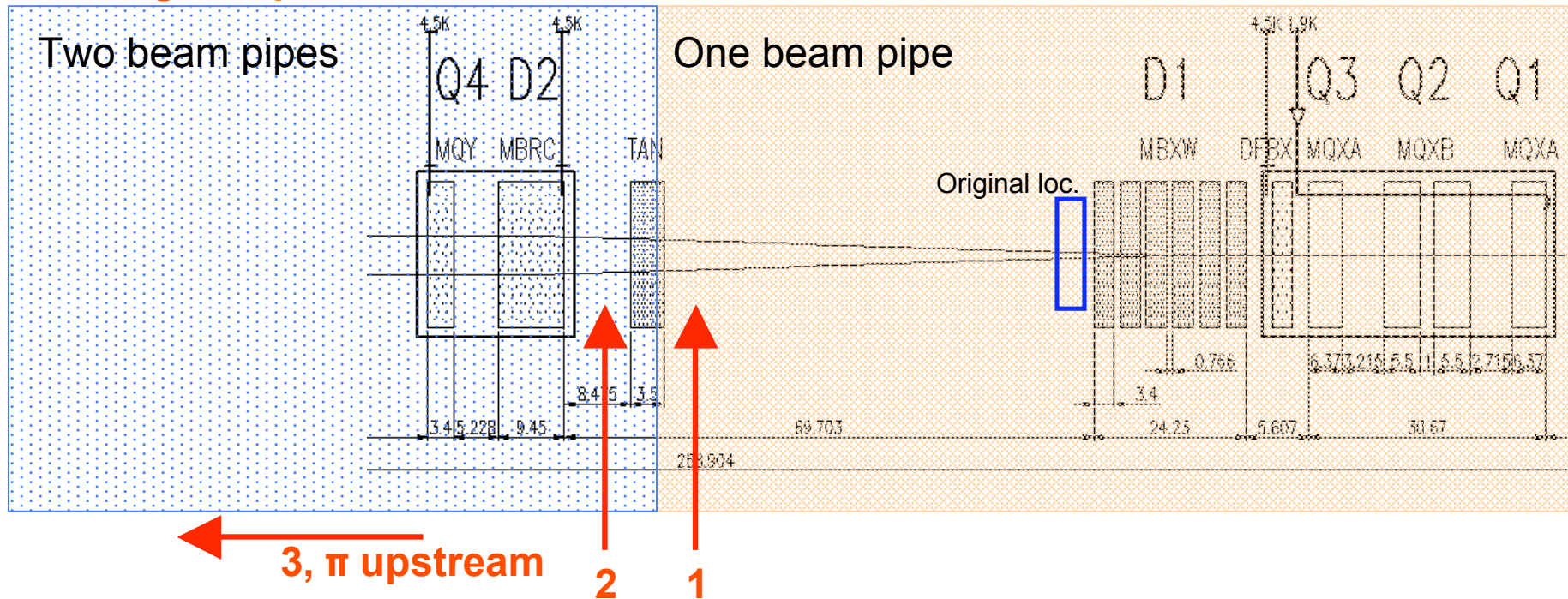


Proposal for TCT locations optimised according to

- triplet protection/collimation
- local space availability
- avoiding interference with already approved equipment

