Technology
Department

# ALICE-ZDC modification

## New beam vacuum layout for TCTVA integration 4L2 and 4R2

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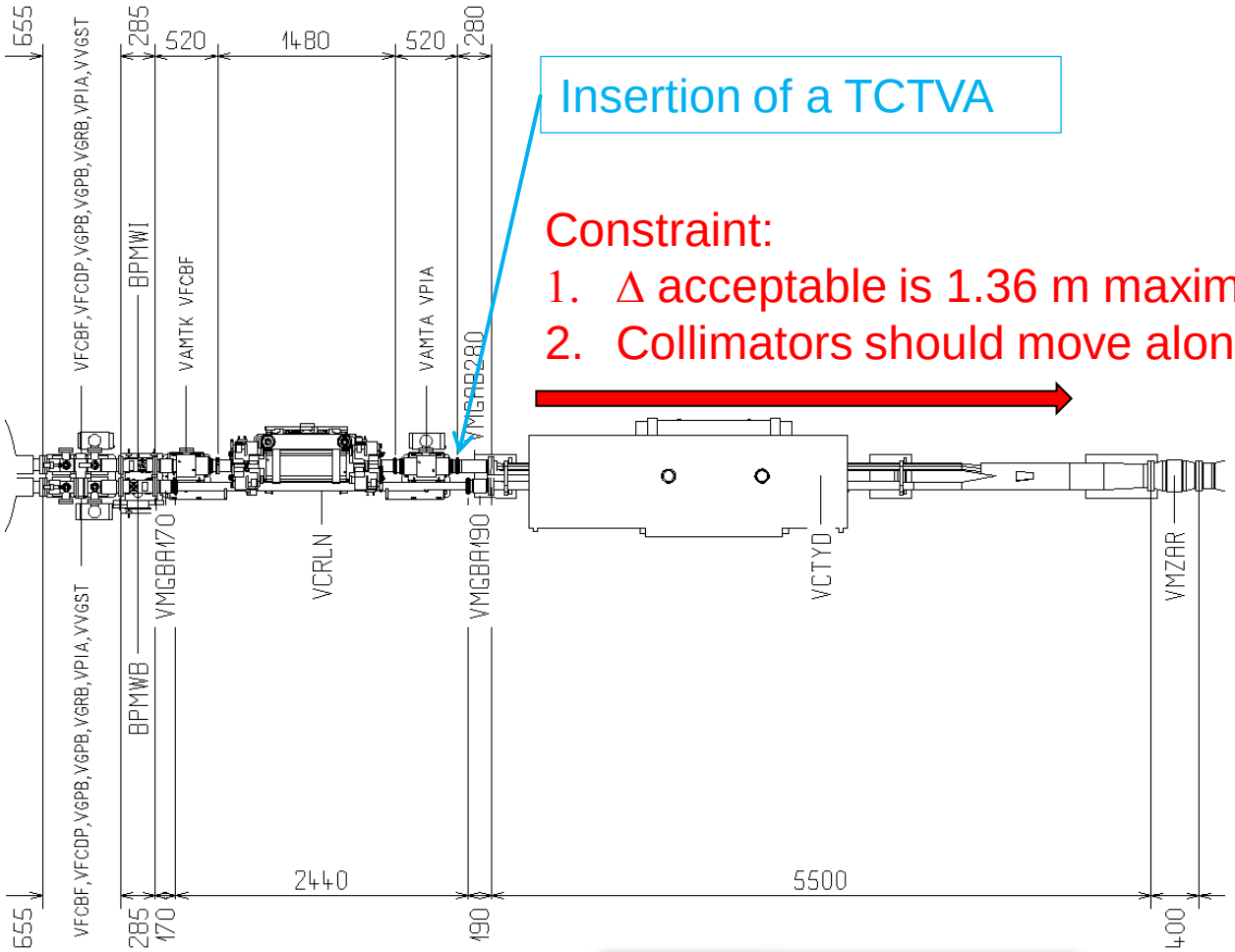
**8/11/2010**

# Current layout 4L2




Insertion of a TCTVA

Constraint:

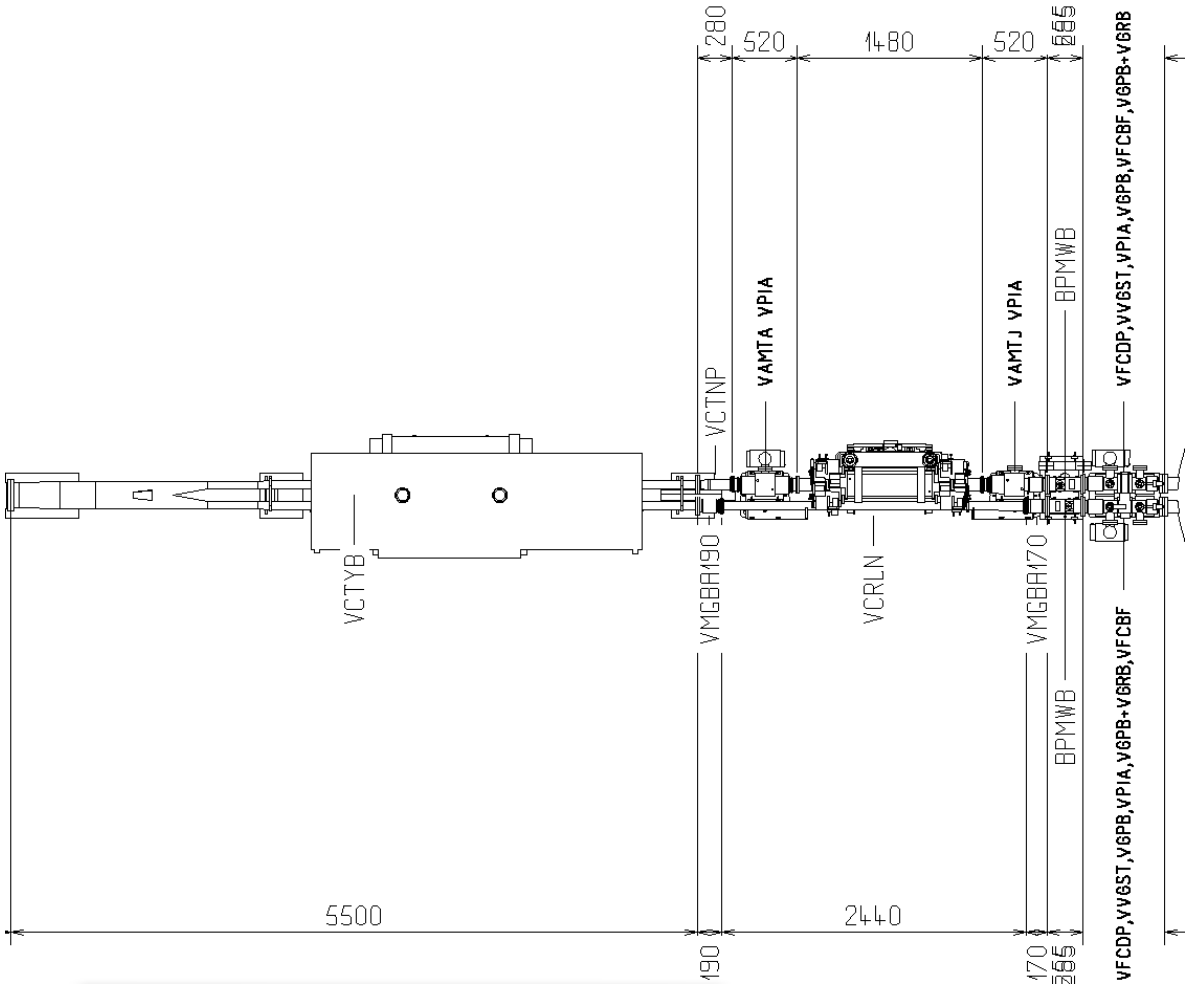
1. Δ acceptable is 1.36 m maximum
2. Collimators should move along their 5th axis

