



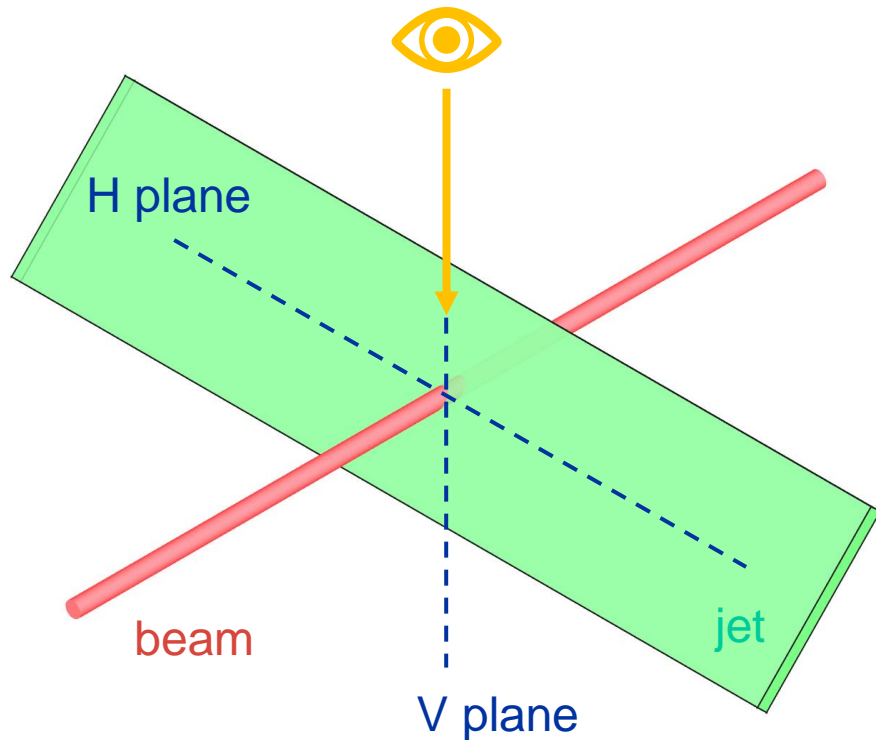
**BGC regular meeting**  
**geometric considerations for BGC v4**  
26/01/2025

D. Butti

# V3 configuration

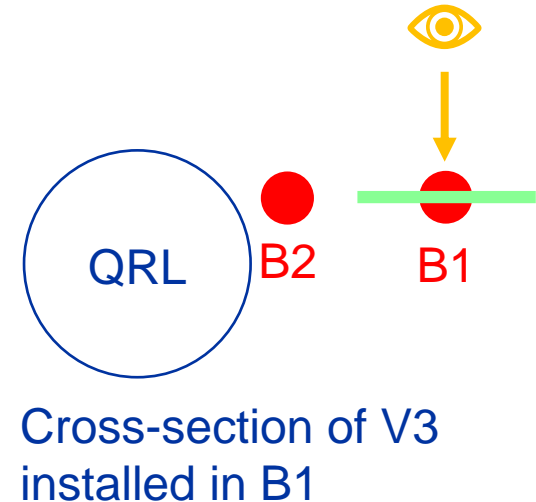
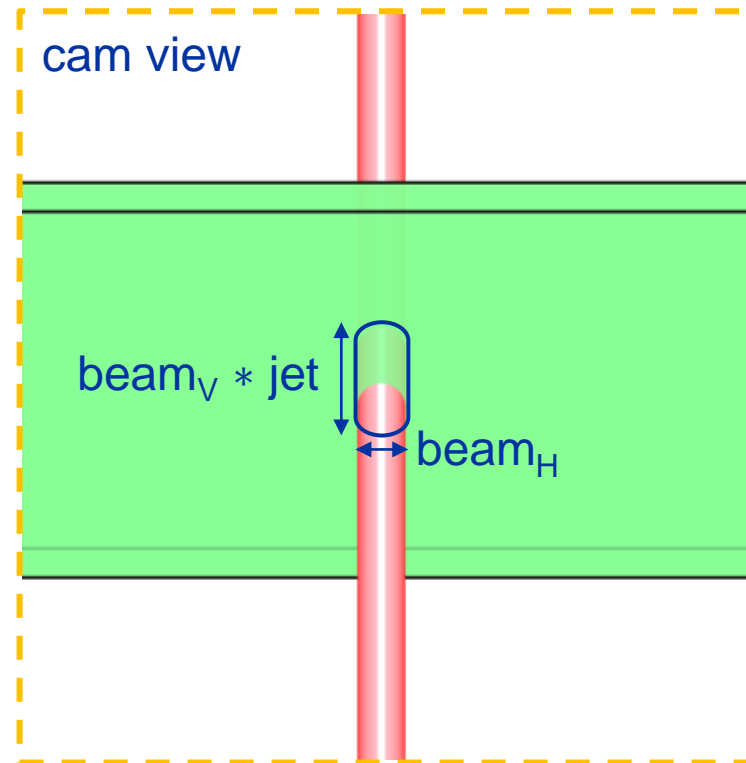
## Pro

