200th Design update
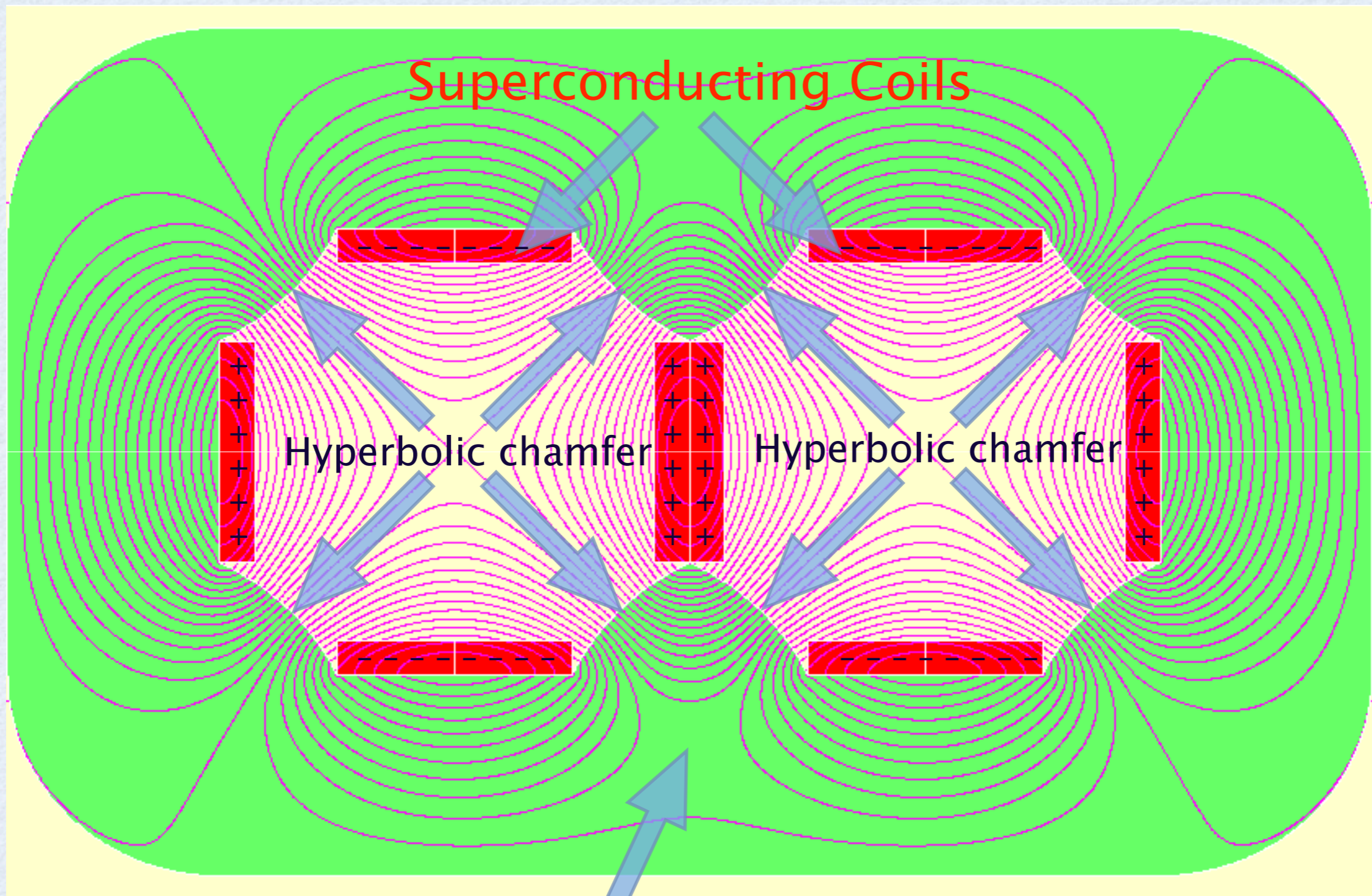
Talk Outline

- Double Panovsky quadrupole: a resumé of Pavel Vobly new ideas for the QD0

- The status of the QD0 "Italian style"