Arc 1-2

IP2: ALICE

# Current layout 4R2

IP2: ALICE




Arc 2-3

# 4L2, database configuration, B1 (external beam line):

| SUBSECTOR | SLOT_ID | SLOT_TYPE_ID | FROM_IP | LENGTH | S_START | S_END | Cumuled lenght | NAME | VAC/OPTIC NAME | TSEL NAME | U_START | U_BEAM_START | U_END | U_BEAM_END |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 104597 | 1722304 | -119.778 | 0.285 | 3212.5824 | 3212.8674 | | BPMWI.4L2.B1 | | BPMWI.B4L2=RA23 | -0.087 | -0.08685 | -0.087 | -0.08641 |
| VACSEC.A4L2.C | 283410 | 1956427 | -119.493 | 0.52 | 3212.8674 | 3213.3874 | | VAMTK.4L2.B | VAMTK.615.4L2.B | VAMTB.A4L2=RA23 | -0.087 | -0.08641 | -0.087 | -0.08561 |
| | | | | | | | | | | | | | | |
| | 377594 | 377405 | -118.973 | 1.48 | 3213.3874 | 3214.8674 | | TCTH.4L2.B1 | | TCTH.A4L2=RA23 | -0.0856 | -0.08561 | -0.0833 | -0.08335 |
| VACSEC.A4L2.C | 382867 | 606728 | -117.493 | 0.52 | 3214.8674 | 3215.3874 | | VAMTA.4L2.B | VAMTA.595.4L2.B | VAMTA.A4L2=RA23 | -0.083 | -0.08335 | -0.083 | -0.08255 |
| VACSEC.A4L2.C | 847503 | 911467 | -116.973 | 0.28 | 3215.3874 | 3215.6674 | | VMGAB.4L2.B | VMGAB.591.4L2.B | VCTNP.A4L2=RA23 | -0.083 | -0.08255 | -0.083 | -0.08212 |
| | | | | | | | 2.8 | | | | | | | |

Current database

New vacuum elements

| SUBSECTOR | SLOT_ID | SLOT_TYPE_ID | FROM_IP | LENGTH | S_START | S_END | Cumuled lenght | NAME | VAC/OPTIC NAME | TSEL NAME | U_START | U_BEAM_START | U_END | U_BEAM_END |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 104597 | 1722304 | -119.778 | 0.285 | 3212.5824 | 3212.8674 | | BPMWI.4L2.B1 | | BPMWI.B4L2=RA23 | -0.087 | -0.08685 | -0.087 | -0.08641 |
| VACSEC.A4L2.C | 283410 | 1956427 | -119.493 | 0.22 | 3212.8674 | 3213.0874 | | VMTBA.4L2.B | | | -0.087 | -0.08641 | -0.087 | -0.08561 |
| | | | | | | | | | | | | | | |
| | 377594 | 377405 | -118.973 | 1.48 | 3213.0874 | 3214.5674 | | TCTH.4L2.B1 | | TCTH.A4L2=RA23 | -0.0856 | -0.08561 | -0.0833 | -0.08335 |
| VACSEC.A4L2.C | 382867 | 606728 | -117.493 | 0.52 | 3214.5674 | 3215.0874 | | VAMTA.4L2.B | | | -0.083 | -0.08335 | -0.083 | -0.08255 |
| VACSEC.A4L2.C | 847503 | 911467 | -116.973 | 1.48 | 3215.0874 | 3216.5674 | | TCTVA.4L2.B1 | | | -0.083 | -0.08255 | -0.083 | -0.08212 |
| | | | | 0.46 | 3216.5674 | 3217.0274 | | VAMTM.4L2.B | | | | | | |
| | | | | | | | 4.16 | | | | | | | |

