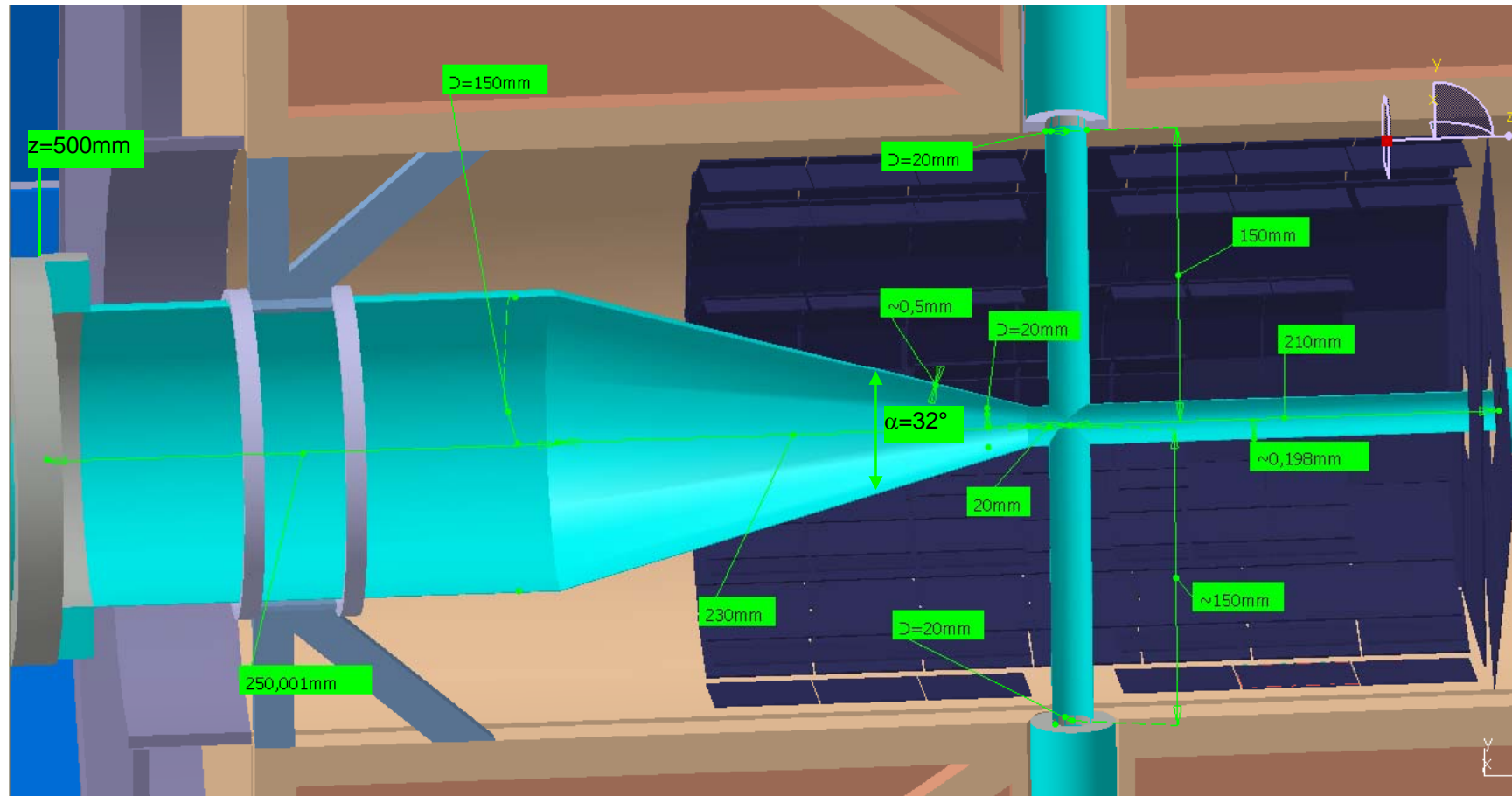


opening angle of  
upstream cone &  
influence on vacuum

Alexander Gruber, SMI, Vienna, Austria

# layout target cross

in Dec. 2008 2 different designs of target cross:

