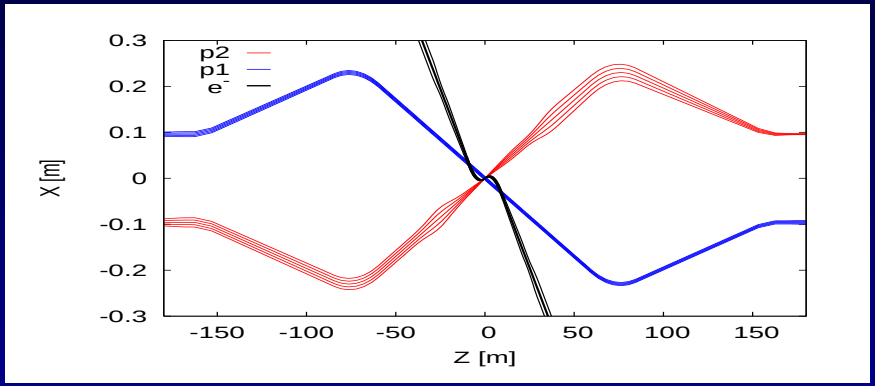
LHeC IR design status



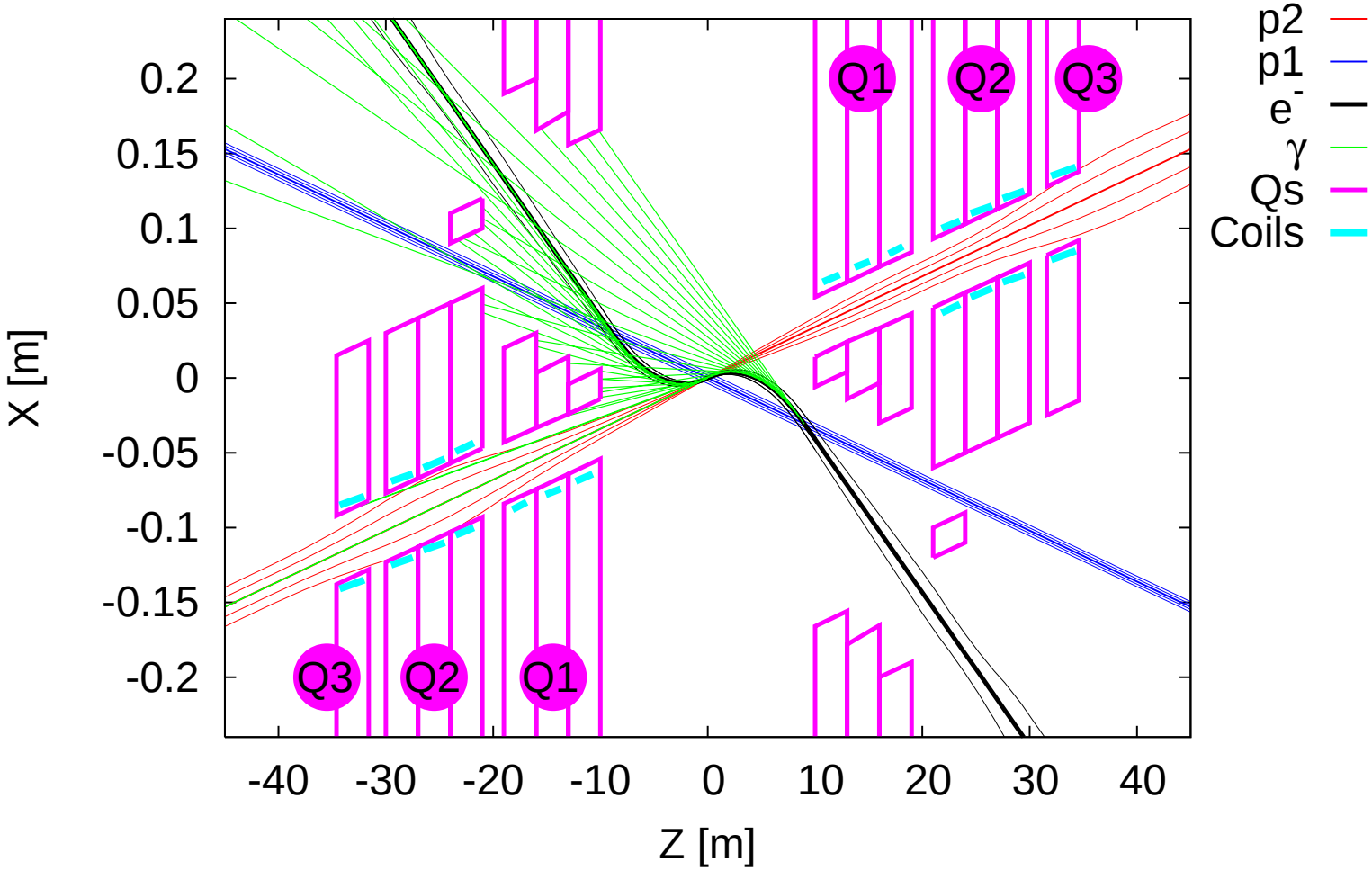
R. Tomás

Thanks to O. Brüning, S. Fartoukh, P. Kostka, R. de Maria, S. Russenschuck and F. Zimmermann