- both planes with one optical line
- configuration OK for overlap monitor
- relaxed margin for jet-beam alignment



## Contra

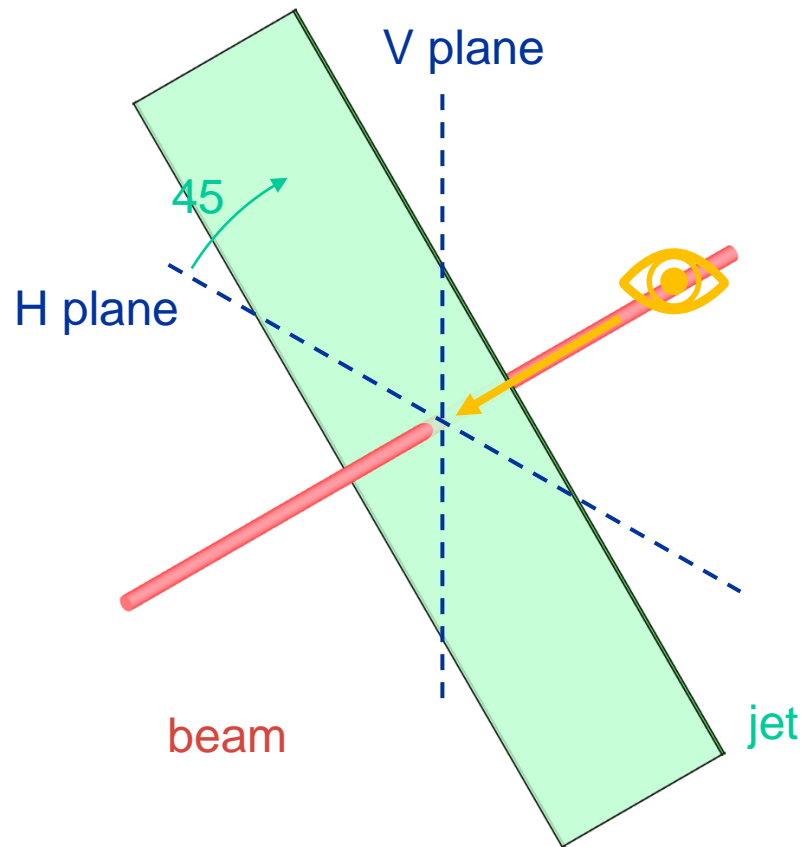
- one direction strongly affected by jet profile
- thin jet limits size of emission volume (hence signal)
- cannot be easily integrated in B2 due to QRL



# V3 skew configuration

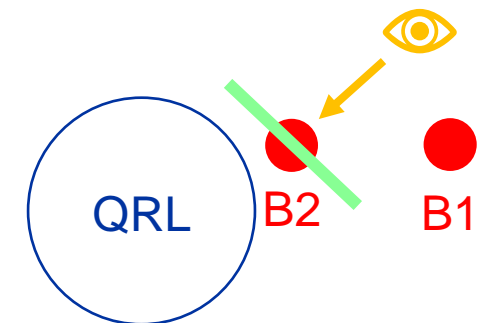
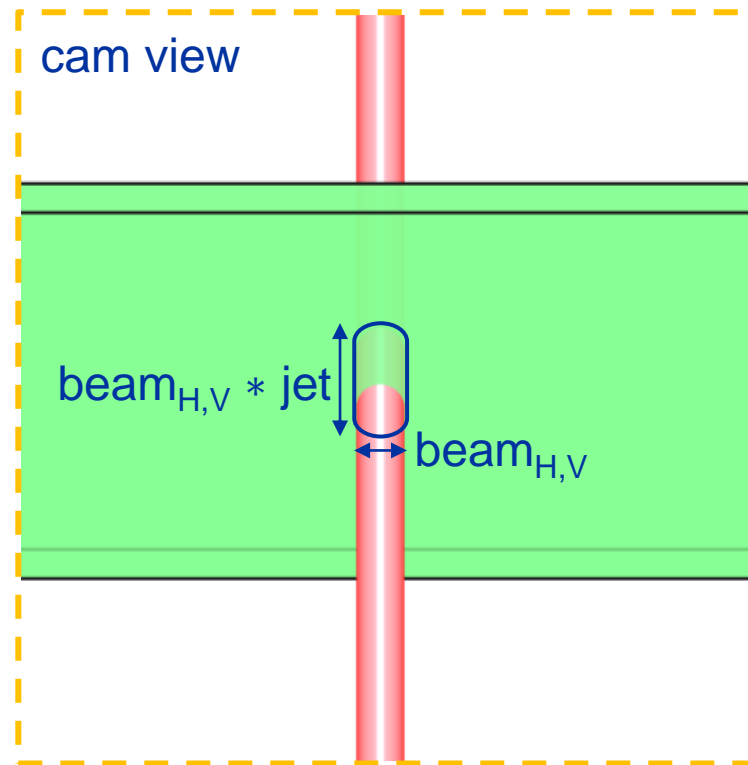
## Pro