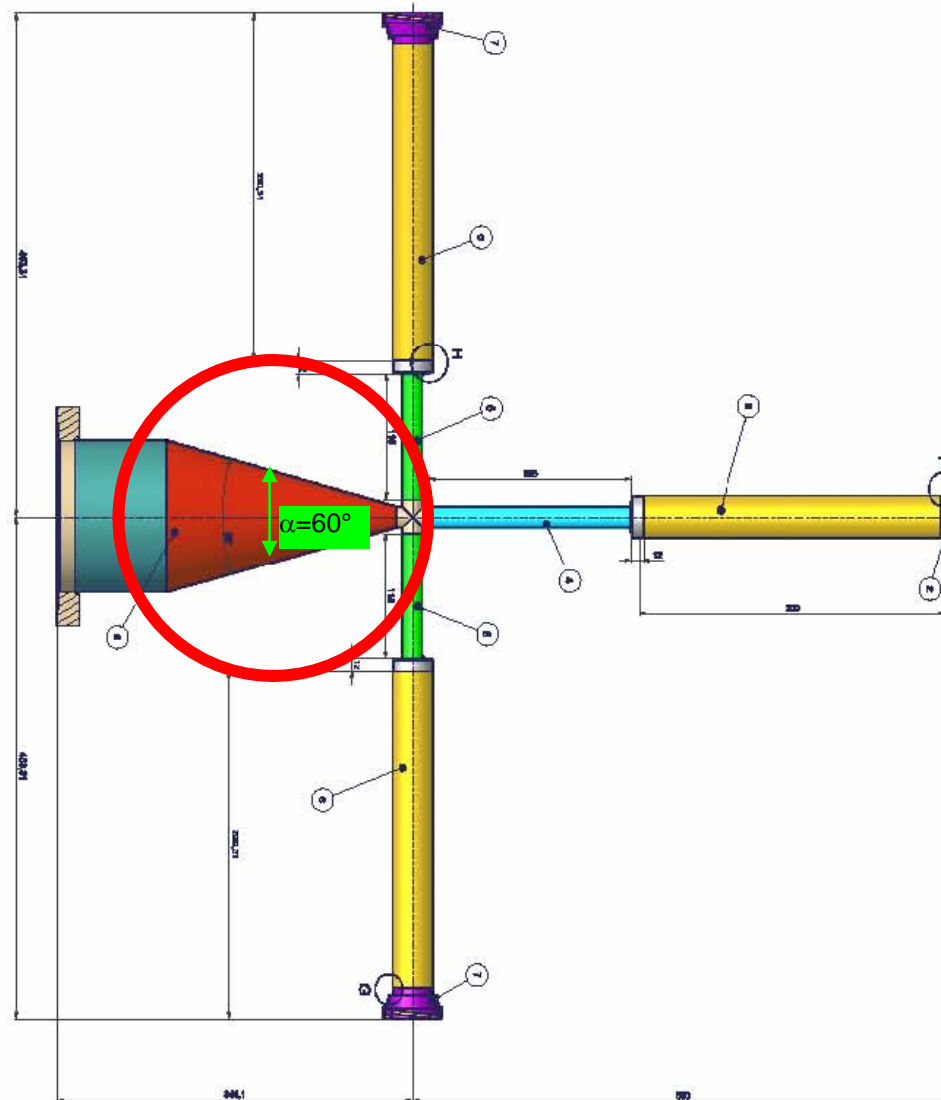


my design, based on earlier CAD drawings

# layout target cross

## The “Funnel”

Ti, wall thickness 0.5 mm  
small diameter 20.0 mm  
large diameter 140.0 mm  
length 105.0 mm

