	281	7	135	13	245	2	285	952	387	1
		282	34	136	3	246	3	286	476	388	1
201	5	283	277	172		247	2	287	179	390	1
202	3	284	263	173	1	248	2	288	298	392	3
203	3	285	56	174	3	249	2	289	229	393	2
204	2	286	25	175	5	252	3	290	80	396	1
		287	11	187	6	253	4	291	40	398	1
208	1	288	11	188	17	254	2	292	39	400	1
210	1	289	15	189	7	257	3	293	141	401	1
		290	2	195	2	259	1	294	72	405	2
240	2	291	4	197	2	263	5	295	29	406	1
241	2	292	5	201	25	265	3	296	10	409	1
242	2	293	12	202	107	266	3	297	11	412	1
244	2	294	8	203	85	267	21	298	19	418	1
248	1	295	2	204	15	268	70	299	6	427	1
253	1	298	2	205	2	269	53	380	1	423	1
257	2	302	1	206	5	270	17	302	2	429	1
263	2			207	1	271	20	303	6	431	1
268	8			208	1	272	177	305	2	435	1
269	3			209	10	273	1133	306	2	828	1
				210	6	274	889	308	3		

Noise, stop @ 4500 → ∴ increased

5.50 9.9 + 1.2 vac/60 230/580

0	2	265	11	315	1
56	5	266	124	327	1
57	31	267	441	334	1
58	107	268	166	336	1
59	5	269	78	356	1
131	3	270	35	360	1
132	8	271	55	361	1
133	1	272	115	362	1
170	2	273	46	363	1
171	2	274	22	364	1
183	3	275	106	383	1
184	3	276	672	402	1
189	1	277	1440	410	1
191	3	278	419	427	1
196	3	279	159	447	1
197	21	280	62	453	1
198	43	281	69	487	1
199	6	282	81	514	1
201	3	283	25	600	1
202	1	284	16	616	1
204	2	285	10	660	1
205	2	286	44	661	1
206	3	287	20	828	1
223	2	288	8	848	1
224	1	289	7	870	1
227	1	290	4	901	1
233	1	291	5		
260	1	295	2		
261	5	296	2		
262	22	298	2		
263	6	380	1		
264	2	306	1		

240/580 9.90 + 1.2 vac/60.

5532 cars

clean

0	0	263	95
54	1	264	63
55	10	265	46
56	94	266	124
57	188	267	101
58	14	268	26
129	7	269	30
130	4	270	360
167	4	271	1798
168	2	272	967
179	3	273	172
180	6	274	62
181	1	275	51
186	2	276	130
193	23	277	38
194	50	278	16
195	9	279	6
197	1	280	26
198	1	281	42
200	1	282	2
230	2	283	2
231	1	284	3
252	2	285	12
253	2	286	6
256	4	289	1
257	23	292	2
258	6	308	1
259	2	350	1
260	61	387	1
261	304	396	1
262	511	401	1

east-dry
4/5/79

240/5800 9.83 + 1.2 tuned up in race 510 °° cold
5 10.09 + 1.3 22,900 old

0	29	198	6	266	448	345	1
55	58	199	5	267	351	346	1
56	287	200	1	268	118	350	1
57	705	202	1	269	211	356	1
58	32	203	3	270	1914	360	2
60	2	204	2	271	6801	376	1
64	1	205	3	272	2960	378	1
68	1	220	2	273	818	379	1
77	1	222	1	274	427	380	2
93	2	223	2	275	301	387	2
127	2	229	1	276	449	406	1
128	7	230	4	277	145	432	2
129	21	231	6	278	60	465	1
130	9	232	1	279	71	486	2
152	1	239	2	280	133	702	1
166	3	241	2	281	119	721	2
167	6	251	2	282	37	742	1
168	5	252	7	283	18	745	2
178	2	253	1	284	14	758	1
179	9	254	1	285	26	901	1
180	21	255	16	286	8	910	1
181	4	256	68	287	4	928	1
188	1	257	97	288	5	930	2
189	1	258	25	289	5	943	1
191	2	259	38	290	5	956	1
192	23	260	264	291	2	993	1
193	95	261	1389	294	1		
194	165	262	1711	298	1		
195	21	263	401	304	1		
196	7	264	273	307	1		
197	10	265	234	308	2		

