

Preliminary extraction optics for proposed options of L^*

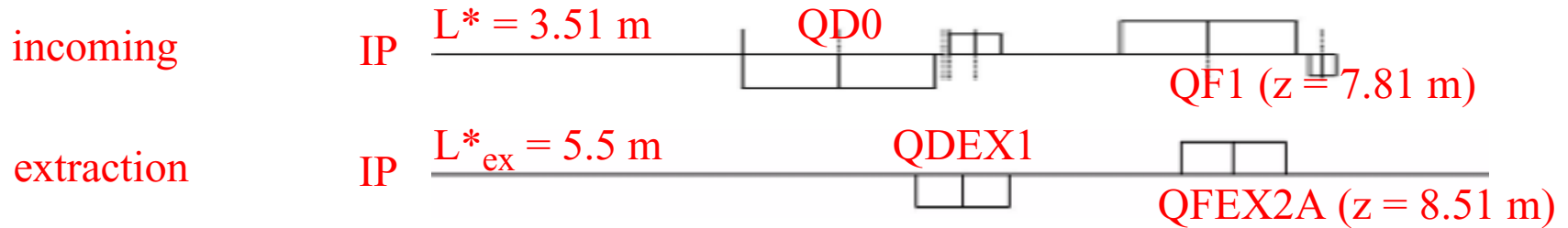
Proposed options for incoming optics:

- Three settings for distance between IP and incoming QD0: $L^* = 3.51$ m, 4.0 m and 4.5 m.
- Position of the incoming QF2 is fixed at $z = 9.5$ m, sufficient for push-pull.

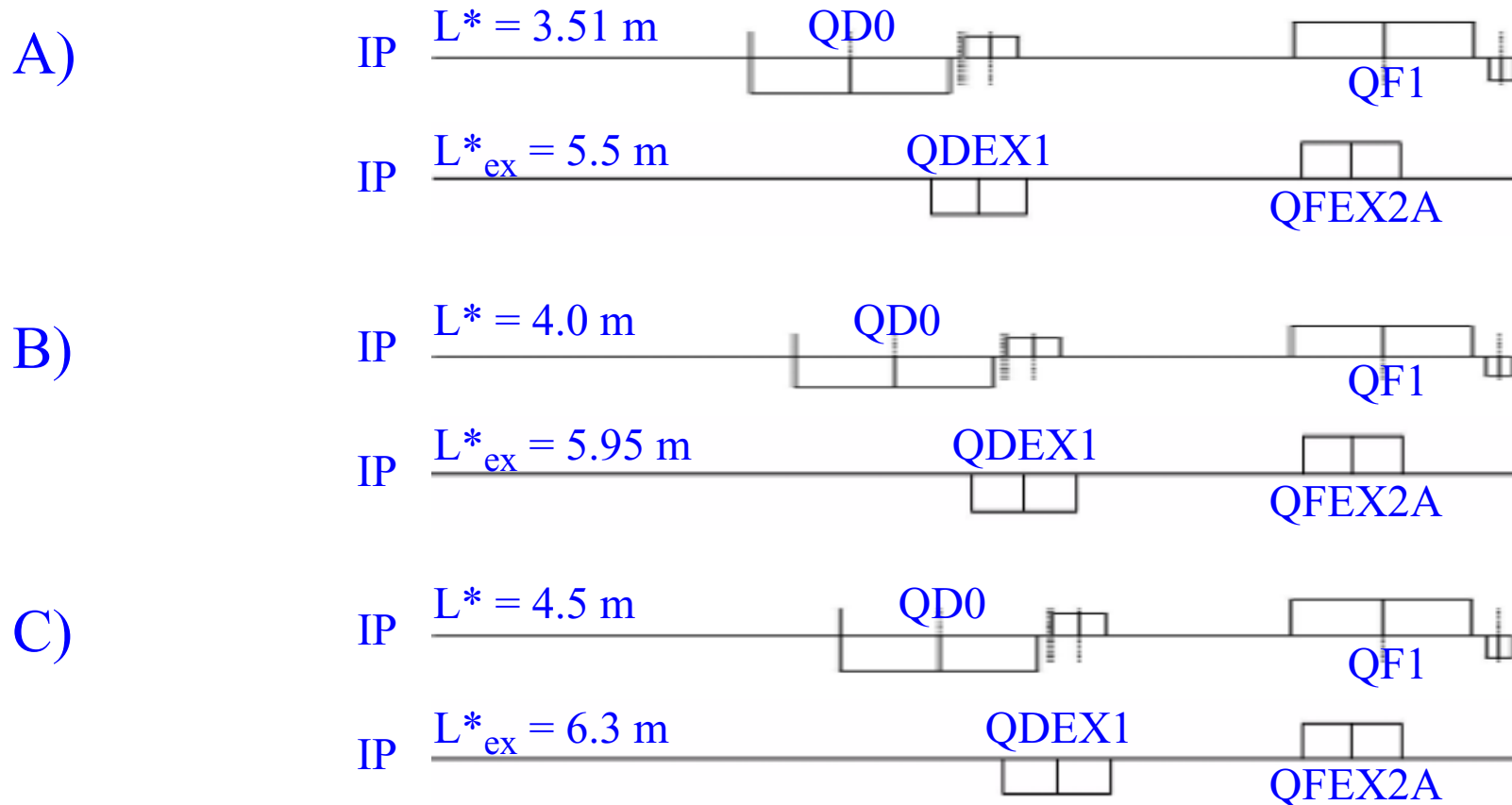
Modifications to extraction optics:

- QDEX1 moves along with QD0 for $L^*_{\text{ex}} = 5.5$ m, 5.95 m and 6.3 m.
- Position of the QFEX2A is fixed at $z = 9.6$ m.
- The crab-cavity and the warm quads move 1.69 m downstream of IP.
- The chicane magnets move 0.9095 m downstream of IP.
- The SC QDEX1 and QFEX2A are made short with a high field, compatible with 250 GeV beam. The warm quadrupoles and chicane bends are compatible with 500 GeV beam.
- The quadrupole field and length are adjusted to maintain the 2nd focus at the Compton IP with $R_{22} = -0.5$, and to minimize the energy dependent beam size.

Nominal positions near IP for push-pull



Modified positions near IP: QDEX1 moves along with QD0, QF1 and QFEX2A are fixed at $z = 9.5 \text{ m}$ and 9.6 m , respectively.



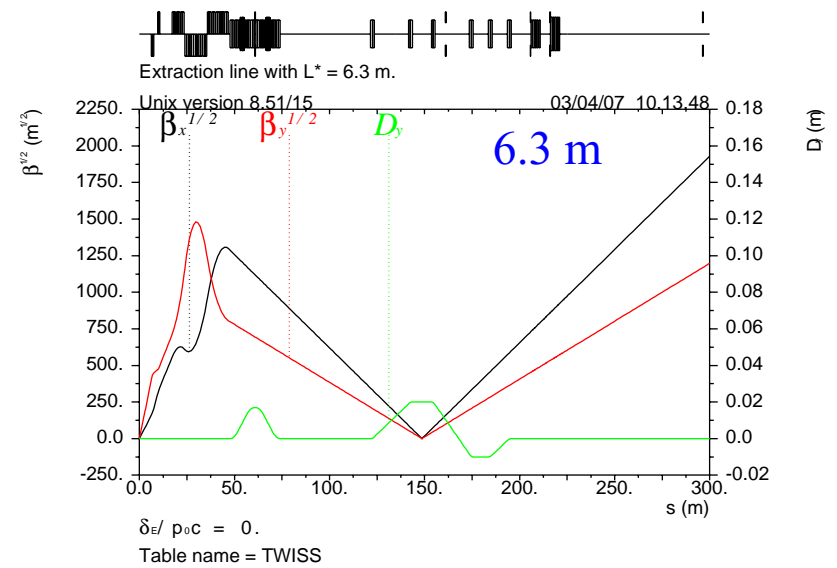
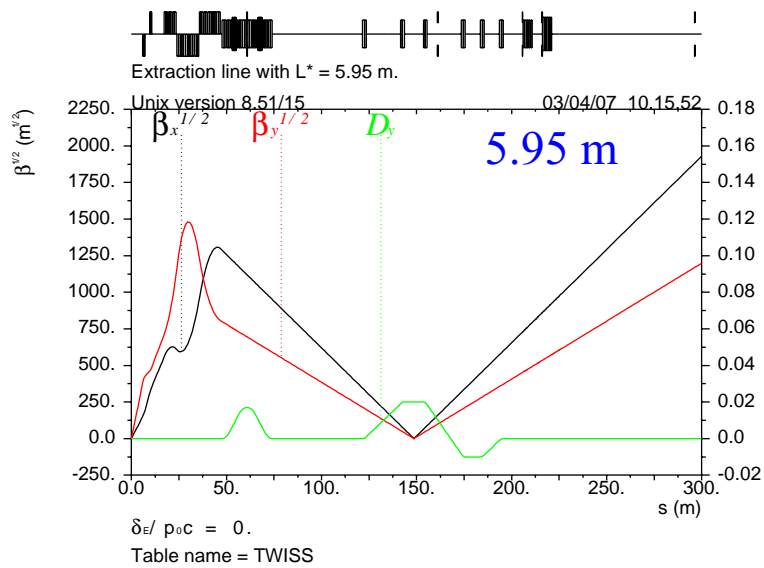
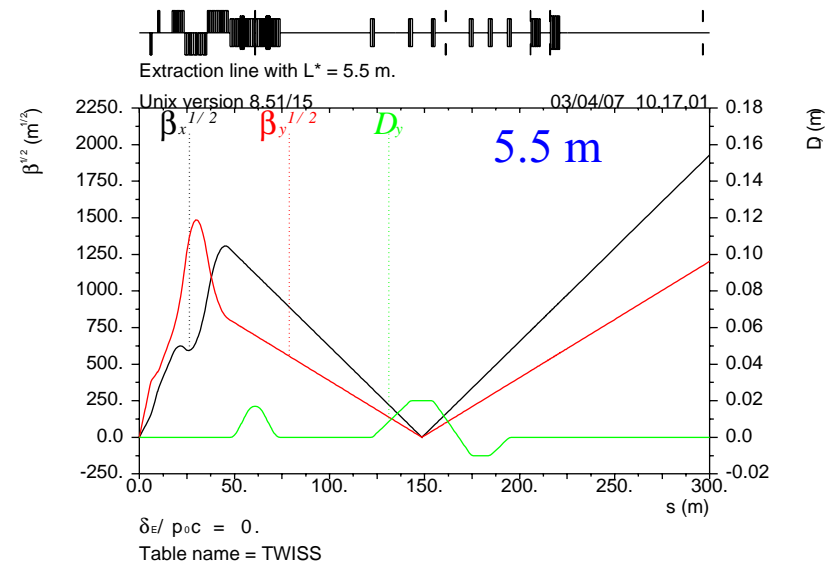
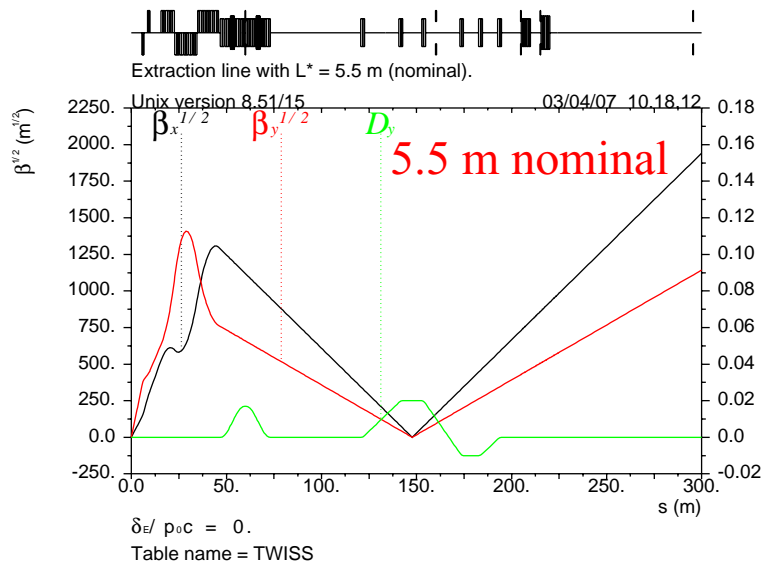