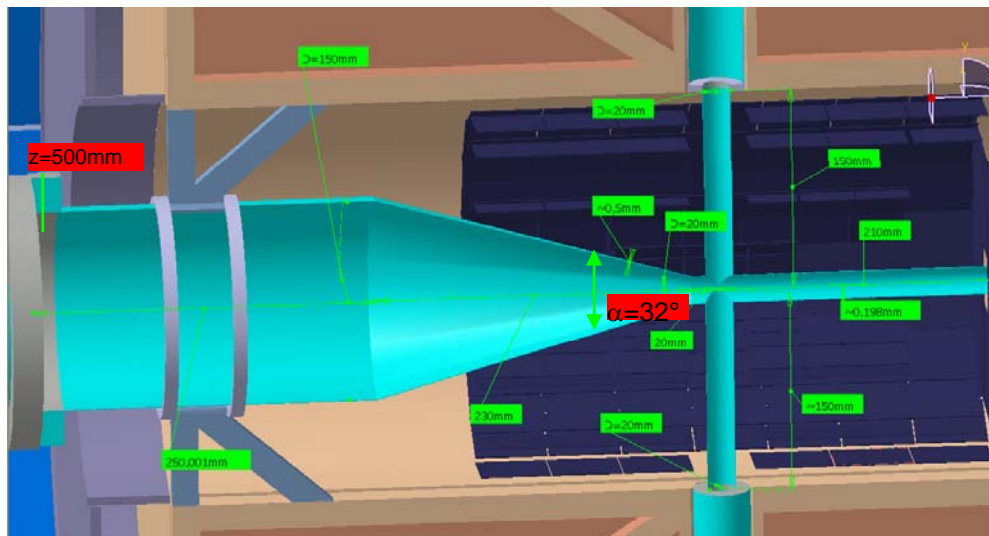


design of D.Prasuhn

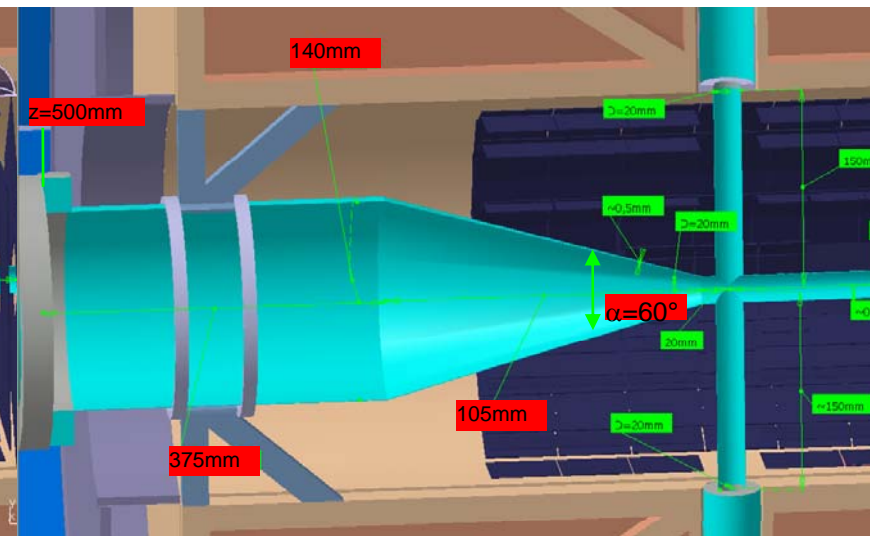
# calculations

- confusion and wish of G. Giraud to make half opening angle  $21^\circ$  (i.e.  $\alpha \sim 42^\circ$ ) (problems with cables)
- studies on effect of **opening angle of big upstream conus** on vacuum in the upstream section. Decide, whether this wish can be accommodated:
  - 4 designs checked:
    - layout of D. Prasuhn
    - my layout
    - layout with  $\alpha = 45^\circ$  (got wrong information on requested  $\alpha$ )
    - layout with  $\alpha = 42^\circ$
- calculations with VAKLOOP:
  - **pressure profile** for  $H_2$ ,  $N_2$

