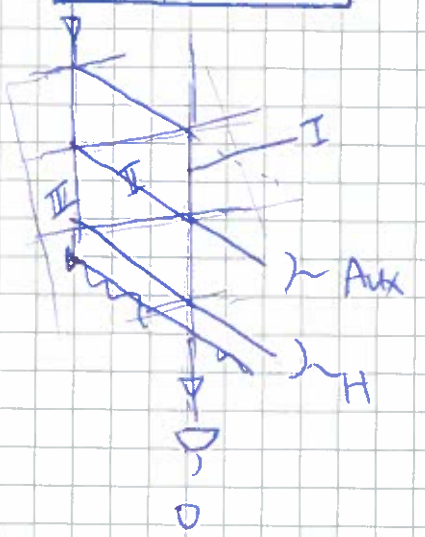
2025/9/26




Robot 2 position for double Cd.

Zin: 292012

Zout: 199560

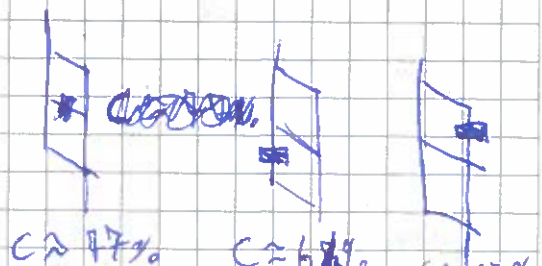
| No. | Position | Block path | Open path. | |
|---|---|---|---|---|
| 1 | -27000 | 1 | 2-3 | ▷ IFG PS2 |
| 2 | 0 | 2 | 1-3 | ▷ IFG PS1 and PS2 |
| 3 | 94k | 3 | 1-2 | ▷ IFG PS3 |
| 4 | 48500 | 1-2 | 3 | ▷ ~~IFG PS~~ |
| 5 | 72500 | 2-3 | 1 | ▷ |
| 6 | 25700 | 3-1 | 2 | ▷ |

Run IFGs for each double Cd blocker position

iFg2_3p20s_B2_26Sep1859.inf

⋮

iFg1_3p20s_B3_27Sep1536.inf




27/09/2025

Run camera mauserements of the new aperture


$y = 19.5$ $z = 15$ (?)

iFg2_3p200s_B1 27Sep2010.inf

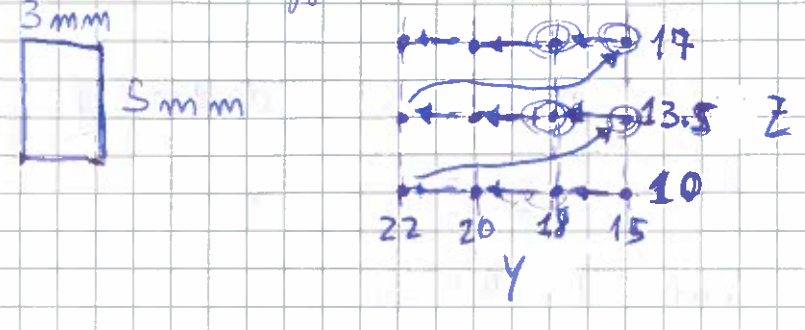
⋮

iFg1_3p200s_B3_28Sep1327.inf

2

28/09/2025

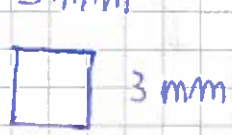
* Scan different aperture positions and size