N M

3.46 10-2 + 1-3 Var 78 rapido 250/500 20000 all@ 1v.
4.23

4.33-454 21min/20K sec 250/580
9.2+2.3 molto rapido! Var 78

0	4	1982	271	372	3811	1944	266	5610	374	2
44	1	1992	272	52	3911	19610	267	1171	388	1
50	2	2004	270	19	4771	197 2	268	368	392	1
54	24	2142	274	60	5881	199 2	269	178	393	1
55	208	215 2	275	187	8822	200 1	270	406	395	2
56	540	225 3	276	56	0 - 4	2145	271	265	396	1
57	17	2264	277	14	50 1	215 2	272	57	740	1
76	1	234 3	278	6	54 52	218 2	270	30	786	1
125	2	235 1	279	14	55 443	224 1	274	68		
126	4	248 1	280	25	56 629	226 2	275	101		
127	26	250 10	281	3	57 38	230 2	276	52		
128	1	251 71	282	1	76 2	234 2	277	11		
132	2	252 74	283	2	125 7	237 3	278	6		
156	1	253 27	284	5	126 14	247 1	279	14		
163	1	254 19	285	1	127 13	248 2	280	11		
164	4	255 217	286	1	1287	250 17	281	4		
175	1	256 1724	297	1	136 1	251 121	282	2		
176	16	257 1614	300	1	163 4	252 107	283	4		
177	11	258 252	302	1	164 4	253 26	284	3		
178	1	259 228	303	1	1652	254 21	286	1		
183	3	260 152	307	1	1672	255 383	335	1		
188	4	261 554	309	1	175 1	256 2380	346	1		
189	57	262 301	339	1	176 15	257 1547	347	2		
190	183	263 64	344	1	177 10	258 340	350	1		
191	38	264 271	345	1	178 2	259 244	353	1		
192	3	265 2765	347	1	188 2	260 202	359	1		
193	8	266 7369	368	1	189 71	261 564	363	1		
194	3	267 1543	372	1	190 187	262 223	364	1		
195	2	268 230	373	1	191 41	263 107	368	1		
196	4	269 124	374	2	192 5	264 381	370	1		
197	2	270 362	380	1	193 6	265 3378	372	1		

4:33 – 21 mins per 20k cons. 9.00 + 2.3 VAC 78 22,990
4:54
5:08 – 6:39 1hr 30 per 22k 250/580

0	2	195	4	268	132	379	2
52	2	196	1	269	87	380	4
53	4	197	4	270	367	386	1
54	135	199	1	271	353	387	1
55	1828	215	2	272	37	388	1
56	2467	218	1	273	19	392	1
57	112	226	7	274	55	395	2
58	1	227	1	275	160	586	1
59	2	233	1	276	44	900	1
61	1	234	4	277	8		
65	1	237	1	278	5		
75	1	246	3	279	17		
76	6	247	5	280	20		
99	1	250	9	281	1		
125	2	251	83	282	1		
126	19	252	75	283	5		
127	18	253	21	284	5		
164	8	254	7	285	5		
175	2	255	190	286	3		
176	22	256	1756	289	1		
177	12	257	1481	308	1		
178	1	258	165	317	1		
182	2	259	204	344	1		
183	3	260	120	350	1		
184	7	261	510	360	1		
189	48	262	242	361	1		
190	149	263	58	364	1		
191	27	264	220	367	1		
192	1	265	2608	369	1		
193	6	266	6563	373	1		
194	2	267	1122	374	2		

↓ Discovered noisy furnace in Mund Room → interference on mains.
Stopped before this run.
$4 \cdot 10^{-10}$ @ end of day.
(No Me all day)

hi Cr?

H I J K

Next day Fri 25/5/79 Luminosity in vac $4\ 10^{-10}$ cold 3 or 4 per sec.