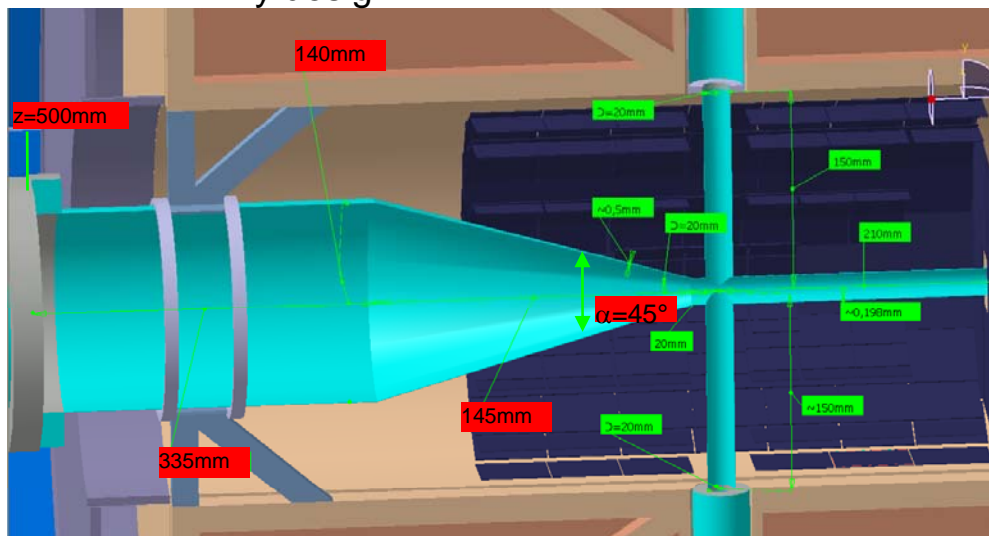
# designs in picture



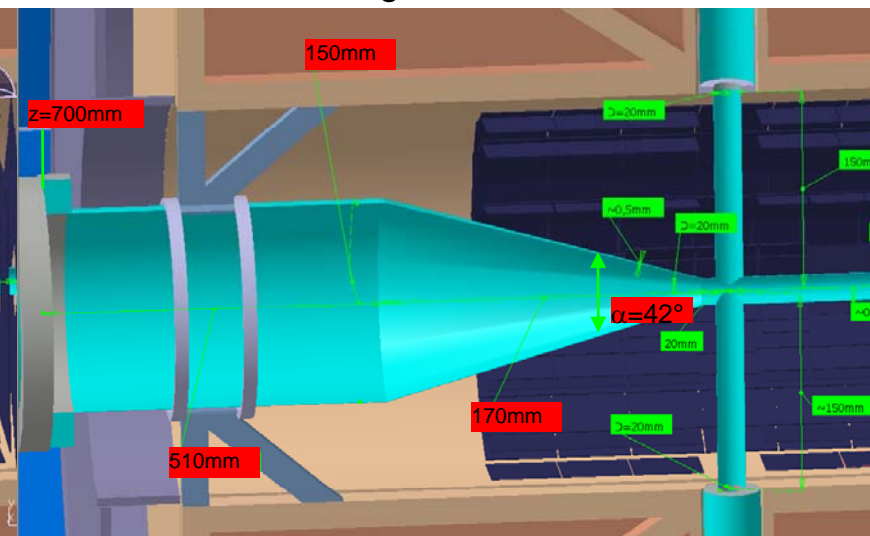
my design



