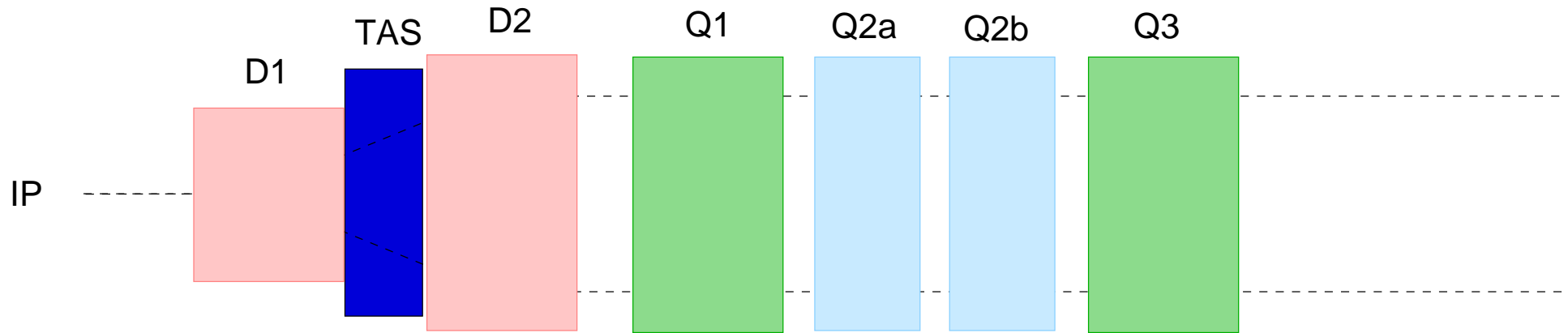





# Separate Triplet Magnets

## ● *2-in-1 triplet magnets:*



 increased  $L^*$

 
$$\beta(s) = \beta^* + \frac{(s - s_{IP})^2}{\beta^*}$$



## *Separate Triplet Magnets*

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### ● *magnet requirements:*

■ D1 / D2:  $L = 13.4$  meter,  $B = 15$  T, aperture?, cross-section?

→  $d(\text{Q1 entrance}) = 194\text{mm}$

■ Q1: 4.5 meter,  $B = 235$  T/m

■ Q2:  $2 \cdot 4.5$  meter,  $B = 260$  T/m

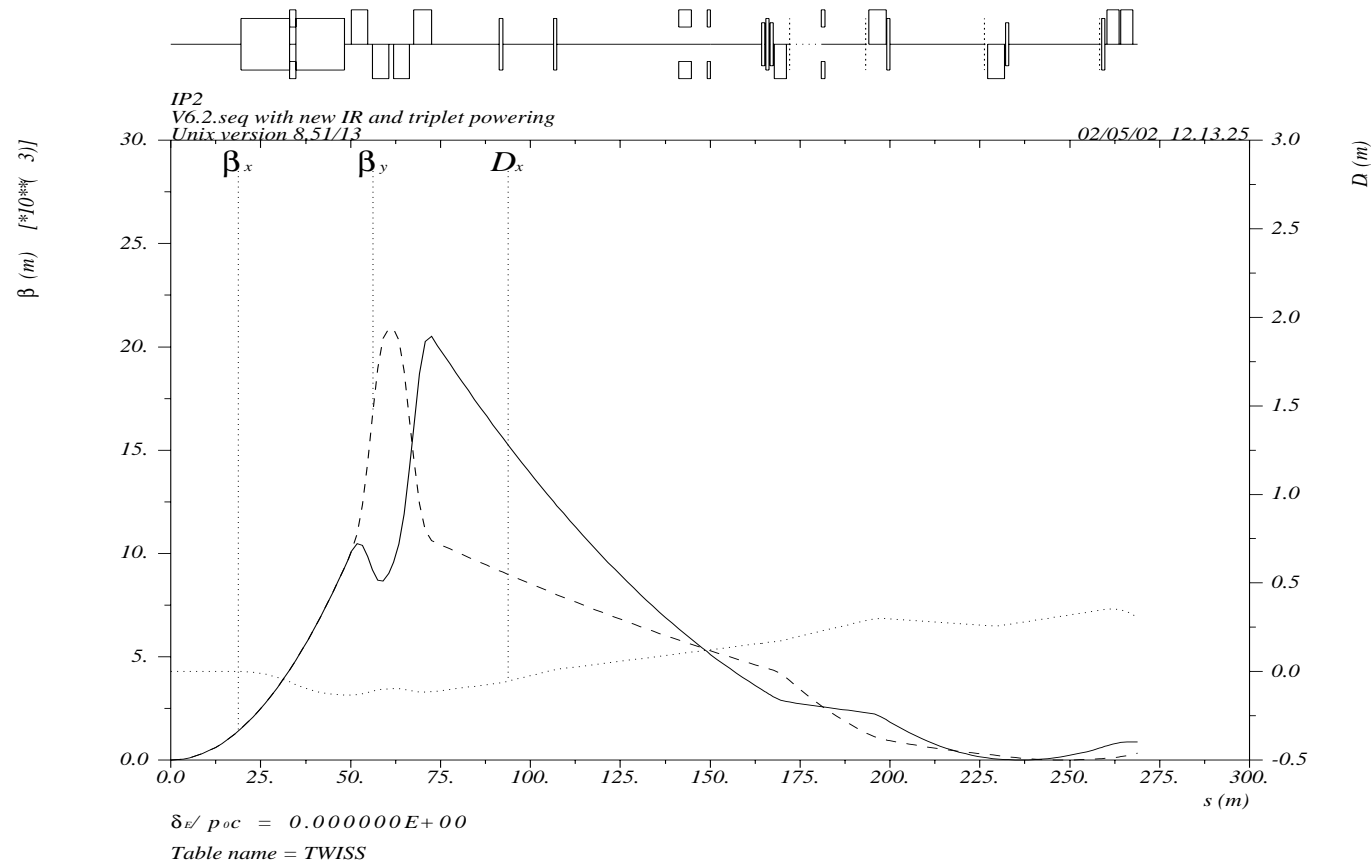
■ Q3: 5.0 meter,  $B = 280$  T/m

→  $\beta_{\text{max}} < 21$  km



# Separate Triplet Magnets

●  $\beta^* = 0.25$  meter





# Aperture

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● **common triplet elements (rough estimate,  $L^* = 23\text{m}$ ):**

■ 10  $\sigma$  beam envelope

■ 10  $\sigma$  beam separation

■ 20%  $\beta$  -beat

■ 4mm spurious dispersion

■ 3mm orbit errors

■ 3mm alignment errors

→  $D(\text{triplet}) > 33\sigma + 10 \text{ mm}$

$$D(\beta^* = 0.5\text{m}) > 61\text{mm}$$

$$D(\beta^* = 0.25\text{m}) > 82\text{mm}$$



# Aperture

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● *separate triplet elements (rough estimate,  $L^* = 50.25\text{m}$ ):*

■  $10\sigma$  beam envelope

■ no beam separation

■ 20%  $\beta$  -beat

■ 4mm for spurious dispersion

■ 3mm orbit errors

■ 3mm alignment errors

→  $D(\text{triplet}) > 22\sigma + 10\text{ mm}$

$D(\beta^* = 0.25\text{m}) > 77\text{mm}$