1237 9.01 + 2.3 Vac 78 250/580

1.30 5500 1st run 6500 2nd 5500 3rd 5500 4th 225 | | 2 |

0 0 1 3 226 1 275 41 44 39 44

52 1 233 2 276 11 19 14 11

53 9 277 1 2 4 2

54 94 56 28 39 241 2 8 4 33

55 400 565 576 644 249 1 246 1 279 7 5 3 8

56 578 937 971 1010 250 9 2 1 280 6 4 1 6

57 20 50 53 42 251 27 17 21 13 2 1 1 2 284 1

59 1 58 1 252 14 34 17 21 2

67 1 2

75 1 253 2 7 3 3 283 5 2 2 1

76 3 1 2 254 12 7 2 1 284 2 1 2 2

92 1 255 126 74 38 31 25 1

126 4 6 3 1 256 420 414 323 332 286 1 1

127 6 6 3 10 257 304 407 292 347

1 258 47 54 56 54

164 4 2 259 52 68 41 38

175 1 260 42 27 27 23 316 1 2

317 2 1

176 4 6 4 4 261 113 112 104 121 318 1 1

177 3 5 2 4 262 55 73 70 57 339 1

347

178 1 263 31 14 16 11 368 1 1 361 1 348 1 1

182 2 183 1 264 184 31 26 37 369 1 1

184 2 3

189 13 188 2 1 18 6 10 265 873 682 440 506 274 2 1 1 373 1 371 1 373 1

190 27 55 36 23 266 1407 1780 1493 1444 378 2

191 17 8 9 4 267 248 367 360 333 380 1 2

193 2 192 1 2 1 144 1 268 38 67 40 38 381 1 2 2

196 2 1 269 32 24 23 21 397 1 1 385 1 1

197 1 1 3 270 95 96 72 71 408 1

200 1 1 144 1 271 71 98 83 82 415 1

210 1 272 8 13 6 11 607 2

214 4 2 273 3 7 3 3

274 3 11 13 7

G

ph ← little bit into [illegible], near beginning.

×3 < DW

×3 DW ~ 10.5 KV

×3 DW after emptying in Ne, ~ quality, 78 K.

F

$4\,10^{-5}$ 8000 Take out specimen & outgas @ 250°C. Replace

Ne $1\,10^{-7}$ background, 78, 8.8 + 2.3 250/580 | 78 10,500

0	1	257	313	365	1
52	41	258	461	373	1
55	323	259	40	375	1
56	613	260	48	379	1
57	60	261	45	381	1
62	2	262	103	382	2
67	1	263	101	389	1
126	4	264	13	397	1
127	1	265	62	404	2
176	2	266	529		
177	5	267	1534		
178	3	268	674		
189	2	269	40		
190	12	270	42		
191	22	271	68		
192	1	272	95		
194	2	273	14		
203	1	274	4		
226	2	275	11		
227	2	276	31		
228	1	277	35		
238	1	279	2		
251	1	280	4		
252	16	281	3		
253	26	283	3		
254	3	318	2		
255	9	319	2		
256	58				

Gas out $1\,10^{-9}$ 9.25 + 2.3 250/580

0	0	184	1	263	56	378	1
53	1	188	2	264	155	380	2
54	49	189	30	265	1807	381	2
55	759	190	60	266	2712	387	1
56	1139	191	18	267	629	394	1
57	38	192	4	268	336		
76	2	193	5	269	129		
78	1	196	4	270	186		
126	7	200	2	271	158		
127	6	210	2	272	25		
128	2	215	2	273	17		
152	1	226	1	274	45		
162	2	246	1	275	93		
164	3	247	5	276	19		
176	4	250	3	277	10		
177	1	251	37	278	3		
178	3	252	39	279	12		
183	3	253	20	280	9		
		254	16	283	1		
		255	162	284	5		
		256	953	285	3		
		257	596	286	2		
		258	181	309	1		
		259	106	363	1		
		260	79	364	1		
		261	254	374	1		
		262	86	376	1		