Dieter's design



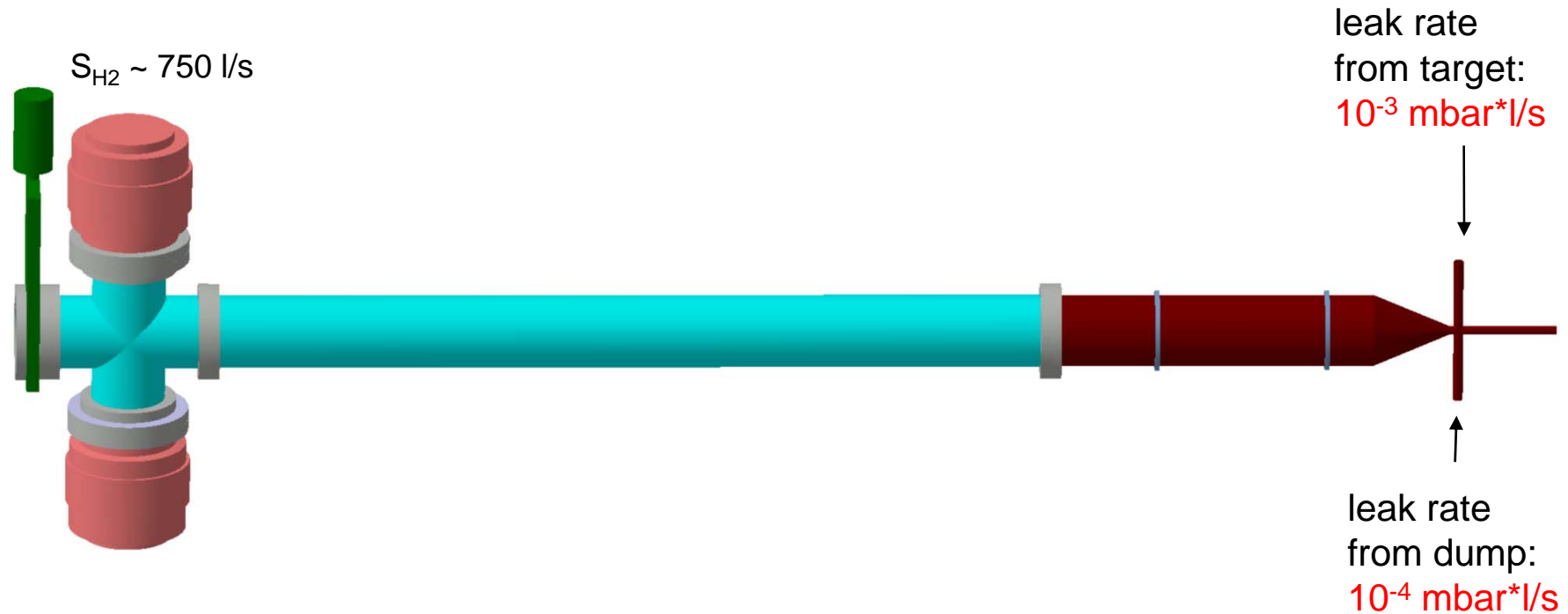
MVD design



MVD2 design

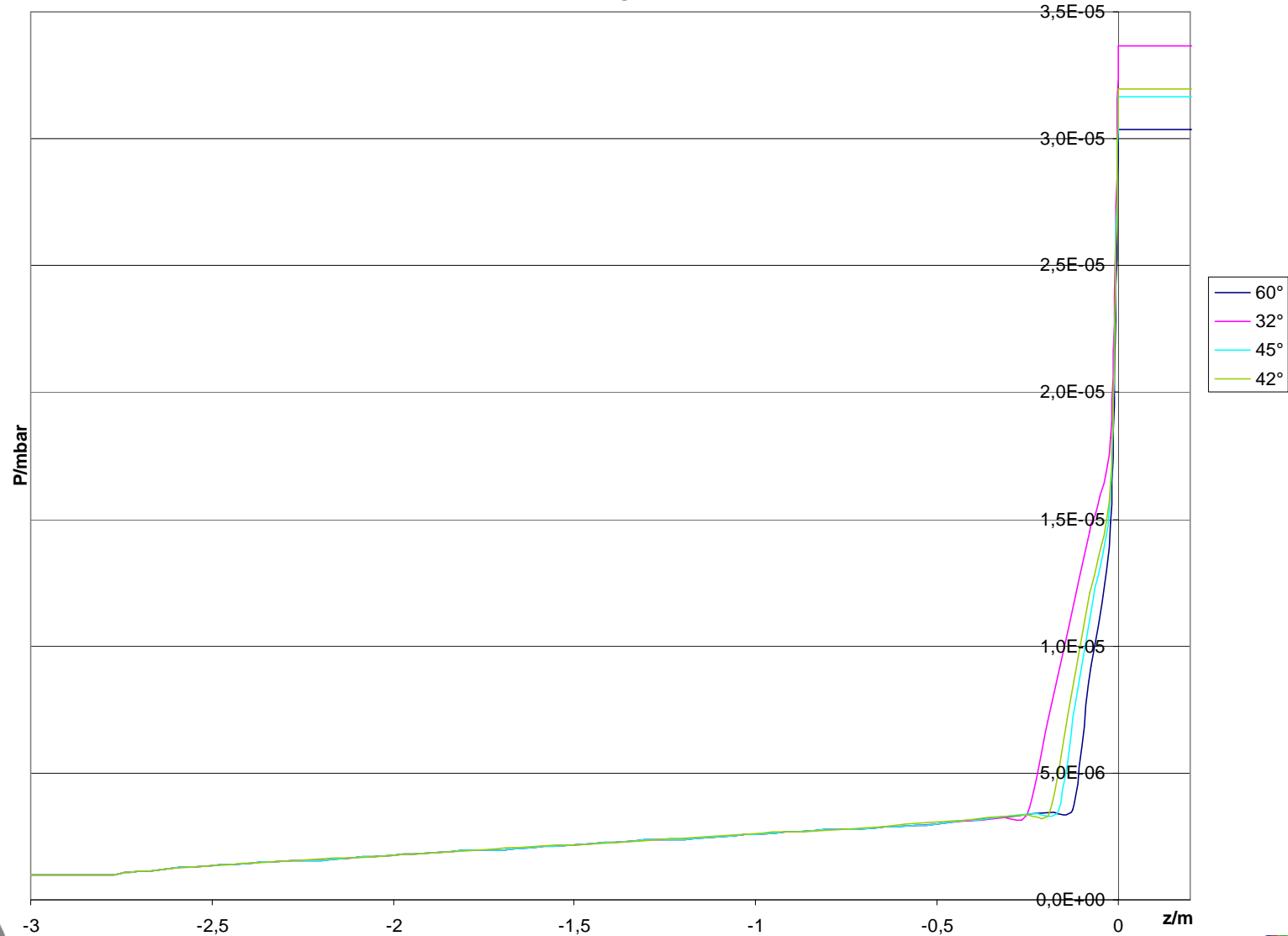