Quadrupole parameters

Table 1: Gradient (T/m) x Length (m) x Aperture (mm) at 250 GeV.

L^*_{ex}	5.5 m nominal	5.5 m	5.95 m	6.3 m
QDEX1 (SC)	100.0 x 1.060 x 15	98.00 x 1.060 x 15	89.41 x 1.150 x 17	86.39 x 1.190 x 18
QFEX2A (SC)	23.08 x 1.200 x 26	31.33 x 1.100 x 30	33.67 x 1.100 x 30	36.00 x 1.100 x 30
QFEX2B,2C,2D	11.19 x 2.143 x 42	11.12 x 1.904 x 44	11.27 x 1.904 x 44	11.36 x 1.904 x 44
QDEX3A,3B	11.93 x 2.106 x 42	11.39 x 2.083 x 44	11.37 x 2.083 x 44	11.36 x 2.083 x 44
QDEX3C	10.89 x 2.106 x 46	11.39 x 2.083 x 44	11.37 x 2.083 x 44	11.36 x 2.083 x 44
QDEX3D	9.63 x 2.106 x 52	9.82 x 2.083 x 51	9.81 x 2.083 x 51	9.80 x 2.083 x 51
QDEX3E	8.08 x 2.106 x 62	8.21 x 2.083 x 61	8.20 x 2.083 x 61	8.19 x 2.083 x 61
QFEX4A	7.11 x 1.945 x 71	7.05 x 1.955 x 71	7.04 x 1.955 x 71	7.04 x 1.955 x 71
QFEX4B,4C,4D,4E	5.94 x 1.945 x 85	5.89 x 1.955 x 85	5.88 x 1.955 x 85	5.88 x 1.955 x 85