Mon 29/may

9.1 – 9-22 +2.3 78/Vac 110^{-9} (no ne locking) 250/580

?, 2.10, 2.28, 2.54, 3.22, 3.49, 4.16, 4.44, 5.13, 5.43, 6.15 Stop @ 6.30

11 × 10,000 +5000

H gated out @ ~100,000 – inadvertently left debug time onto spectrum.
~ 5 secs worth 22–75 range (orbit)

0	8 (!)	71 2	176 87	212 4	258 1167	282 7	342 2
16	1	72 1	177 64	214 8	259 920	283 16	343 1
17	9	73 1	178 4	215 10	260 863	284 25	344 1
18	29	74 1	179 1	217 1	261 2294	285 3	345 4
19	2	75 8	183 12	224 1	262 820	286 4	346 4
20	1	76 43	184 3	225 6	263 403	287 2	347 2
21	1	77 12	187 3	226 11	264 2928	289 2	348 3
etc	48 12 / 49 17 / 50 0 / 51 4 / 52 11	84 2	188 43	230 1	265 7050		349 3
53	53	92 2	189 263	233 5	266 5678	292 1	350 1
54	2186	97 1	190 686	234 6	267 4454	293 2	352 1
55	2184		191 100	237 1	268 1190	296 2	353 1
56	7494	125 14	192 22	245 3	269 678	297 3	361 1
57	676	126 55	193 40	246 11	270 1833 1833	299	362 1
58	14	127 54	194 7	247 19	271 1141	303 1	363 1
59	90	128 4	195 2	248 4	272 216	305 2	364 2
60	49	131 1	196 10	249 9	273 143	306 2	365 1
61	73	132 2	197 26	250 93	274 368	315 6	366 4
62	53	156 1	198 1	251 413	275 699	316 9	367 3
63	50	162 2	199 199	252 330	276 150	317 26	368 4
64	14	163 6	200 4	253 49	277 49	318 2	369 2
65	11	164 15	202 4	254 160	278 41	319 1	370 7
66	5	165 2	208 1	255 2139	279 107		371 2
67	1	174 3	210 3	256 8280	280 47	338 3	372 10
		175 14	211 1	257 5044	281 9	339 2	373 21

374 22
375 5
376 2
377 2
378 6
379 32
380 42
381 12
382 3
383 3
384 2
385 9
386 21
387 14
388 2
390 2
392 2
393 2
395 3
396 2
401 1
402 1
403 1
405 2
493 1
645 1
703 1
905 1
990 1

E

W, Th, F assembling KIM, exchanger, etc.

Fri

Discovered Timer Ch 2 possibly not accessed by Dhe box during previous runs, as set to hold. ? Effect on accuracy.

So 9.2 – 9.25 + 2-3   78   5×10⁻¹⁰ vac (no ne).   250/580

20K words in 1½ hrs.

0	3	183	3	254	110	282	5	380	7
53	4	184	1	255	307	283	8	381	3
54	373	186	3	256	1263	284	2	382	1
55	2303	187	3	257	557	285	2	383	1
56	4222	188	10	258	210			384	2
57	607	189	29	259	168	295	1	386	2
58	2	190	63	260	177	301	1	398	1
59	1	191	8	261	402	307	1	400	1
60	5	192	1	262	238	313	1	402	1
62	2	194	4	263	437	314	1	403	1
72	1	196	4	264	852	315	2	476	1
73	1	197	2	265	3060	316	1	479	1
75	2	199	2	266	3694	317	3		
76	8	201	1	267	561	337	1		
77	2	210	2	268	280	340	2		
125	3	211	2	269	162	343	1		
126	7	214	1	270	352	347	2		
127	7	226	1	271	135	365	2		
128	1	243	1	272	66	367	1		
130	1	245	1	273	51	371	3		
164	2	247	2	274	90	372	4		
174	1	248	1	275	102	373	10		
175	4	249	3	276	77	374	4		
176	13	250	19	277	15	376	3		
177	3	251	59	278	14	377	2		
178	1	252	80	279	16	378	4		
182	1	253	23	280	4	379	10		

D

total 100   20K in 1½ hrs.

