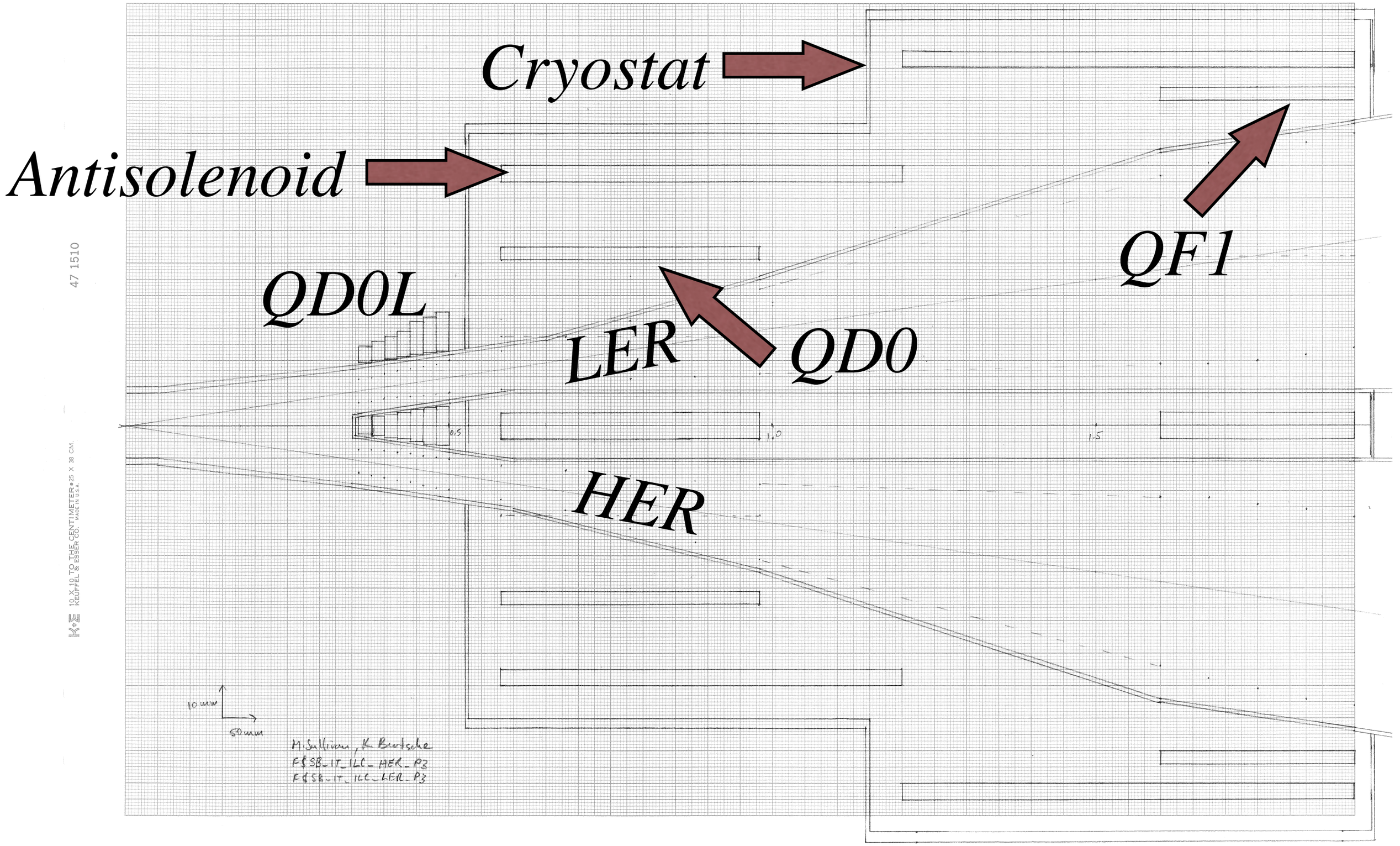
Interaction Region and SVT

Eugenio Paoloni

New IR

- Giovanni Marchiori left Pisa for Paris
- Who will translate the new IR in GDML?
- The BDSIM tool adapted by Giovanni Marchiori is far from being automatic

Last Design from Mike Sullivan



We have lengthened QDO to lower the magnet strength and we have shortened
and moved back a bit QF1. In the P2 design QF1 was fairly weak so we used up some of that margin by shortening
it. The primary reason for the P3 iteration is to bring down the strength of QD0 and keep the peak beta functions
still close to 2000 m in the vertical plane. We also backed up QD0 to increase the amount of available
conductor space from 3 mm to 4 mm. Conductor space for QF1 is also 4 mm. HER QD0 strength is now 1.2 T/cm.
The maximum beta values are(meters):

	X	Y
LER	415	2193
HER	581	1971

for beta*(mm)	X	Y
LER	35	0.16
HER	20	0.27

Using a 7 mm radius beam pipe through the PM we allow 1 mm of space for the vacuum chamber and 0.5 mm of
space between the beam pipe and the magnetic material we are left with 3mm of space between the two beams
at 0.4m. This space for PM material increases by about 1 mm for every 2 cm we move away from the IP.
The following field strengths come from an estimate from Kirk Bertsche for elliptical cross-section magnets.
We have an ellipitical beam pipe with a larger vertical dimension to give us more vertical beam-stay-clear.
With ellipitical PMs with Br=14 kG, we get the following quadrupole fields for the LER:

IP face of magnet slice (m)	Strength (G=Kg/m)	LER K value	thickness (cm)
0.36	800.000	-5.9959	2
0.38	900.000	-6.7453	2
0.40	1000.000	-7.4948	2
0.42	1000.000	-7.4948	2
0.44	1000.000	-7.4948	2
0.46	1000.000	-7.4948	2
0.48	1000.000	-7.4948	2

The super-conducting QD0 starts at 0.58 m and is 0.4 m long for both beams. The K values and gradients are:

	K	G (kG/m)
LER	-3.91517	-522.3842
HER	-5.10220	-1191.338

The super-conducting QF1 starts at 1.60 m from the IP and is 0.3 m long for both beams. The K values and gradients are:

	K	G (kG/m)
LER	+2.97830	397.3817
HER	+3.08603	720.5722

Non trivial design

- One dedicate people for ~1 week to translate in GDML the IR
- (+1 to learn GDML)

SVT status

- At present we have the very detailed model of the BaBar SVT integrated with a Layer 0
- PRO: fidelity
- CONS: unflexible, i.e. is very hard to implement modifications in the geometry
- A parametric, even “crude”, GDML model is desirable

SVT digitization

- At present a crude digitization is implemente in BRUNO
- Fixed multiplicy (1)
- Null dead time
- OK for February, to be improved for the TDR