# geometry for calculations for H<sub>2</sub>

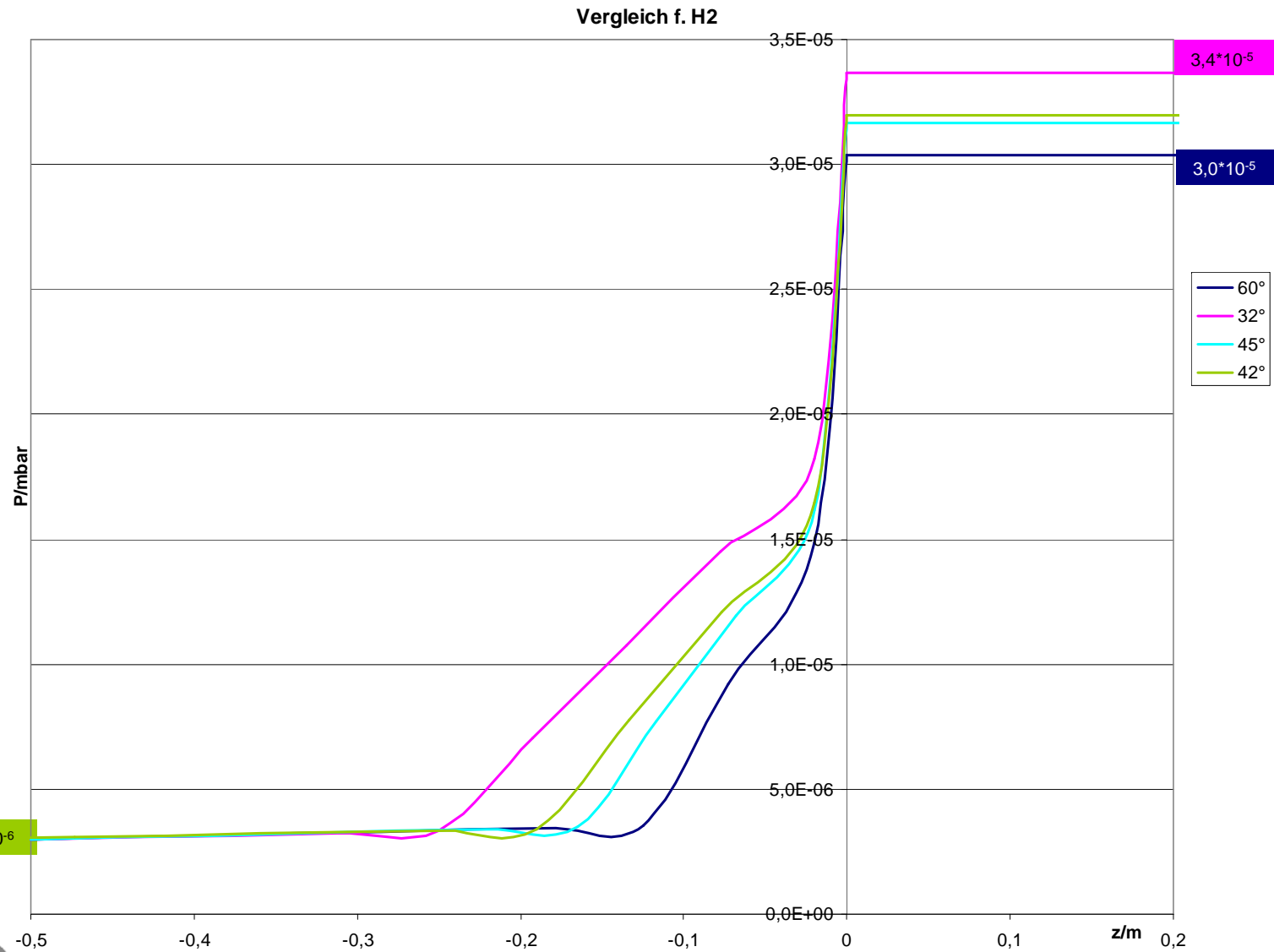


# H<sub>2</sub>-pressure