Grate out H speed up rate slightly   9.6 + 2.3   250/580   vac 78

0	2	213	1	270	578	345	3	617	1
68	2	215	1	271	167	348	2	812	1
76	7	218	1	272	92	349	2		
77	1	225	1	273	55	360	1		
125	3	226	1	274	171	362	1		
126	10	232	1	275	145	364	1		
127	7	233	1	276	43	365	1		
128	1	239	1	277	18	367	3		
163	1	245	1	278	15	369	1		
164	2	247	4	279	25	371	3		
165	1	248	2	280	15	372	3		
174	1	249	3	281	2	373	7		
175	5	250	24	282	2	374	6		
176	14	251	92	283	9	375	4		
177	6	252	49	284	6	376	1		
178	2	253	21	285	4	377	3		
183	2	254	71	286	1	378	8		
184	1	255	594	287	1	379	6		
187	1	256	1883	288	1	380	7		
188	4	257	638	289	1	381	1		
189	51	258	361	305	1	382	1		
190	101	259	192	306	1	385	4		
191	22	260	269	314	1	386	7		
192	5	261	526	315	1	387	1		
193	7	262	317	316	2	388	1		
194	6	263	245	317	4	396	1		
195	1	264	1099	318	2	397	1		
196	4	265	5601	338	2	399	1		
198	2	266	5037	339	2	402	1		
199	2	267	996	341	1	411	1		
200	1	268	482	343	3	491	1		
202	2	269	262	344	2	550	1		

C

20K all @ 9.8kv +2.3 quickie

9.8 + 2.3   250/580   vac 78

0	4	215	1	275	128	366	3
75	1	226	2	276	37	368	1
76	6	234	1	277	28	369	1
125	2	246	3	278	19	370	1
126	8	248	1	279	14	371	5
127	8	249	2	280	15	372	8
128	1	250	22	281	7	373	11
144	1	251	97	282	2	374	3
163	3	252	49	283	6	376	2
164	6	253	21	284	7	377	3
174	1	254	70	285	3	378	4
175	1	255	620	288	1	379	5
176	9	256	1863	303	1	380	8
177	4	257	717	304	1	381	1
178	1	258	299	308	3	382	1
180	1	259	189	314	1	384	1
187	1	260	301	315	1	387	1
188	6	261	530	316	1	393	1
189	53	262	323	317	1	394	1
190	112	263	243	339	2	402	1
191	9	264	1111	340	1	596	1
192	7	265	5389	342	1	894	1
193	3	266	5209	344	2		
194	8	267	1063	346	1		
196	7	268	313	348	1		
197	4	269	258	349	3		
198	2	270	583	351	1		
199	2	271	178	356	1		
200	1	272	97	359	1		
214	1	273	64	362	1		
		274	160	364	2		

D

4.10 - 5.10
10.2 + 2.3 650/580
~ 7-10/sec

0	2	224	1	270	72	340	1
74	1	225	1	274	163	344	1
125	2	226	4	275	164	345	1
126	9	234	3	276	23	348	1
127	7	237	1	277	4	350	1
128	2	238	1	278	22	362	1
131	1	243	1	279	41	365	1
132	1	245	1	280	7	368	4
160	3	247	1	281	7	369	1
164	6	250	22	282	3	370	1
174	2	251	87	283	4	372	4
175	6	252	45	284	8	373	2
176	4	253	11	285	3	375	1
177	3	254	33	286	3	377	4
182	1	255	543	287	3	378	4
184	1	256	2105	288	3	379	3
188	9	257	664	289	2	380	6
189	55	258	216	296	1	381	1
190	103	259	192	298	1	382	1
191	1	260	257	302	1	383	1
192	1	261	635	305	1	384	1
193	6	262	306	306	1	385	1
194	4	263	301	307	1	386	3
195	3	264	1179	308	1	389	1
196	6	265	4957	309	1	392	1
197	2	266	5922	315	3	393	1
198	1	267	423	316	2	394	2
199	1	268	199	317	1	395	2
213	1	269	189	323	1	402	1
214	2	270	617	324	1	549	1
215	3	271	199	326	1		
216	1	272	65	342	2		