- same as V3 non-skew
- simpler integration in B2



## Contra

- one direction strongly affected by jet profile
- thin jet limits size of emission volume (hence signal)
- cannot be easily integrated in B2 due to QRL

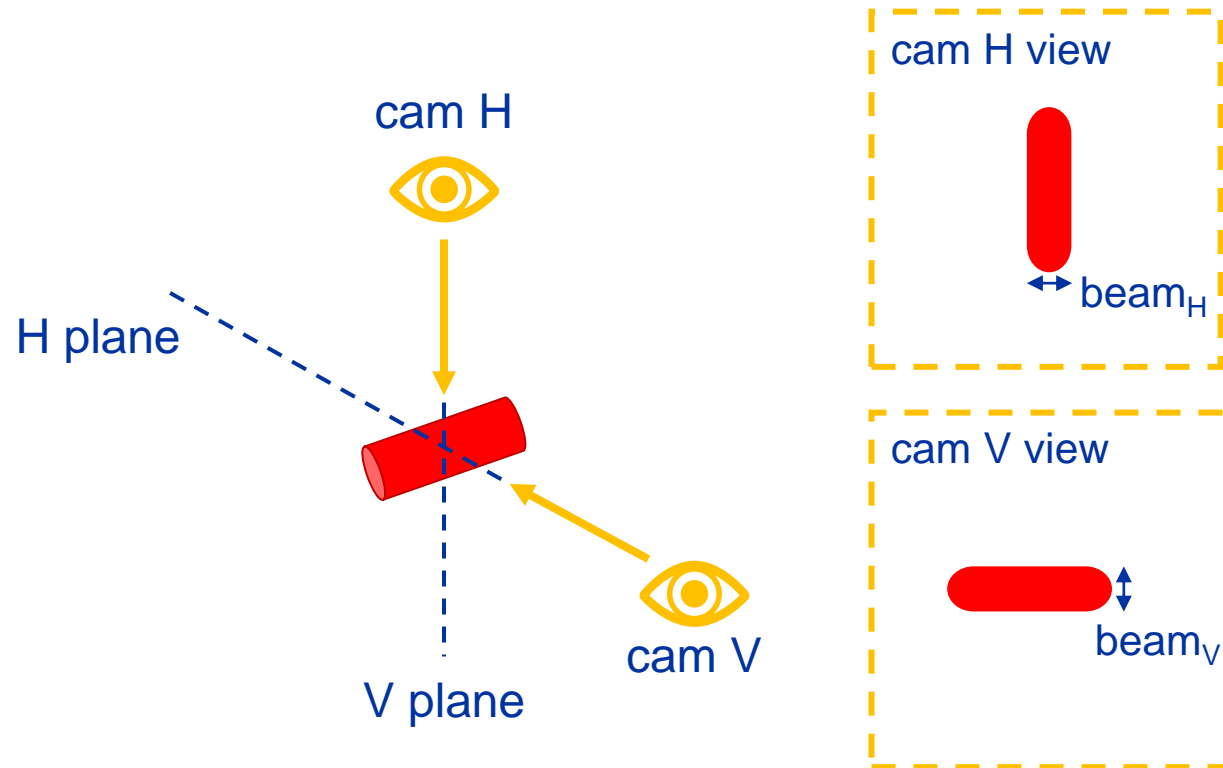


Cross-section of V3 skew concept for B2

# Towards optimized instrument...

Wishlist:

1. try to eliminate impact of jet thickness in both planes
2. avoid mixing H and V beam size in one image
3. prefer configuration with skew jet for QRL integration



Let's forget about the jet orientation and imagine the jet as something that creates a visible footprint of the beam...