along pbar-line

Vergleich f. H2



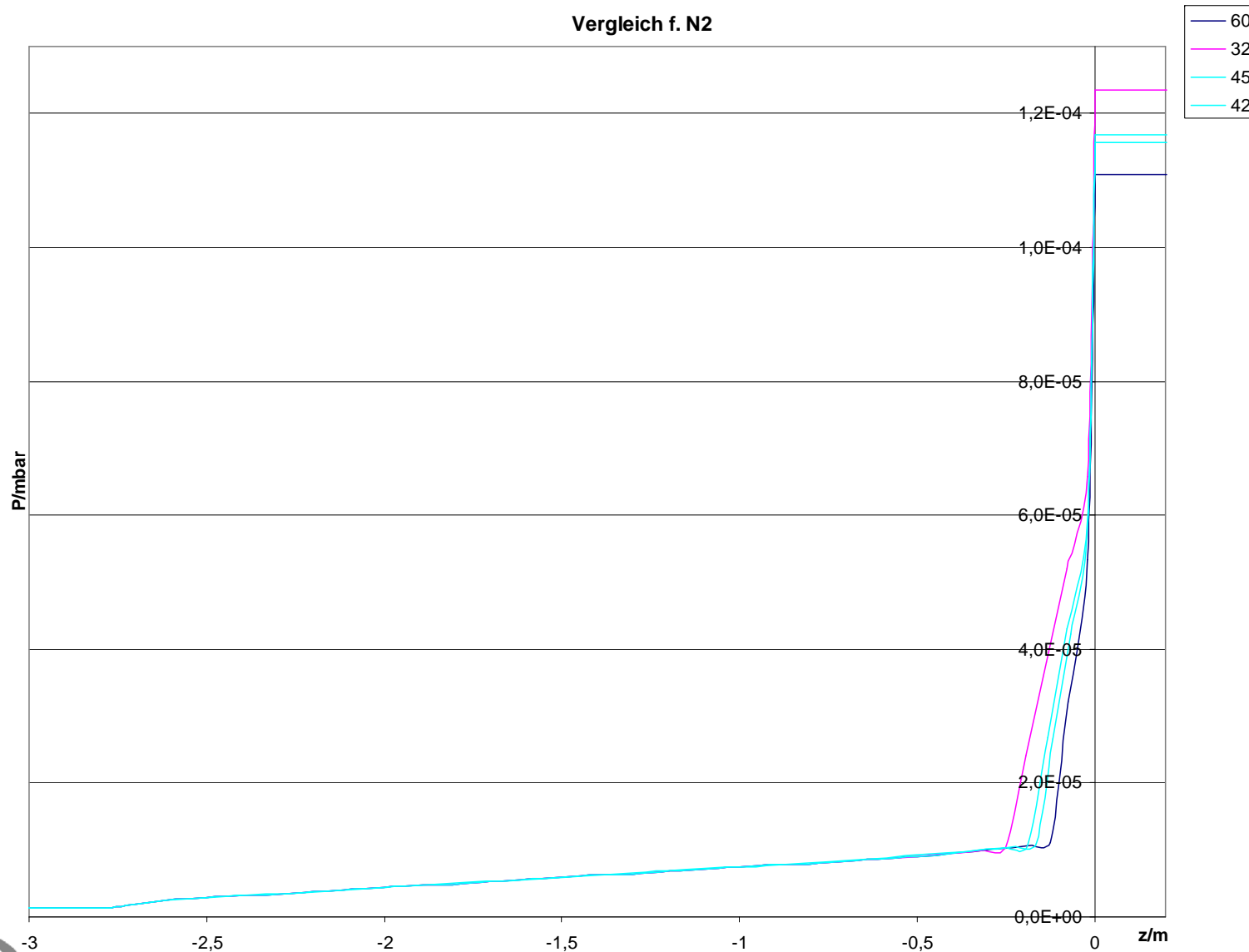
# H<sub>2</sub>-pressure along pbar-line