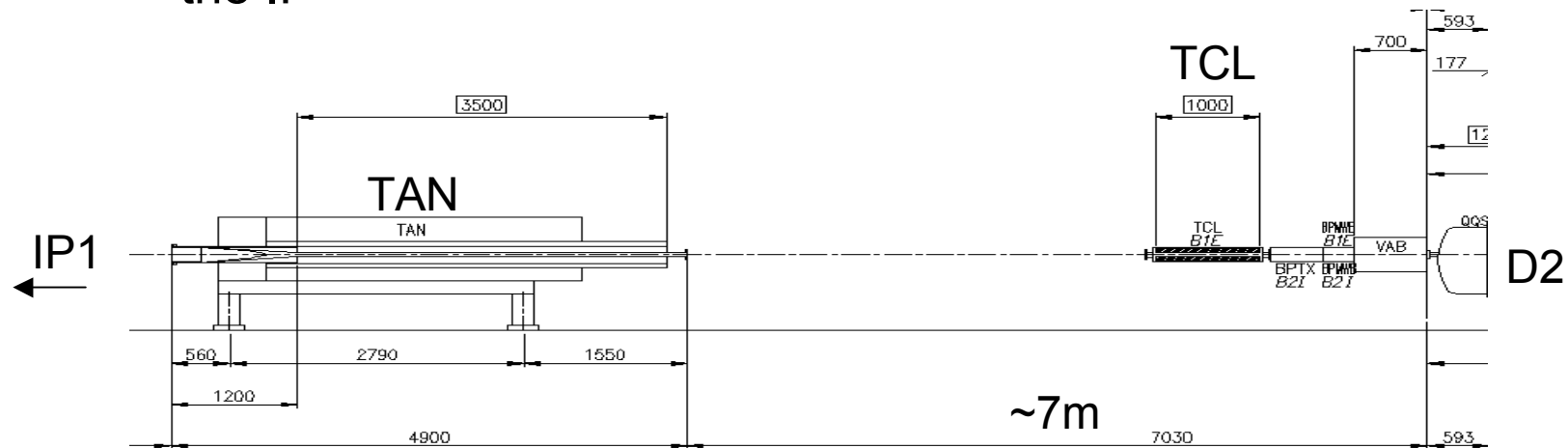
Investigated possibilities:



Possibility 2 looks most promising:

1: **downstream of TAN** (recombination chambers in IR2/IR8): common beam pipe, phase advance from triplet OK, sufficient beam separation for possible “finger” jaw between two beams. BUT: luminosity measurement at recombination chambers with the neutrals from the IP, totally new design

- **2:** During collision even **close to D2** phase advance to triplet OK ($<5^\circ$): TCTs before recombination, separate beam pipes, maybe TCT design similar to TCS design
- **3:** **π upstream** of triplet not possible. TCTs should be functional during squeeze and not restrict the choice of β^* at the IP

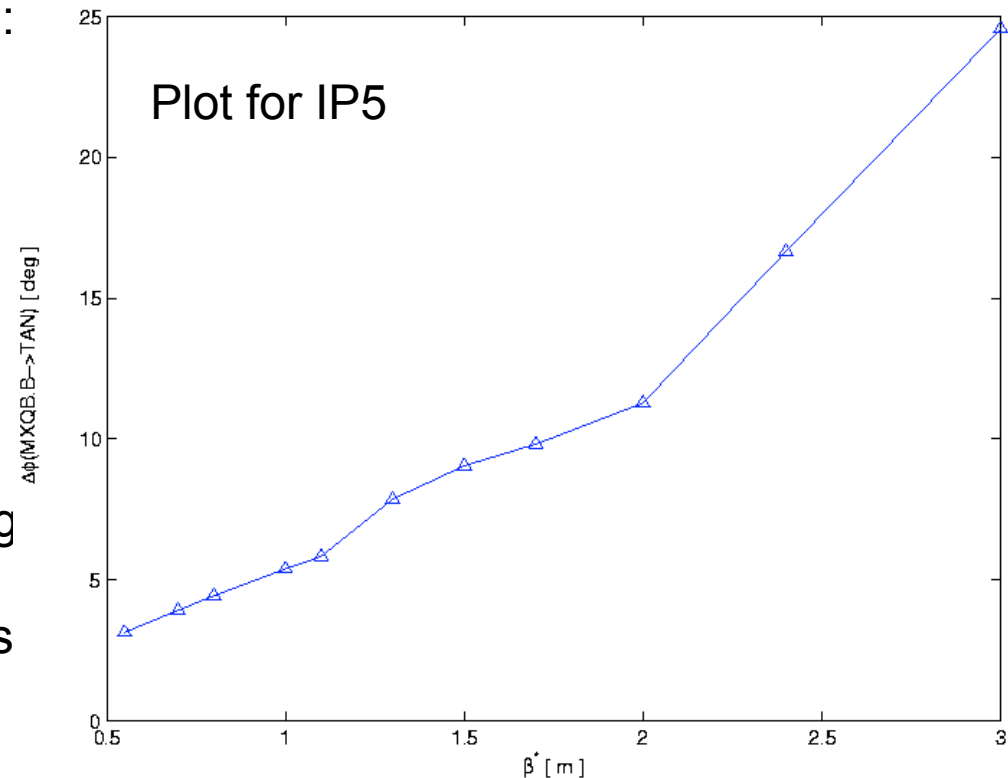


TCTs shall be functional during squeeze:

D2 location:

Phase advance between TCT and triplet at beginning of squeeze not optimal...but more aperture in the triplet:

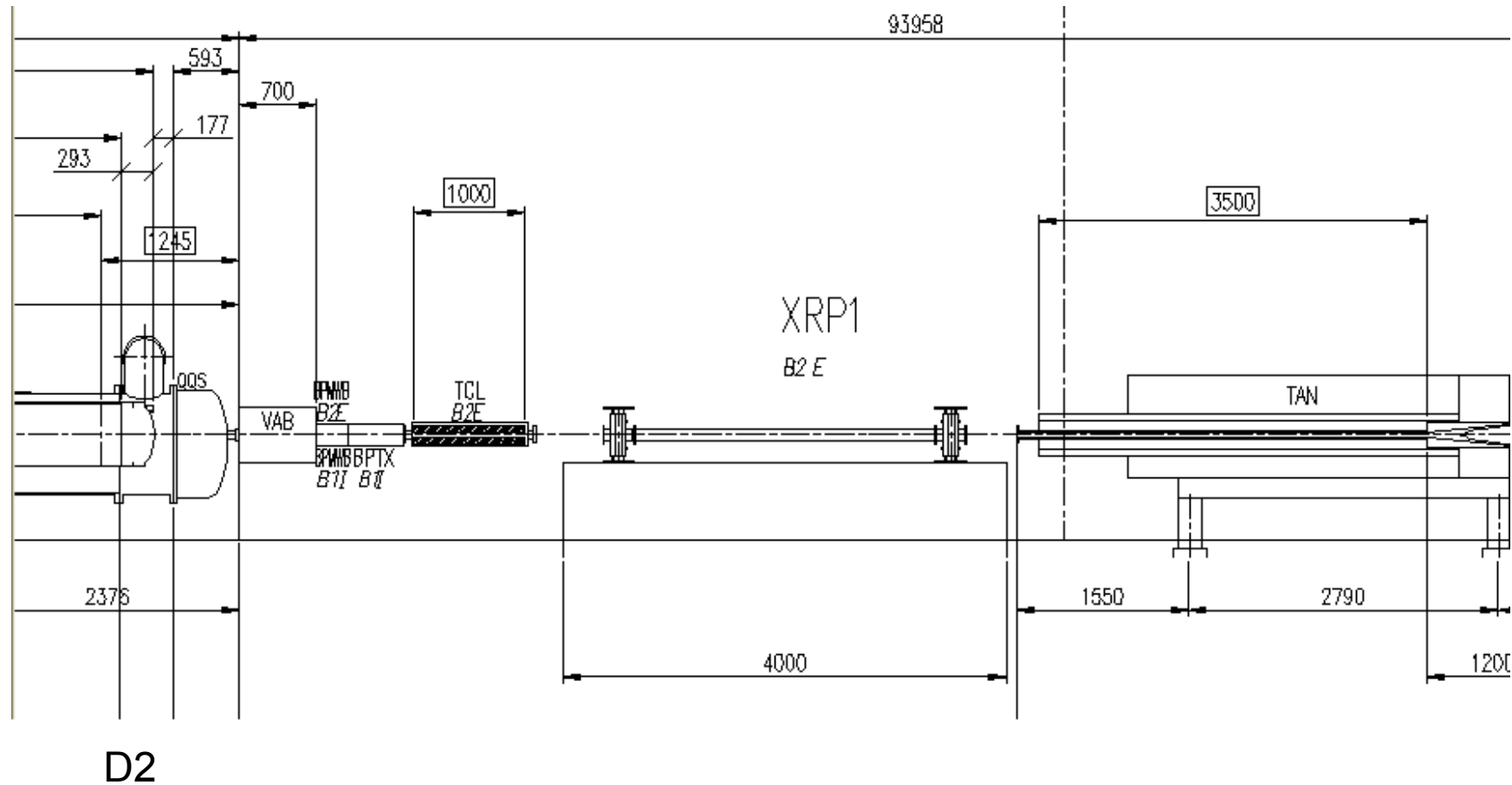
- Example IR1, beam1, horizontal:
~60° between triplet and TCT location
 - Ratio of beamsizes (H) unsqueezed/squeezed: ~5
 - Assuming 10sig aperture in triplet at collision _ 50sig before squeeze.
 - Possible transverse TCT setting: 15sig at beginning of squeeze.
 - During the squeeze the TCTs must be moved out...