Panovsky double quadrupole

Superconducting Coils

Hyperbolic chamfer   Hyperbolic chamfer

Permendur Yoke

Pavel Vobly

Key ingredients

- ## High permeability of the yoke
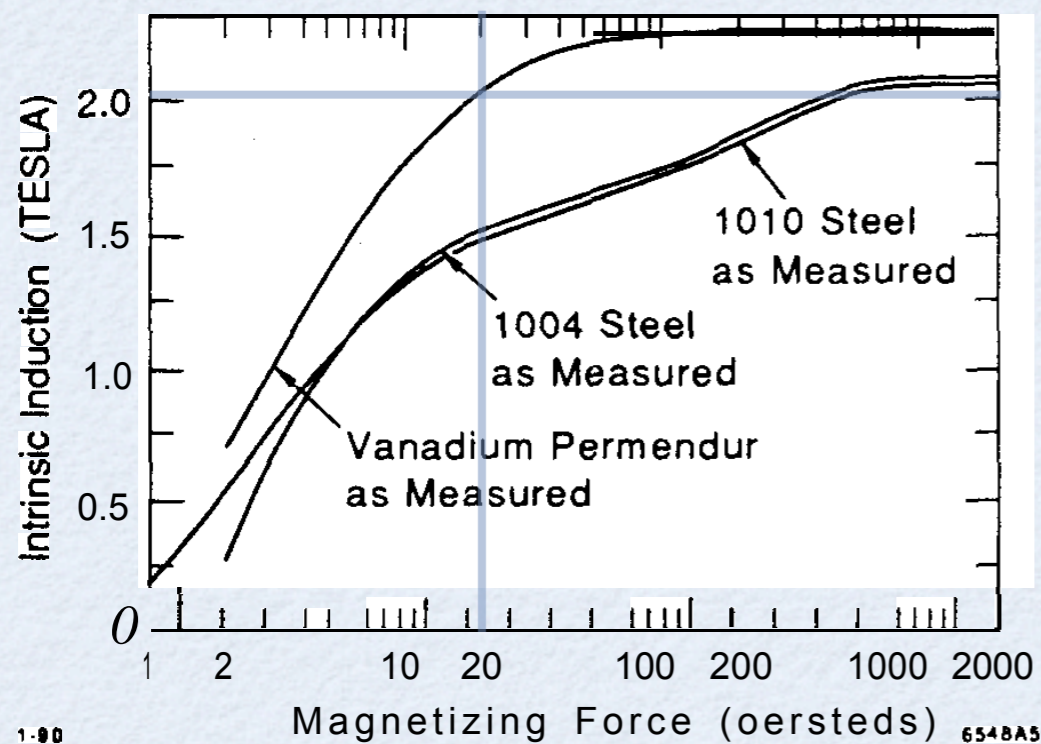 - ### i.e. Permeability > 1000, B < 2 T
- ## Uniform current density