Modified database

Delta= 1.36
Max= 1.36

# 4L2, database configuration, B2 (internal beam line):

| SUBSECTOR | SLOT_ID | SLOT_TYPE_ID | FROM_IP | LENGTH | S_START | S_END | Cumuled lenght | NAME | VAC/OPTIC NAME | TSEL NAME | U_START | U_BEAM_START | U_END | U_BEAM_END |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VACSEC.B4L2.B<br>VACSEC.B4L2.R | 283358 | 1661744 | -120.433 | 0.655 | 3211.9274 | 3212.5824 | | VANKB.4L2.C | VANKB.624.4L2.C | VAAHB.A4L2=RA23 | 0 | 0.08785 | 0 | 0.08685 |
| | 181635 | 102020 | -119.778 | 0.285 | 3212.5824 | 3212.8674 | | BPMWB.4L2.B2 | | BPMWB.A4L2=RA23 | 0.087 | 0.08685 | 0.087 | 0.08641 |
| VACSEC.A4L2.C | 283359 | 2042840 | -119.493 | 0.17 | 3212.8674 | 3213.0374 | | VMGBA.B4L2.R | VMGBA.617.4L2.R | VMGBA.B4L2=RA23 | 0.087 | 0.08641 | 0.087 | 0.08615 |
| VACSEC.A4L2.C | 382865 | 1468934 | -119.323 | 2.44 | 3213.0374 | 3215.4774 | | VCRLN.4L2.R | VCRLN.604.4L2.R | VCRLE.A4L2=RA23 | 0.087 | 0.08615 | 0.087 | 0.08241 |
| | | | | | | | | | | | | | | |
| INSTALLED | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| VACSEC.A4L2.C | 382866 | 2042766 | -116.883 | 0.19 | 3215.4774 | 3215.6674 | 2.8 | VMGBA.A4L2.R | VMGBA.591.4L2.R | VMGBA.A4L2=RA23 | 0.082 | 0.08241 | 0.082 | 0.08212 |
| VACSEC.A4L2.C | 283360 | 1626173 | -116.693 | 5.5 | 3215.6674 | 3221.1674 | | VCTYD.4L2.X | VCTYD.562.4L2.X | VCTYB.A4L2=RA23 | 0 | 0.08212 | 0 | 0.07369 |

Current database

New vacuum element

| SUBSECTOR | SLOT_ID | SLOT_TYPE_ID | FROM_IP | LENGTH | S_START | S_END | Cumuled lenght | NAME | VAC/OPTIC NAME | TSEL NAME | U_START | U_BEAM_START | U_END | U_BEAM_END |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VACSEC.B4L2.B<br>VACSEC.B4L2.R | 283358 | 1661744 | -120.433 | 0.655 | 3211.9274 | 3212.5824 | | VANKB.4L2.C | VANKB.624.4L2.C | VAAHB.A4L2=RA23 | 0 | 0.08785 | 0 | 0.08685 |
| | 181635 | 102020 | -119.778 | 0.285 | 3212.5824 | 3212.8674 | | BPMWB.4L2.B2 | | BPMWB.A4L2=RA23 | 0.087 | 0.08685 | 0.087 | 0.08641 |
| VACSEC.A4L2.C | 283359 | 2042840 | -119.493 | 0.17 | 3212.8674 | 3213.0374 | | VMGBA.B4L2.R | VMGBA.617.4L2.R | | 0.087 | 0.08641 | 0.087 | 0.08615 |
| VACSEC.A4L2.C | 382865 | 1468934 | -119.323 | 3.8 | 3213.0374 | 3216.8374 | | VCRL%.4L2.R | | | 0.087 | 0.08615 | 0.087 | 0.08241 |
| | | | | | | | | | | | | | | |
| PROPOSAL | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| VACSEC.A4L2.C | 382866 | 2042766 | -116.883 | 0.19 | 3216.8374 | 3217.0274 | 4.16 | VMGBA.A4L2.R | VMGBA.591.4L2.R | | 0.082 | 0.08241 | 0.082 | 0.08212 |
| VACSEC.A4L2.C | 283360 | 1626173 | -116.693 | 5.5 | 3215.6674 | 3221.1674 | | VCTYD.4L2.X | VCTYD.562.4L2.X | VCTYB.A4L2=RA23 | 0 | 0.08212 | 0 | 0.07369 |