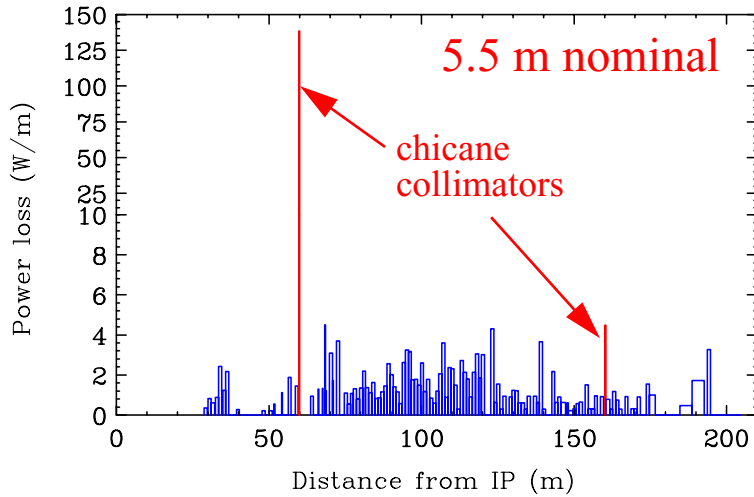
- In the new $L^*_{ex} = 5.5$ m, 5.95 m, 6.3 m options the lengths and z-positions of the quads are fixed, except the QDEX1.
- The Aperture is the radius to beam pipe.

Extraction β functions and dispersion

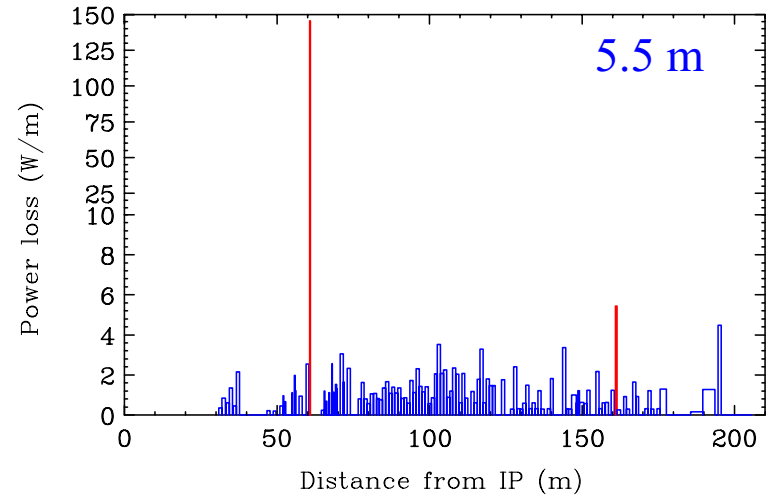


Disrupted beam loss for 250 GeV low beam power option (cs14)

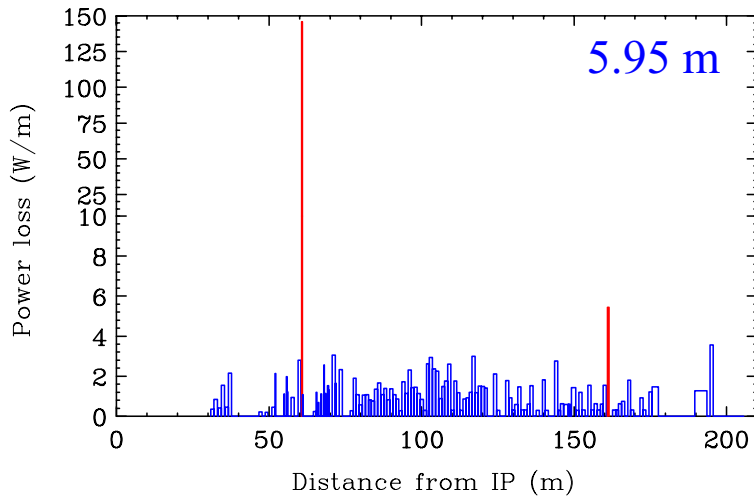
Total loss on magnets and pipe: 152 W
 At chicane collimators: 42 W, 2.2 W
 At dump collimators: 2.8 kW, 6.7 kW, 10.7 kW



Total loss on magnets and pipe: 126 W
 At chicane collimators: 44 W, 2.7 W



Total loss on magnets and pipe: 125 W
 At chicane collimators: 44 W, 2.7 W



Total loss on magnets and pipe: 123 W
 At chicane collimators: 44 W, 2.7 W