Proposals for IR1 and IR8

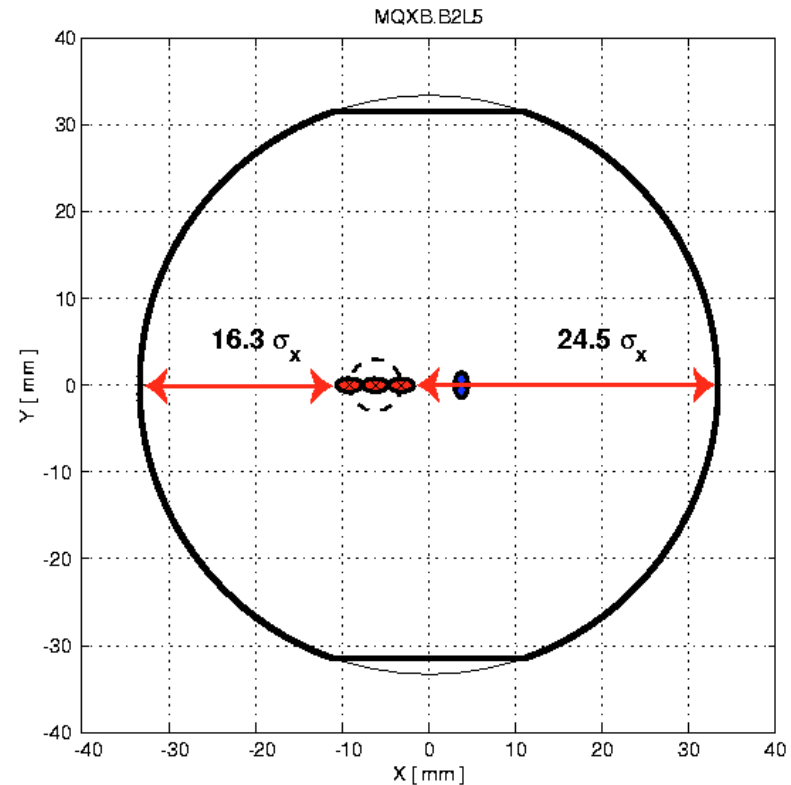
- **IR1:**
 - TCTh and TCTv close to D2
 - 2 jaws per collimator, if possible – use TCS design
 - smaller intra-beam distance: 165mm
- **IR8:**
 - ~4m between recombination into one beam pipe and equipment downstream of D2
 - only for early collision (1m $_*$) protection necessary
 - space for TCTh and TCTv
 - For protection arguments: at least TCTh should be installed
 - TCTv could be combined with TCLI (also at IR2)

IR5: Interference with TOTEM, no space for TCTs close to D2



IR5: TCTs stay at D1

- Horizontal crossing at IP5: more margin to non-protected side in triplet
- only **ONE** horizontal collimator jaw
- collimation vertically with two jaws
- beam separation at TCT location: ~30mm



IR2: possible interference with ZDC of Alice at D2 location

- ~4m space available between equipment downstream of D2 and recombination
- Space reservation for ZDC: 2.5m (ECR coming out soon)
- Luminometer (LM): either 40cm or 10cm space needed
- Minitan?
- With the present vacuum layout: no space for TCTh. But vertical crossing
- TCTv at D1
- Only needed for ion run (0.5m _*)
- Discussion with C.Rathjen: possibility of shortening the recombination chamber (~50cm, loosing ~1_ in aperture), moving ZDC further to IP.
- Proposed order of elements: IP-RC-LM-ZDC-TCTh-D2
- Possible for ZDC ?(radioactivity-access, change of location, background,...)

Vertical Collimator at D1