A

10.7 + 2.3 250/580
5.20 rapido — flushed. ~ 10-20/sec

0	1	266	569				
117	1	267	53				
126	2	268	42				
127	1	269	18				
131	1	270	64				
177	1	271	22				
187	1	272	8				
188	1	273	6				
189	8	274	11				
190	3	275	19				
196	2	276	4				
213	1	277	3				
215	1	278	2				
225	1	279	6				
234	1	280	1				
247	1	282	1				
250	2	283	2				
251	16	287	1				
252	2	289	1				
253	1	293	1				
254	1	306	1				
255	61	308	1				
256	218	343	1				
257	62	379	1				
258	32	386	1				
259	13						
260	39						
261	54						
262	30						
263	28						
264	149						
265	553						

C 12, 1%

O 16

Ne^{+} 92% 8%

20 22

	Tc^{+}	%	Tc^{++}	Tc^{3+}
Tc	46	7.9	23	15.3
	47	7.7	23.5	15.6
	48	73.5	24	16
	49	5.5	24.5	16.3
	50	5.3	25	16.6

		%			Ru^{3+}
Ru	96	5.7	Ru^{2+}	48	32
	98	2.2		49	
	99	12.8		49.5	
	100	12.7		50	
	101	16.9		50.5	
	102	31.3		51	
	104	18.3		52	34.6