Modified database

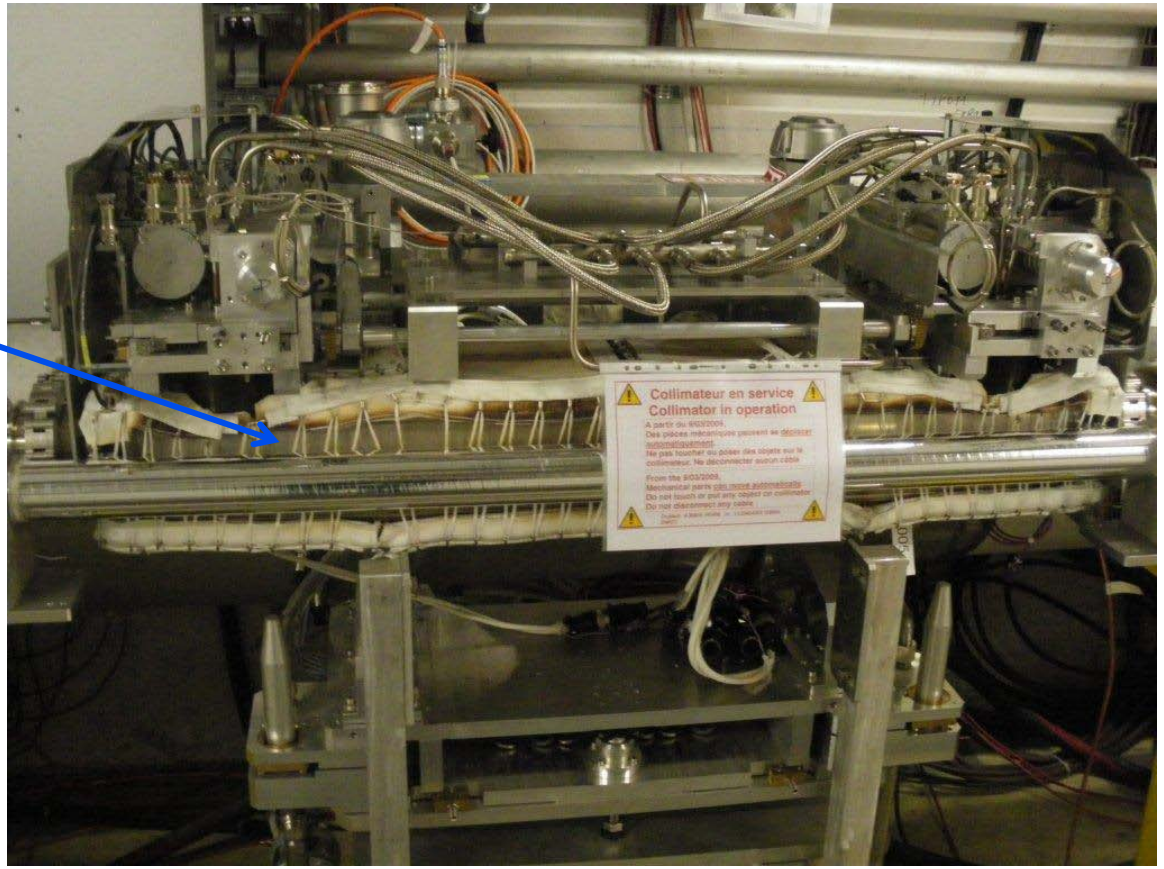
**New VCRL% chamber L=3.8 m**

Vacuum - Chamber - Circular - Long Straight Section - ID67 - OD70- Type L% - QCF100/QCF100