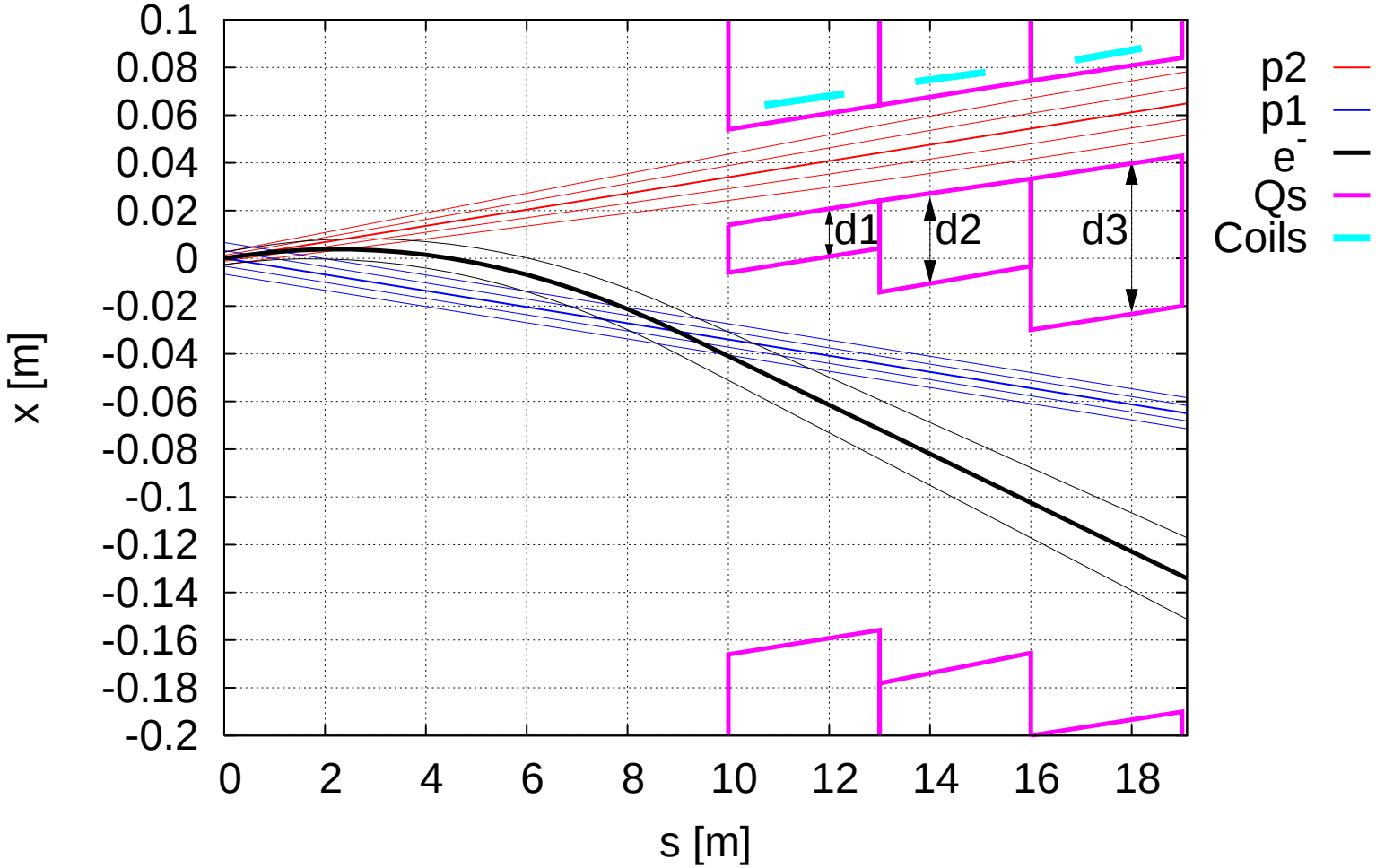
Status

- IR concept with β^*= 0.1 m in IR2
- Lots of synchrotron radiation in the IR
- Challenging magnet design
- Compatible with nominal LHC
- What about HL-LHC with β^*= 0.15 m in IP1 and IP5?