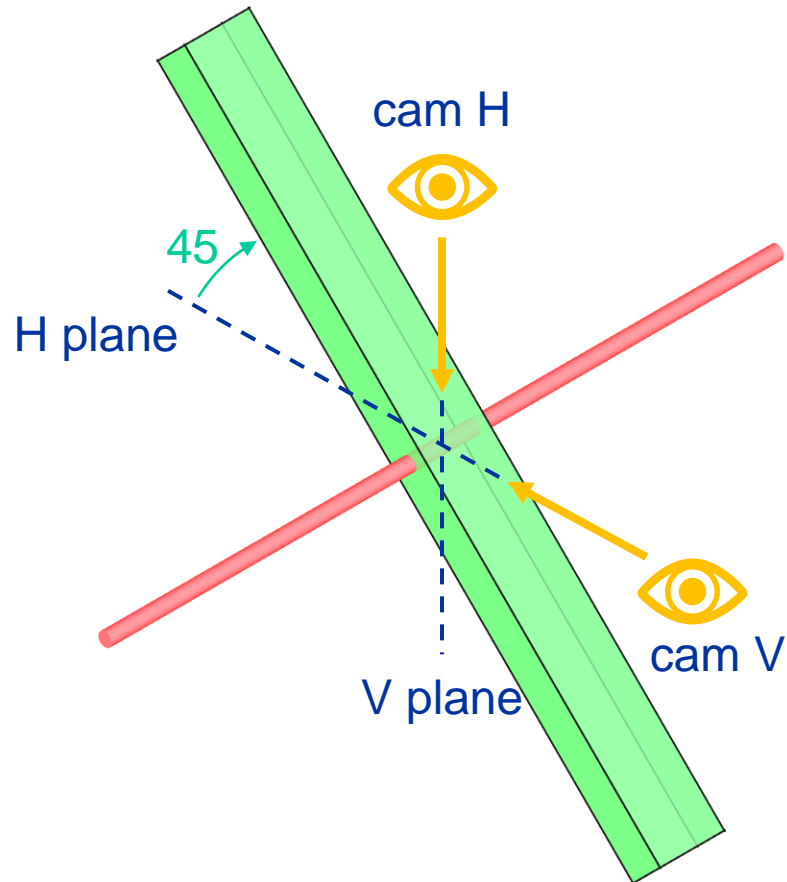
→ true beam size on both planes can be detected by **looking along the two beam directions**

The longer the footprint, the more signal at the camera

# V4 concept with skew jet and two optical lines

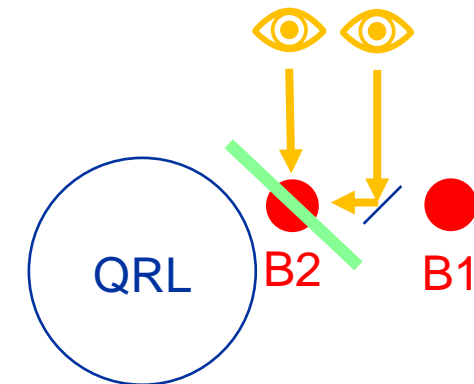
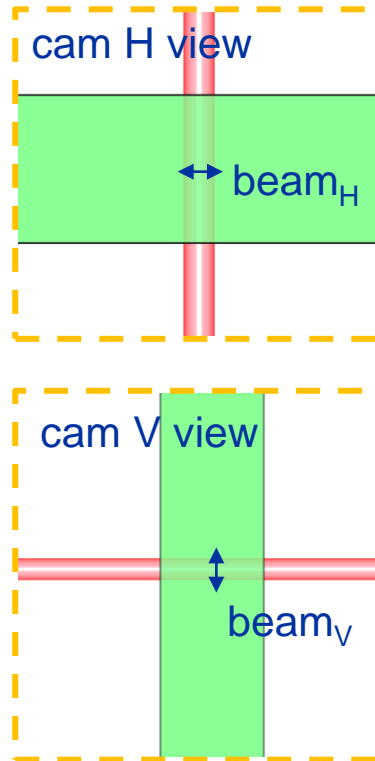
## Pro

- no jet thickness effect
- longer emissive region provides more signal
- simpler integration in B2