## REMARK #1

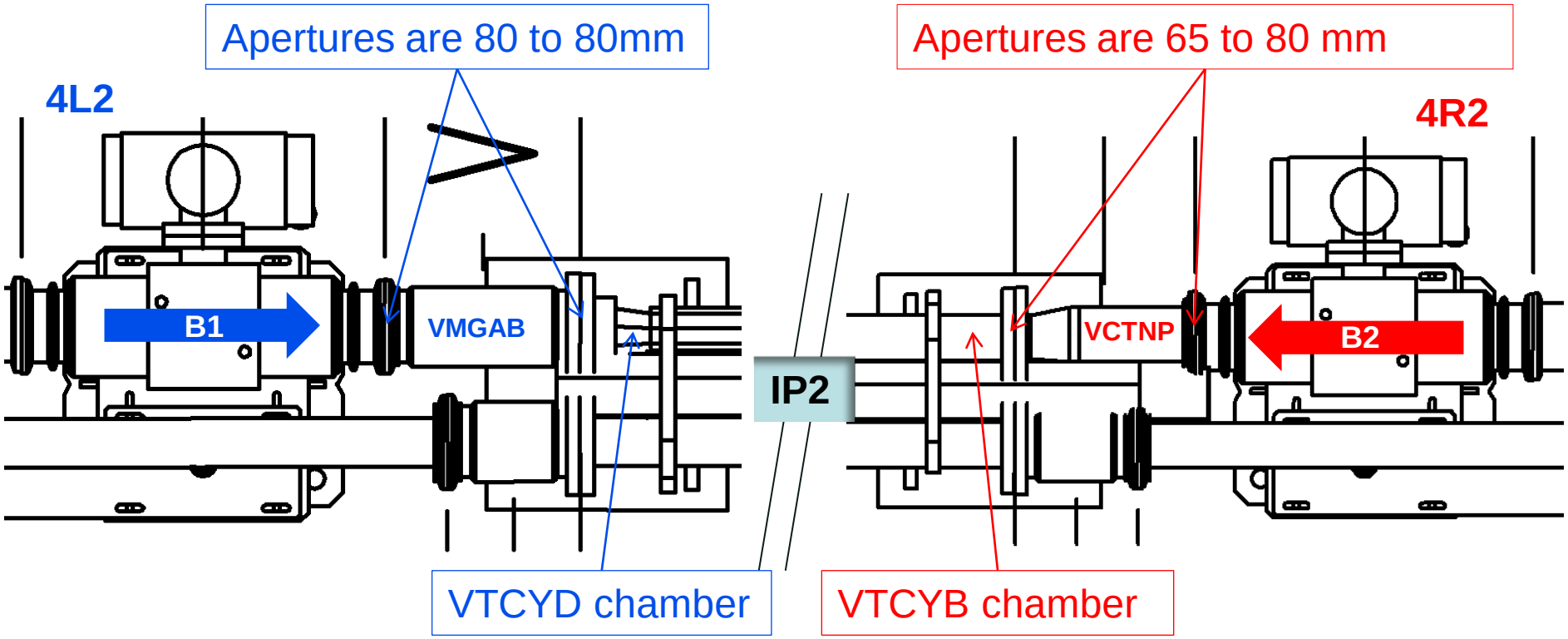
Current situation of 4L2 and 4R2 concerning the TCTH collimator bakeout