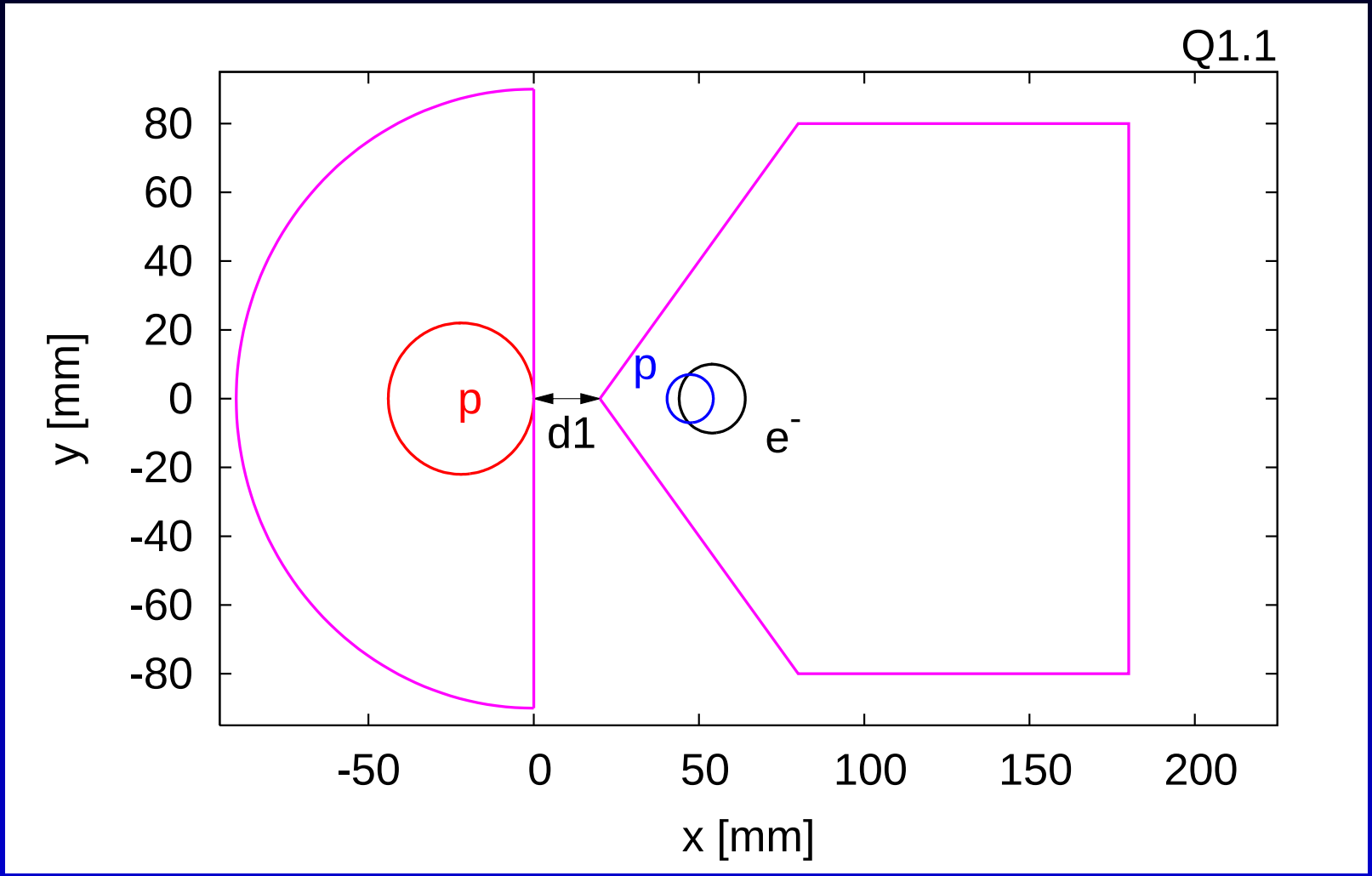
IR layout


p2
p1
e-
γ
Qs
Coils
Q1
Q2
Q3
Q3
Q2
Q1
X [m]
Z [m]
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-40
-30
-20
-10
0
10
20
30
40