## Contra

- extra optical line
- tighter margin for beam-jet alignment (jet cannot be too big for gas load)
- more packed jet and optical lines (45 deg instead of present 90)



Concept of skew jet and two optical line, one folded with flat mirror

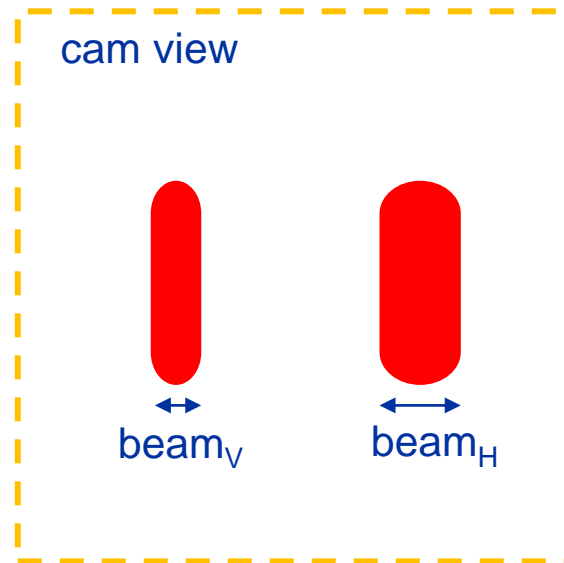
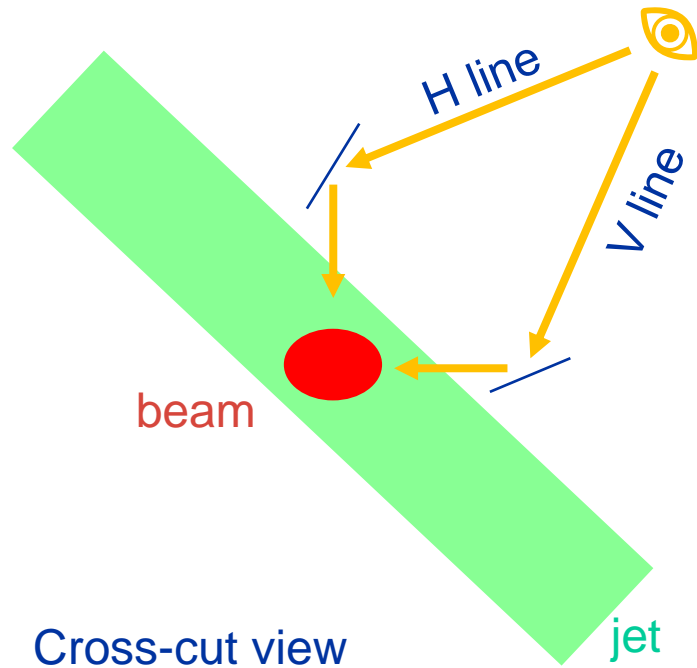
# V4 concept with skew jet and one optical lines

## Pro

- same as option with two lines
- only one camera to maintain

## Contra

- optics becomes more challenging
- optical branch more packed



Configuration achievable by modifying only the optical branch of the version with two lines

→ could be considered as an optimization option in a second stage

# Conclusion

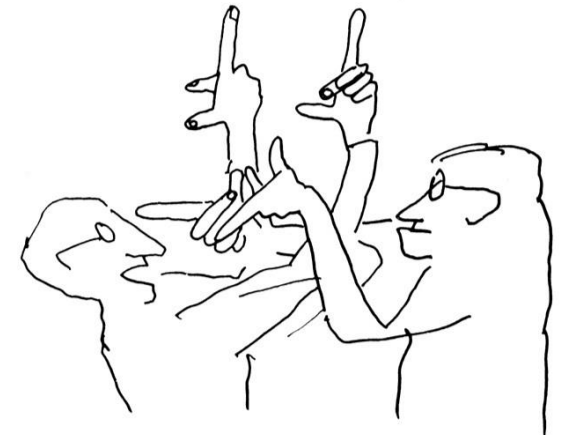
Decoupling H and V measurements highly beneficial for BGC performance

- accurate emittance measurements in both planes
- allow tail measurements in both direction (impossible in jet-affected plane in V3 configuration)

Configuration with two optical lines and skew jet allows this option and ease integration of BGC B2

Design effort required to manage reduced angular distance between optical lines and jet

Configuration could be further improved, with modifications of the optical branch only, to send the two beam projections on one camera



~~MAGNETIC~~ DISCUSSION  
BGC V4 B. Touschek