Aperture_scan_ifg1_3p30s_28Sep1825.inf

Should be 2

Repeat scan during night with smaller aperture



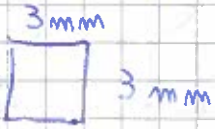

Aperture_scan_ifg1_B_3p40s_28Sep inf

Aperture_scan_ifg2_B_3p40s_29Sep0307.inf

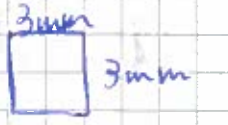
29/09/2025

Aperture_scan_ifg1_B3_3p40s_29Sep1122.inf

Try aperture pos

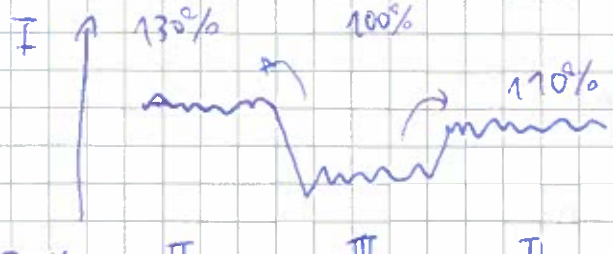



Z = 10 Y = 19 — ①




Z = 13.5 Y = ~~18~~ 19 — ②

①, ② have the same intencities tendency




when consider $I_{II}$ is 100%

$I_{II}$ is ≈130%

$I_I$ is ≈110%

D:\doc_dias_double_Cd_90deg_fast_29Sep1846.inf

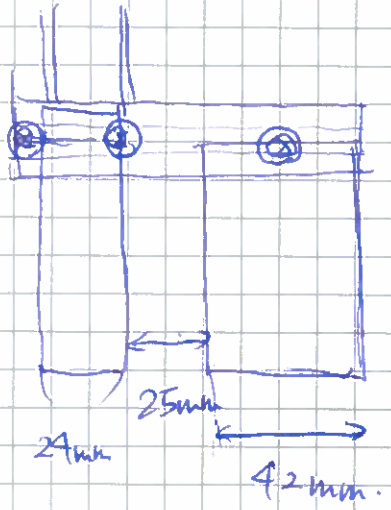
change phase shifter with 5mm quats


previous phase shifter has 55mm height
(quarts or saphire)

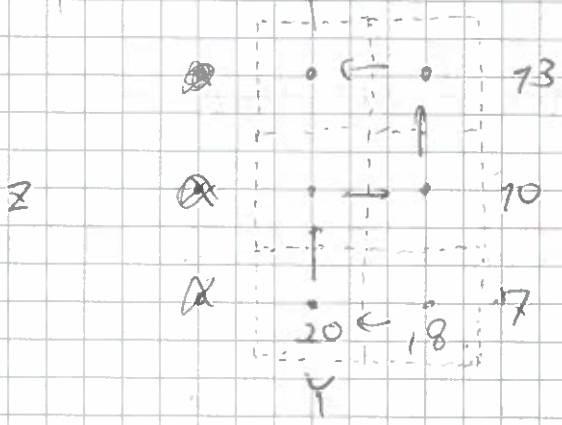
↳ change the height of phase shifter holder.

roughly 1° gives 1 period

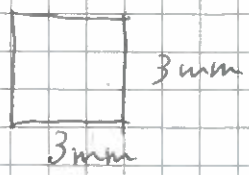
double-Cd absorber setting back




| No | Blade Path | position |
|---|---|---|
| 1 | I | -21,000 |
| 2 | II | 5,000 |
| 3 | III | 95,000 |




Aperture size 3x3 mm



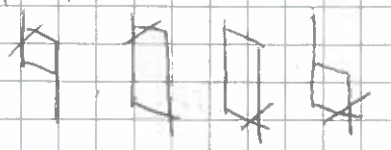

position sweep scan.

6 position

×

4 IFG

▸24 condition



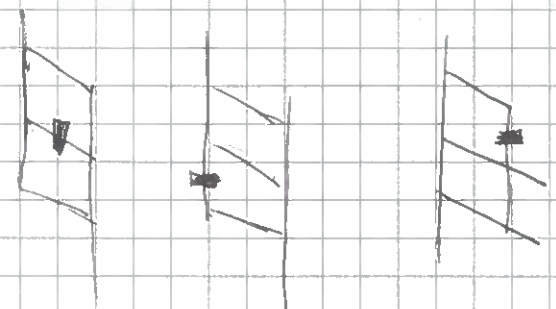
4 30/09/2025

Aperture_scan_ifg2_newPS_B1_2pS0s_29Sep2253.inf

Aperture_scan_ifg1_newPS_B3_2pS0s_30Sep0524.inf

APERTURE SETTINGS:


y = 19 z = 8.5



~73% ~64% ~64%

IFGs look unstable despite good contrast, changed room temperature to 23°C

Run aperture scans during night.