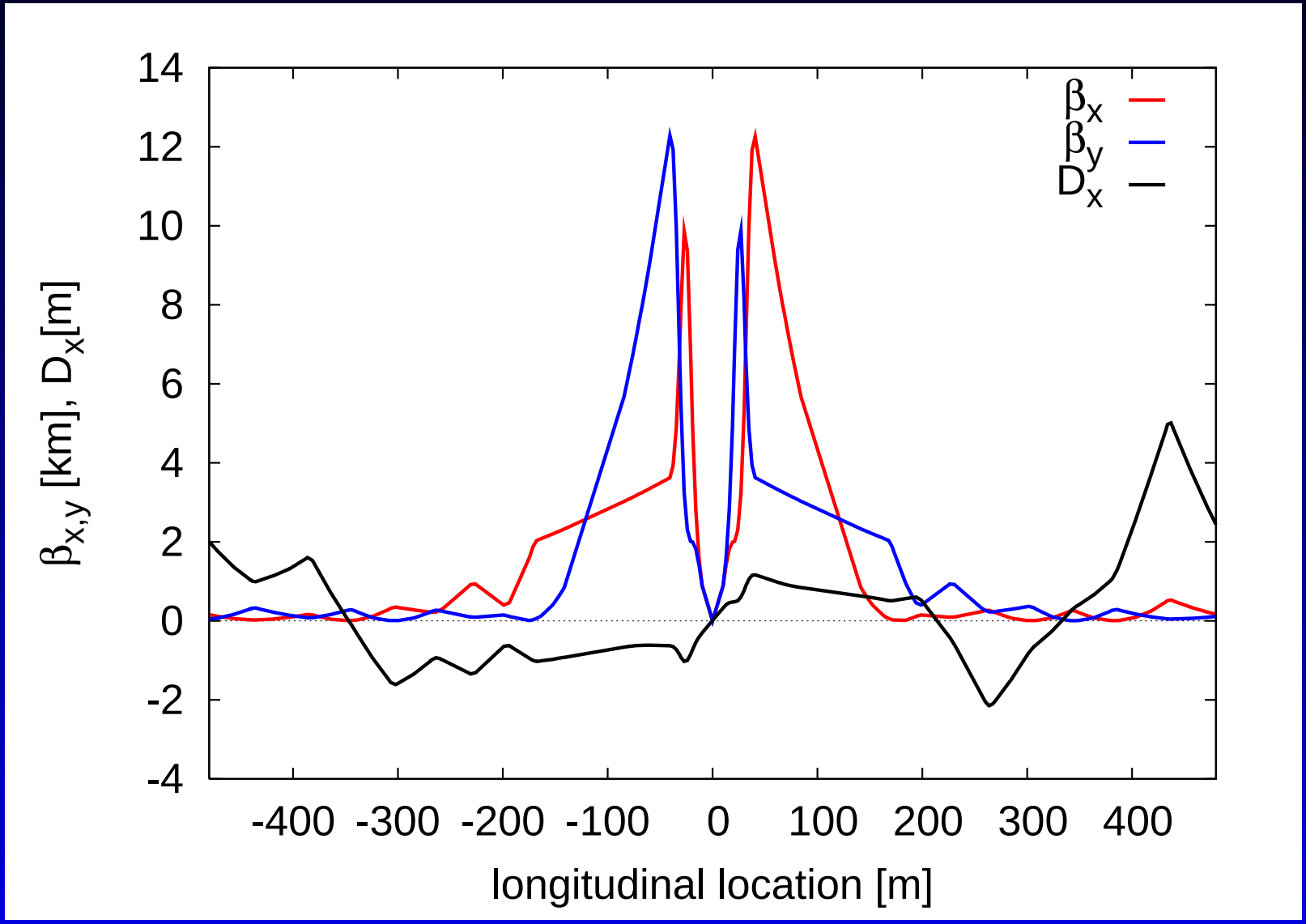
Q1 longitudinally



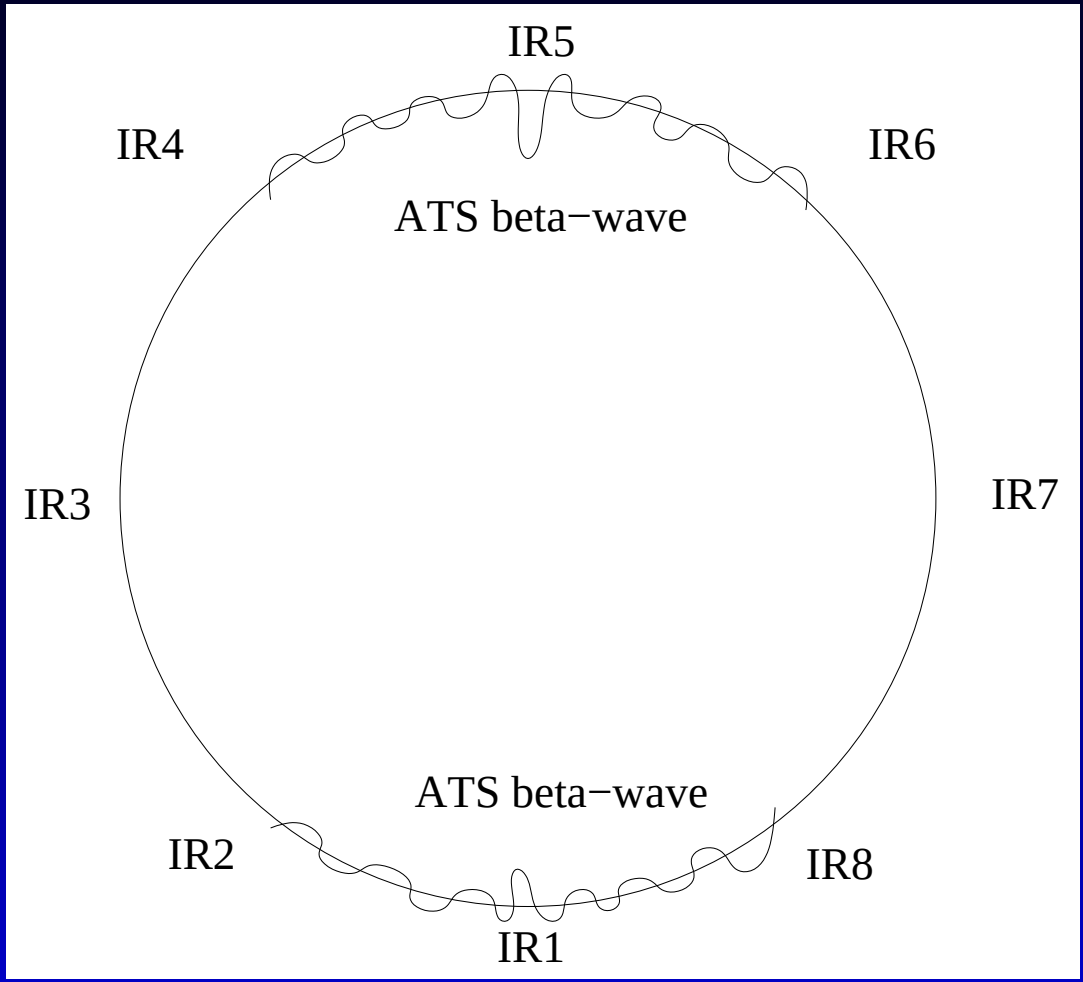
First block of Q1



LHeC IR optics matched to LHC



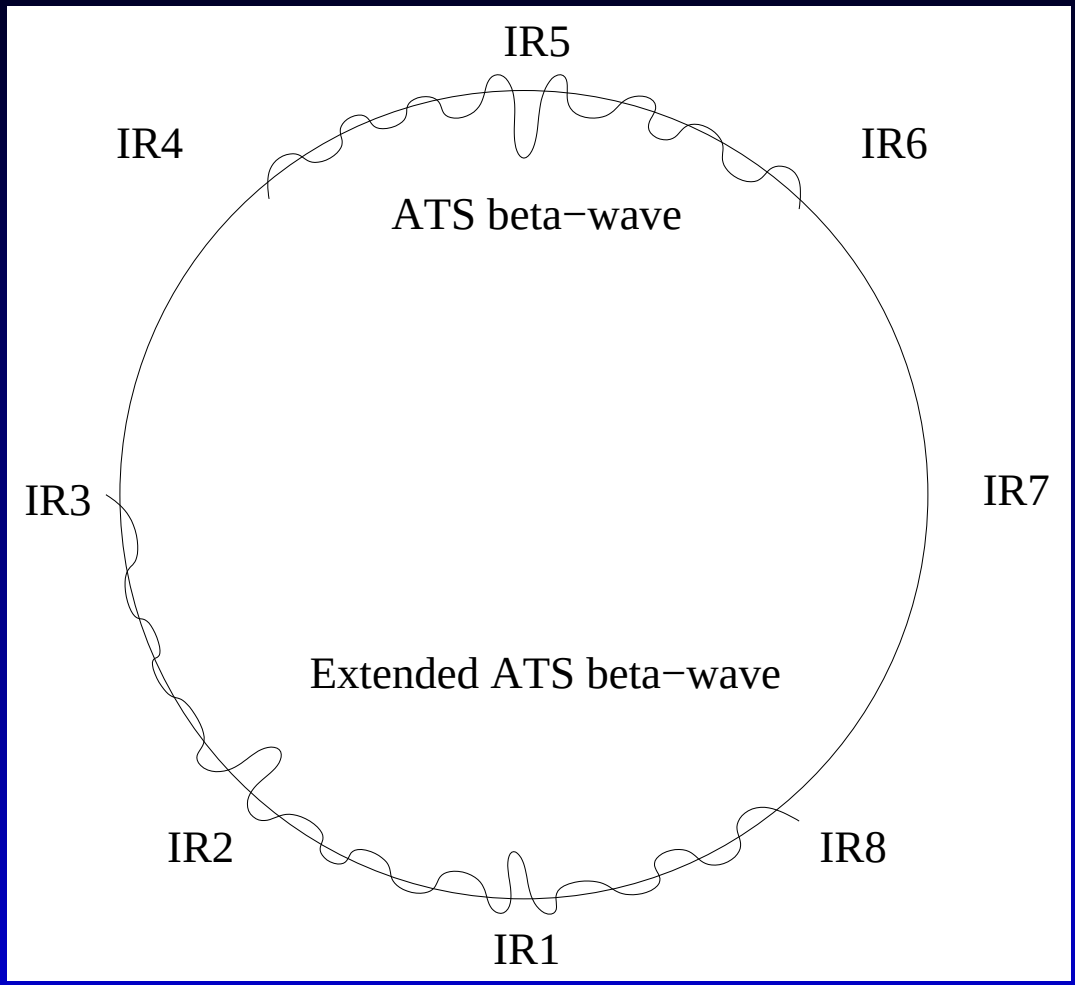
What about HL-LHC with ATS optics?



ATS optics uses IR2 quadrupoles to squeeze β^* in IR1.

This is not comfortable for LHeC.

Possible solution to achieve LHeC low β^*



Starting the β-wave from IR3. Such optics is very challenging. R. de Maria estimates 1 year or more work.

Future work

- New (longer) L* to reduce synchrotron radiation
- Optimization of proton crossing angle
- New magnet specifications to S. Russenschuck
- Assess the feasibility of starting the ATS in IR3 (in collaboration with R. de Maria and S. Fartoukh)
- Full LHC optics design compatible with HL-LHC