	Ir^{+}	%	Ir^{2+}	Ir^{3+}
Ir	191	38.5	95.5	63.6
	193	61.5	96.5	64.3

		%		
W	180	0.1	(60)	(45)
	182	26.4	60.6	45.5
	183	14.4	61	45.75
	184	30.6	61.3	46
	186	28.4	62	46.5

Ta	181	100	90.5	60.3	45.25

1.613 V e^2

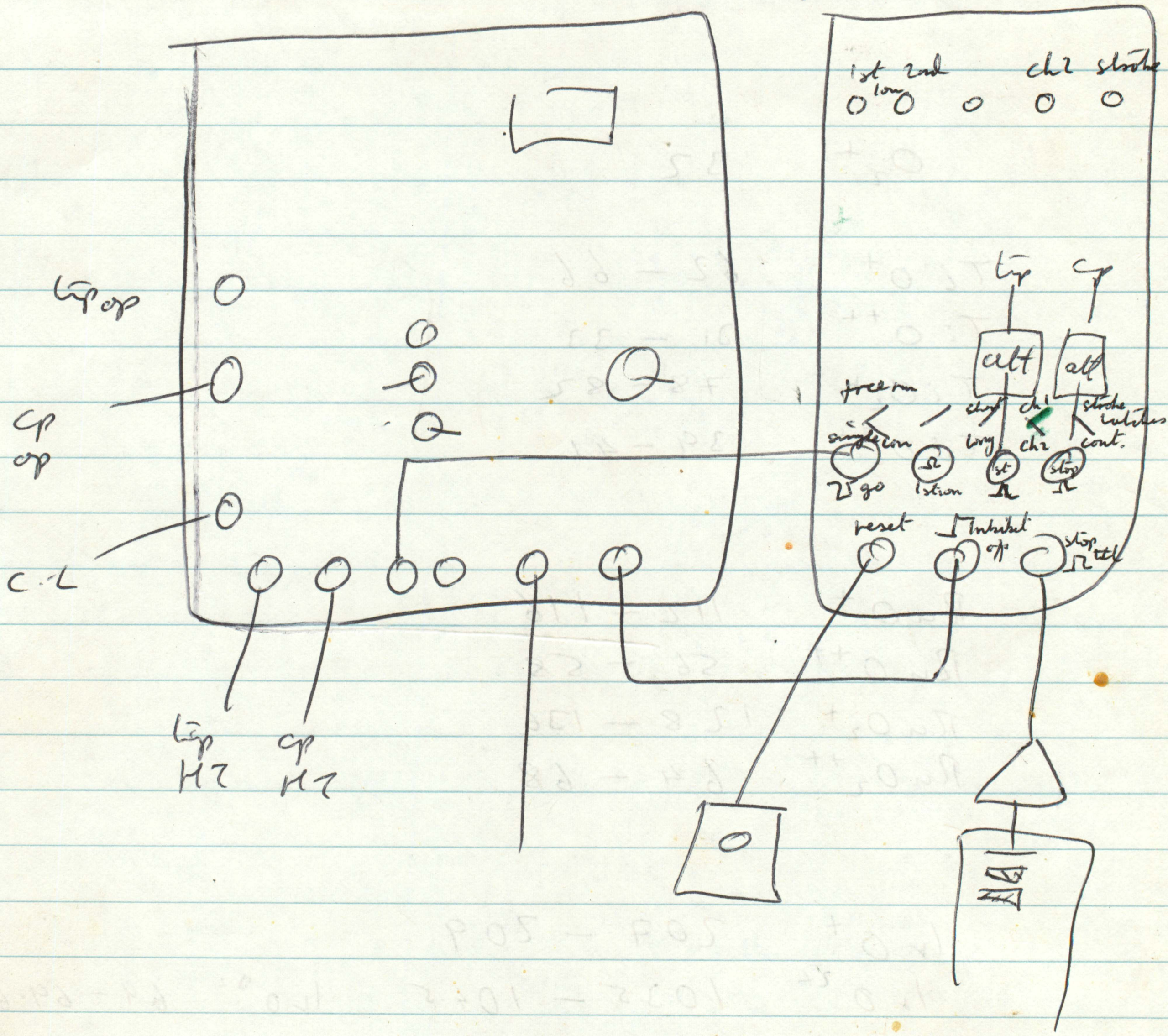
O_2^+ 32

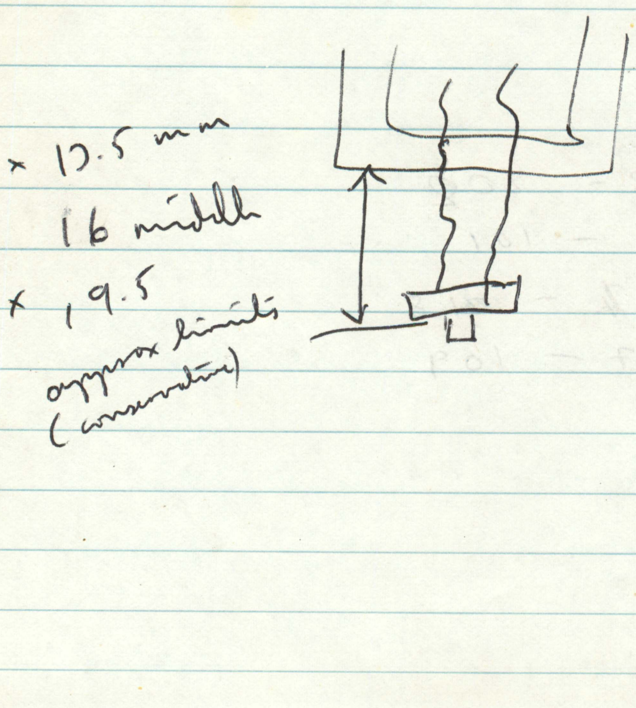
TiO^+ 62 – 66
TiO^{++} 31 – 33
TiO_2^+ 78 – 82
TiO_2^{2+} 39 – 41