Aperture_scan_ifg2_newPS_B1_2p30s_30Sep1837.inf

Aperture_scan_ifg1_newPS_B2_2p30s_01Oct0836.inf

01/11/2025

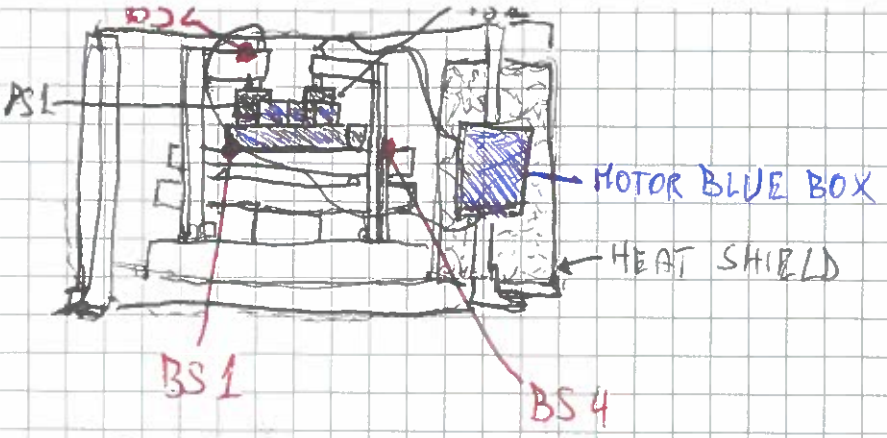
IFGs are still unstable, suspected air flow in IFM box.

OPEN BOX LID → ifg1_newPS_6p10s_B2_01Oct1056.inf (BAD)

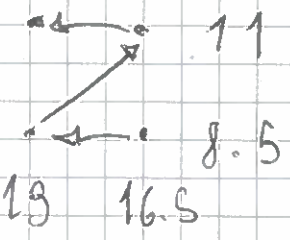
CLOSED LID → ifg1_newPS_6p10s_B2_01Oct1133.inf (GOOD)

The motor moving the PSs is a source of heat, moved outside the box.

(TOOK PICTURE)




Stability improved, running aperture scan during the night




Aperture_scan_ifg2_newPS_B1_6p10s_010ct1928.inf
Aperture_scan_ifg1_newPS_B3_6p10s_010ct2236.inf

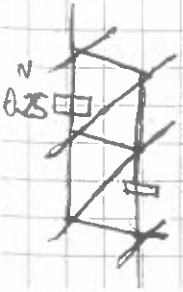

$z = 11$ $y = 16.5$

02/10/2025

Scan path intensities

robot_diag_double_Cd_test_02Oct1000.inf


Insert Indium to adjust intensities

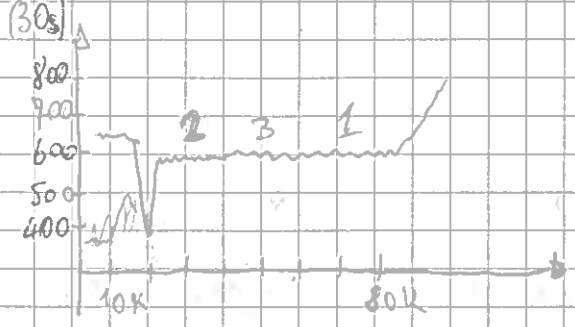



← free space for robot in the middle!

(INFO INSIUM: CYCLE 197 3-16-19 PAGE 175)

6

robot_diag_double_Cd_90deg_test_02Oct1000.inf



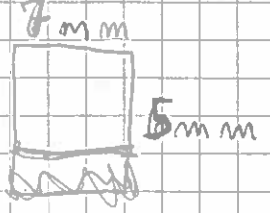

ifg2_newPS_6p20s_B1_02Oct1244.inf
ifg1_newPS_6p20s_B2_02Oct1317.inf
ifg2_newPS_6p20s_B2_02Oct1348.inf
ifg1_newPS_6p20s_B3_02Oct1421.inf
⋮
ifg1_newPS_6p20s_B3_03Oct0849.inf

03/10/2025

Select PS angle ranges

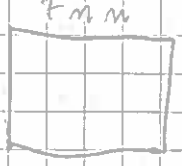
PS1 → [-1, 1]  PS2 → [-3, -1]


ifg2_newPS_2p30s_B1_03Oct1202.inf C~70%
ifg1_newPS_2p30s_B2_03Oct1228.inf C~71%
ifg2_newPS_2p30s_B2_03Oct1252.inf C~72%
ifg1_newPS_2p30s_B3_03Oct1318.inf C~65%




ifg2_newPS_2p30s_B1_03Oct1357.inf C~70%
ifg1_newPS_2p30s_B2_03Oct1429.inf C~71%
ifg2_newPS_2p30s_B2_03Oct1454.inf C~71%
ifg1_newPS_2p30s_B3_03Oct1520.inf C~69%


ifg2_newPS_2p30s_B1_030ct1611.inf C~69%
ifg1_newPS_2p30s_B2_030ct1637.inf C~69%
ifg2_newPS_2p30s_B2_030ct1702.inf C~70%
ifg1_newPS_2p30s_B3_030ct1728.inf C~65