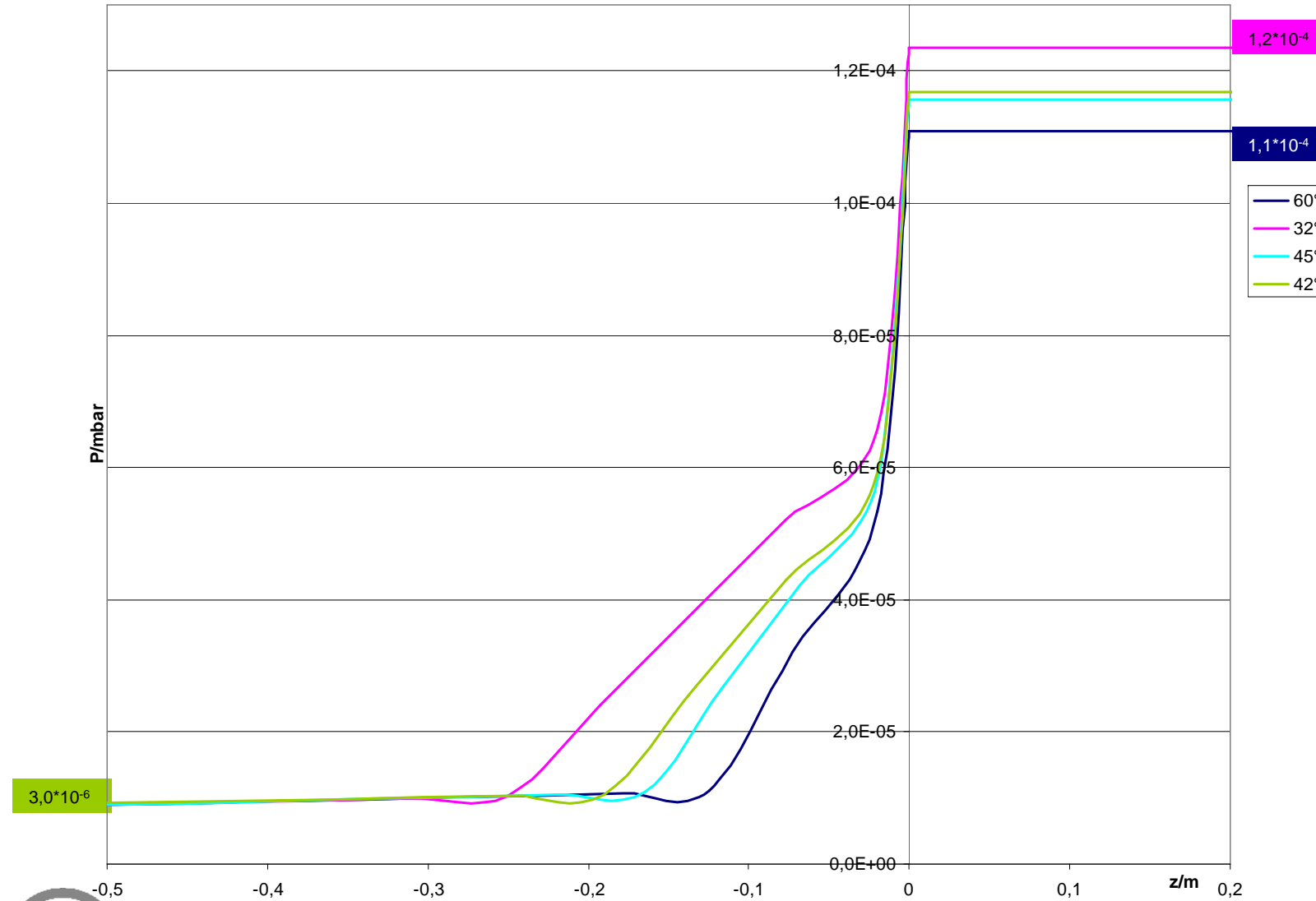
# N<sub>2</sub>-pressure along pbar-line

Vergleich f. N<sub>2</sub>



# N<sub>2</sub>-pressure along pbar-line

Vergleich f. N<sub>2</sub>



# results

- difference in pressure not too big due to same entrance orifice for all designs (20 mm  $\emptyset$ )
  - but difference inside cone up to factor 3 due to same size of conductance of cone and small piece from target cross
  - this difference in pressure adds up in calculation of thickness of residual gas, which destroys pbars before reaching IP
- 
- In following discussion fix values of parameters of this piece of beam pipe and then please stay with that layout !