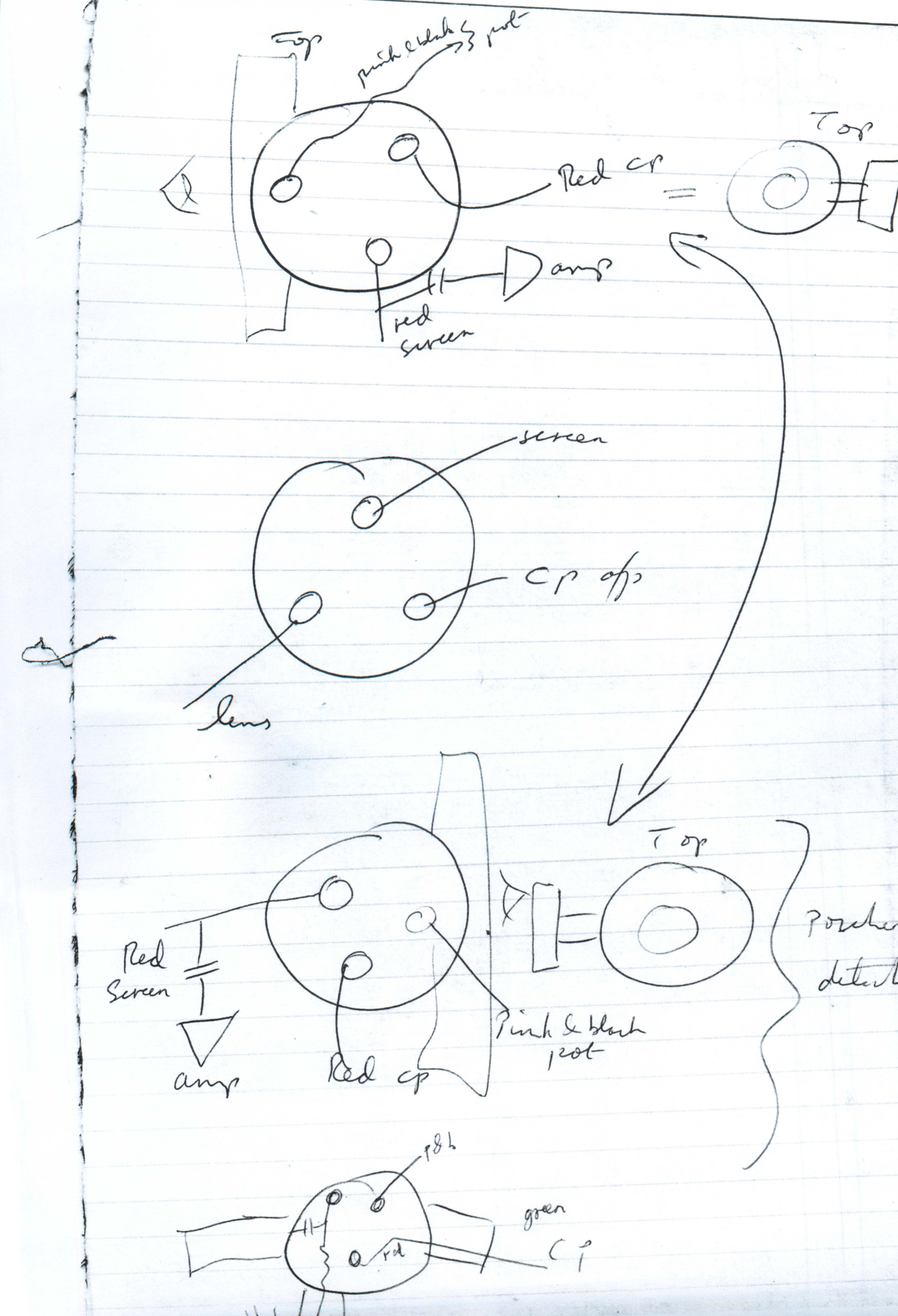
RuO^+ 112 – 116
RuO^{++} 56 – 58
RuO_2^+ 128 – 136
RuO_2^{++} 64 – 68

IrO^+ 207 – 209
IrO^{2+} 103.5 – 104.5 IrO^{3+} 69 – 69.6
IrO_2^+ 223 – 225
IrO_2^{++} 111.5 – 112.5 IrO_2^{3+} 74.3 – 75

WO_2^+ 198 – 202
WO^{2+} 96 – 101
WO_2^+ 214 – 218
WO_2^{2+} 107 – 109


1st
2nd
long
ch2
strobe
alt
alt
free run
single con
stop
ch1
ch2
strobe
cont.
go
reset
stop
C.L


× 17.5 mm
16 middle
× 19.5
approx limits
(conservative)


Top
pink & black pot
Red cp
=
Top
amp
red screen
screen
cp cap
lens
Top
Red Screen
amp
Red cp
Pink & black pot
Porch
pink
green
cp