**NO JACKET**



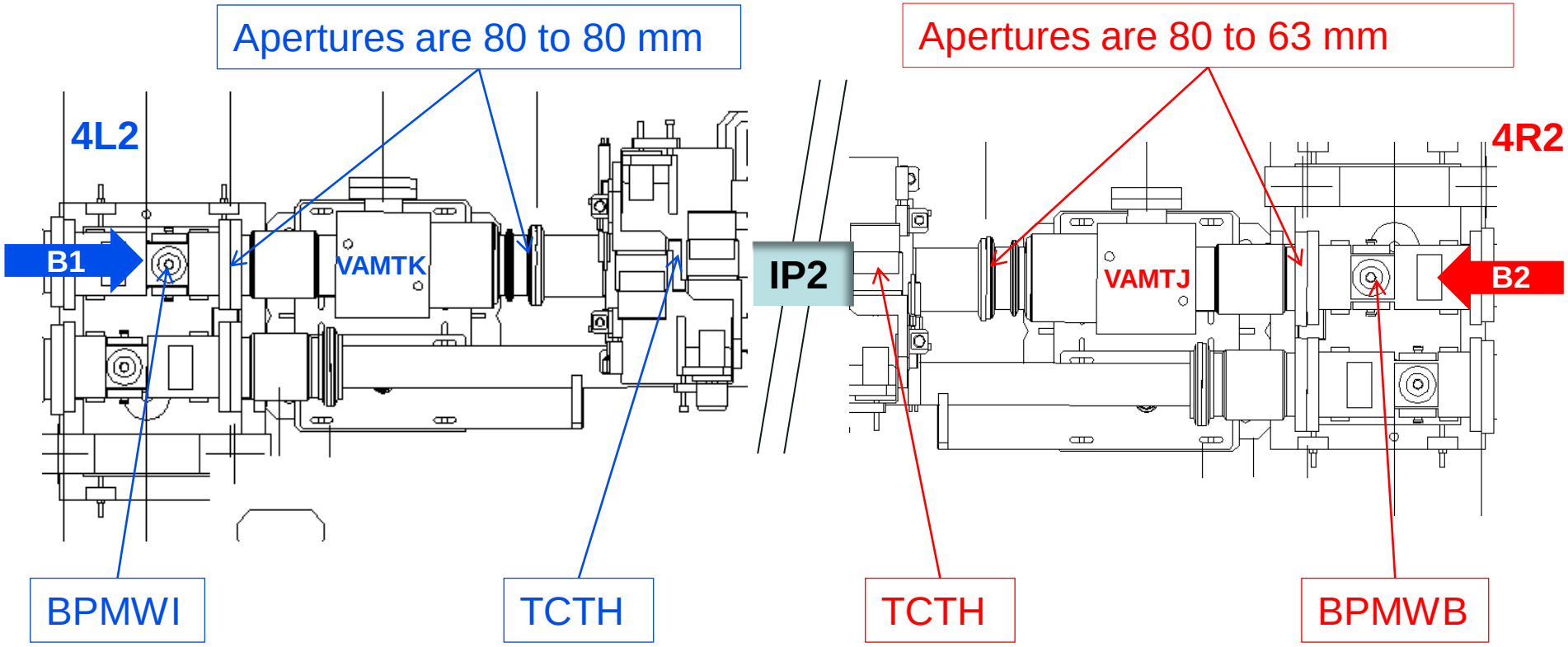
## REMARK #2.1

4L2 and 4R2 are symmetric for the integration but…
The mechanical aperture is different between 4L2 and 4R2 around Y chambers:



## REMARK #2.2

4L2 and 4R2 are symmetric for the integration but…
The mechanical aperture is different between 4L2 and 4R2 around BPMs:



Creation of new vacuum elements for 4L2:

- VMTBA: Collimator Module - DN100/QCF100 - 80/80 → aperture is 80 mm, L=220 mm, the bellows connected on the collimator side accept the 5th axis motion.
- VMTQC: Collimator Pumping Module - DN100/QCF100 - 80/80 → aperture is 80 mm, L=460 mm, the bellows connected on the collimator side accept the 5th axis motion.
- VCRLP: Vacuum - Chamber - Circular - Long Straight Section - ID67?? - OD70??- Type LP - QCF100/QCF100 → aperture is 67 mm??, L=3800 mm.

Integration issues:

- The connections of QCF100 (DN100 conical flanges) require space for a MKT collar: Ø is 230 and thickness is 35 mm.
- The thickness of the bakeout (PI thin layer) envelop for the VCRL% chamber is 5 mm which means a total outer diameter of 70+10=80 mm.

Creation of new vacuum elements for 4L2:

- VMTBA: Collimator Module - DN100/QCF100 - 80/80 → aperture is 80 mm, L=220 mm, the bellow connected on the collimator side accepts the 5th axis motion.
- VMTQC: Collimator Pumping Module - DN100/QCF100 - 80/80 → aperture is 80 mm, L=460 mm, the bellow connected on the collimator side accepts the 5th axis motion.
- VCRLP: Vacuum - Chamber - Circular - Long Straight Section - ID67 - OD70- Type LP - QCF100/QCF100 → aperture is 67 mm, L=3800 mm.

Integration issues:

- The connections of QCF100 (DN100 conical flanges) require space for a MKT collar: Ø is 230 and thickness is 35 mm.
- The thickness of the bakeout (PI thin layer) envelop for the VCRL% chamber is 5 mm which means a total outer diameter of 70+10=80 mm.

Creation of new vacuum elements for 4R2:

- VMTBB: Collimator Module - QFC100/DN100 - 80/63R → aperture is 80 to 63 mm, L=220 mm, the bellow connected on the collimator side accepts the 5th axis motion.
- VMTQD: Collimator Pumping Module - QFC100/DN100 - 80/63 → aperture is 80 to 63 mm, L=460 mm, the bellow connected on the collimator side accepts the 5th axis motion.
- VCRLP: Vacuum - Chamber - Circular - Long Straight Section - ID67?? - OD70?? - Type LP - QCF100/QCF100 → aperture is 67 mm??, L=3800 mm, same chamber as 4L2.

Summary on a screen-shot, new issues