Aperture_scan_ifg2_newPS_B1_2p30s_03Sep1911.inf
⋮
Aperture_scan_ifg1_newPS_B3_2p30s_040ct1232.inf

04/10/2025

Aperture_scan_ifg2_newPS_B1_2p30s_040ct1906.inf
⋮
Aperture_scan_ifg1_newPS_B3_2p30s_040ct2301.inf

05/10/2025

z = 10 y = 16.5
ifg2_newPS_2p30s_B1_050ct1433.inf C~65%
ifg1_newPS_2p30s_B2_050ct1500.inf C~72%
ifg2_newPS_2p30s_B2_050ct1527.inf C~72%
ifg1_newPS_2p30s_B3_050ct1555.inf C~66%

z = 11.5 y = 16.5
ifg2_newPS_2p30s_B1_050ct1624.inf C~68%
ifg1_newPS_2p30s_B2_050ct1651.inf C~68%
ifg2_newPS_2p30s_B2_050ct1719.inf C~68%
ifg1_newPS_2p30s_B3_050ct1745.inf C~63%

z = 10.5 y = 16.5

ifg newPS_2p30s_B1_05Oct1814.inf C~65%

z = 11 y = 16.5

06/10/2025 no intensity after ifg2_newPS_2p30s_B1_05Oct2104 → ok

rocking_05oct2121 → no intensity

Robot bumped into IFM box cover and changed Col orientation. Col bumped into IFM, no damage from measurements with camera. Changed ZOUT_DOUBLECol → 207413

ifg1_newPS_2p120s_B3_06Oct1208.inf/tif

ifg2_newPS_3p120s_B2_06Oct1340.inf/tif

Updated Robot diagonal positions:

| BLOCK | POSITION (DIAG.) | NEW LABELS (SEE PAGE 10) |
|---|---|---|
| 1 | -23000 | 3 |
| 2 | 0 | 2 |
| 1-3 | 26000 | 1-3 |
| 1-2 | 46000 | 3-2 |
| 2-3 | 70000 | 1-2 |
| 3 | 90000 | 1 |

Measured single path intensities after placing Indium

| PATH | COUNTS (60s) |
|---|---|
| 1 | 1547 |
| 2 | 1545 |
| 3 | 1525 |

Aperture_scan_ifg1_newPS_B1_6p20s_06Oct2117.inf

7.10.25 8:30 reactor power 41 MW → 55 MW

| s | FWHM scan | in $z_s$ |
|---|---|---|
| -1,2 | 0,000642 | 953 |
| -1,15 | 530 | 1108 |
| -1,10 | 477 | 1161 |
| -1,05 | 59 | 996 |
| -1,12 | 481 | 1160 |

Aperture_scan_ifg1_newPS_B2_6p10s_070ct1119.inf

(Aperture_scan_ifg1_newPS_B3_6p10s_070ct1532.inf


Select aperture position and PSs range:

Y=15 Z=11 PS1 [-1.5, 0.5] PS2 [-1, 1]

Test of measurement of weak value IFGs

$w_{+1} = \frac{\langle + | \hat{\Pi}_1 | \Psi \rangle}{\langle + | \Psi \rangle}$ = "wv 1"

$|\Psi^{x_1 x_2 x_3}\rangle = \frac{1}{\sqrt{3}} (e^{i x_1} |1\rangle + e^{i x_2} |2\rangle + e^{i x_3} |3\rangle)$

= "psi_$x_1$_$x_2$_$x_3$"

$|+\rangle$ → 0-BEAM

prep_psi_0_0_0.sc → $|\Psi^{000}\rangle = |+\rangle = \frac{1}{\sqrt{3}} (|1\rangle + |2\rangle + |3\rangle)$

ifg1R_newPS_2p30s_0_070ct1313.inf

ifg1R_newPS_2p30s_p90_080ct1143.inf

RELATIVE STEP PHASE SHIFT

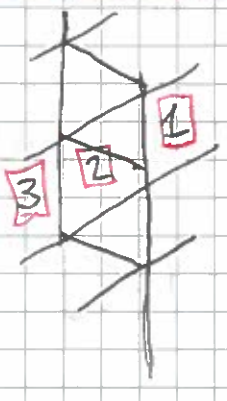
08/10/2025

Mistake in the script "ifg1r_newPS_2p30s.sc" fixed (I'st started with a step instead of measurement.)
Adjusted fit cosine to keep the IFGs in the same PS range (or almost)

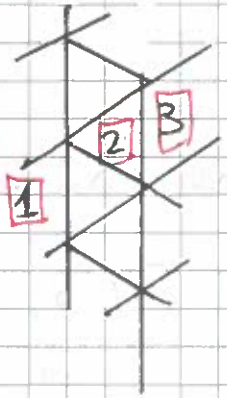
## CHANGED PATHS LABELS !!!

The path labeling was not consistent with previous experiments. Changed script names accordingly ("NL" → NEW LABEL)

OLD LABELS




NEW LABELS!




STATE PREPARATION

SET $x_2 = x_3$ (IFG 1 + FIT AUX

SET $x_1 = x_2 = x_3$ (IFG 2 + FIT 0

RESULT → $|\Psi\rangle = \frac{1}{\sqrt{3}}(|1\rangle + |2\rangle + |3\rangle)$

9.10.25 7:52, address error when moving robot diagonal

ifg1R_newPS_2p30s_psi_+1+1+1_0_08Oct1314.inf

ifg1R_newPS_2p30s_psi_1-1-1_-pi_08Oct0904.inf

Relative steps

$|\Psi_{IN}\rangle = \frac{1}{\sqrt{3}}(|1\rangle - |2\rangle - |3\rangle)$

-pi → +180 $\Delta x_1$

Run different measurement tests, procedure still not optimal (Script mistakes, fit failing to select right phases.

Changed measurement file structure

WEAK VALUE P1 — Psi

ifg_WV1_psi_+1+1+1_....inf

- ifg_wv1.....dat ← $\Delta x_1 = 0$
- ifg_wv1.....dat ← $\Delta x_1 = -\frac{\pi}{2}$
- ifg_wv1.....dat ← $\Delta x_1 = \frac{\pi}{2}$
- ifg_wv1.....dat ← $\Delta x_1 = \pi$
- ifg_wv1.....dat ← path intensity (2→1→3)

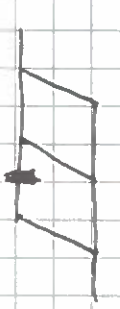
ifg_Wv1_psi_+1+1+1_090ct1515.inf
⋮
ifg_Wv1_psi_+1+1+1_090ct1951.inf
} Wrong PS pos.

10/10/25

↓ Measurement tests and adjustments, some are good

13/10/25 Smm□ Y=16, Z=11

Contrast_loops_B1_2_3_130ct1020.inf



B1
C ≈ 0.62

B2
C ≈ 0.74

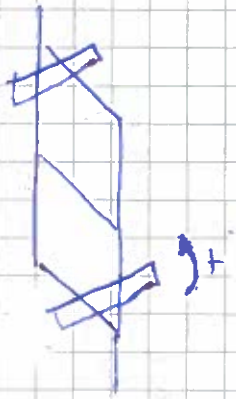
B3
C ≈ 0.69

20:36 Address error on Robot Diagonal

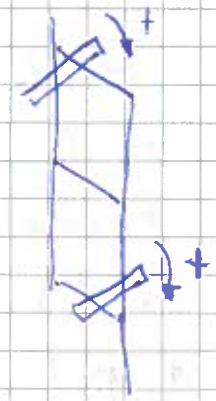
13/10 → 16/10 Measurements, optimization and attempts to prepare $|\Psi\rangle = \frac{1}{\sqrt{3}}(|1\rangle + e^{-i\frac{\pi}{3}}|2\rangle + e^{i\frac{2\pi}{3}}|3\rangle)$

Changed PSs movement direction of $x_2$ scans

$x_1$ SCAN



$x_2$ SCAN



$x_3$ SCAN

16/10 → 20/10

Performed different measurements, LABVIEW often crashes or fits do not converge. List of good and bad measurements present in the python scripts. We decided to change measurement method to avoid fitting

**NEW METHOD:** EXTRACT PERIOD FROM FITS AND TAKE EXACTLY 16 POINTS PER PERIOD. DATA IS OBTAINED BY SHIFTING THE POINTS.

finish 25.10. 7:00