Fig. 5. Intrinsic induction (B-H) versus magnetizing force H for measured samples.
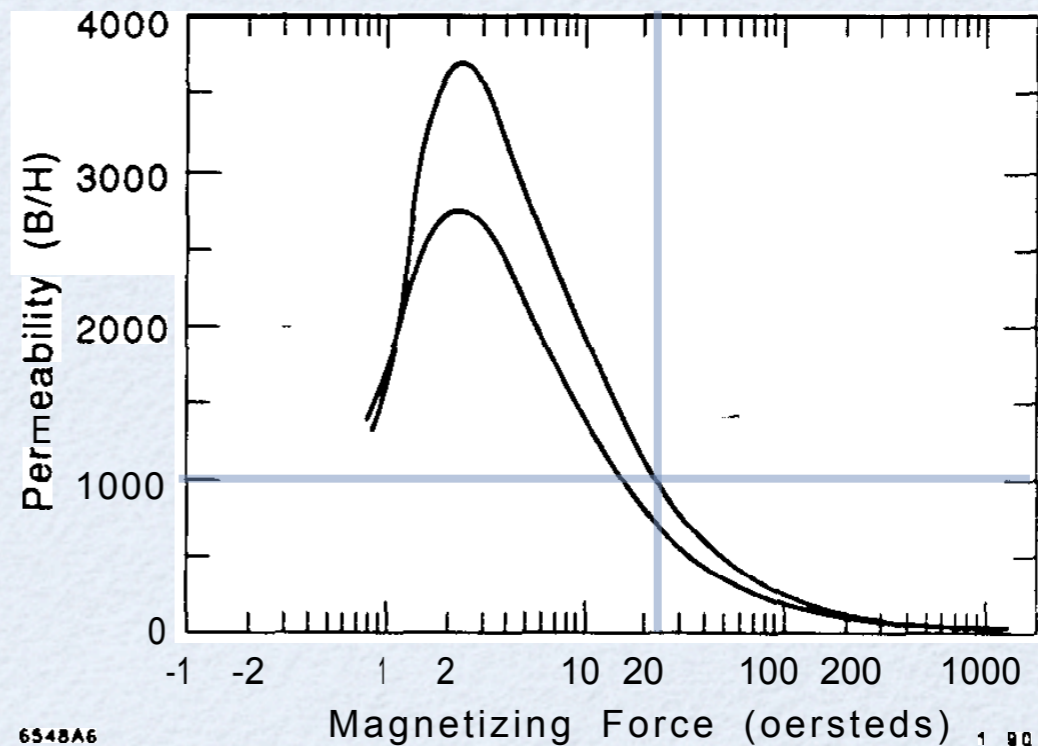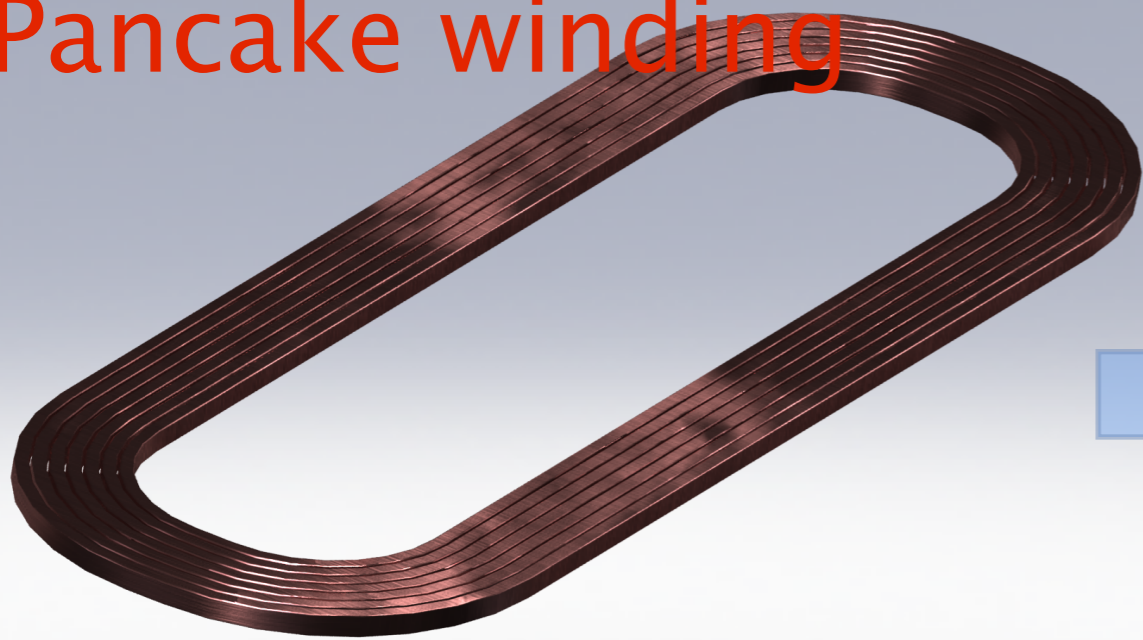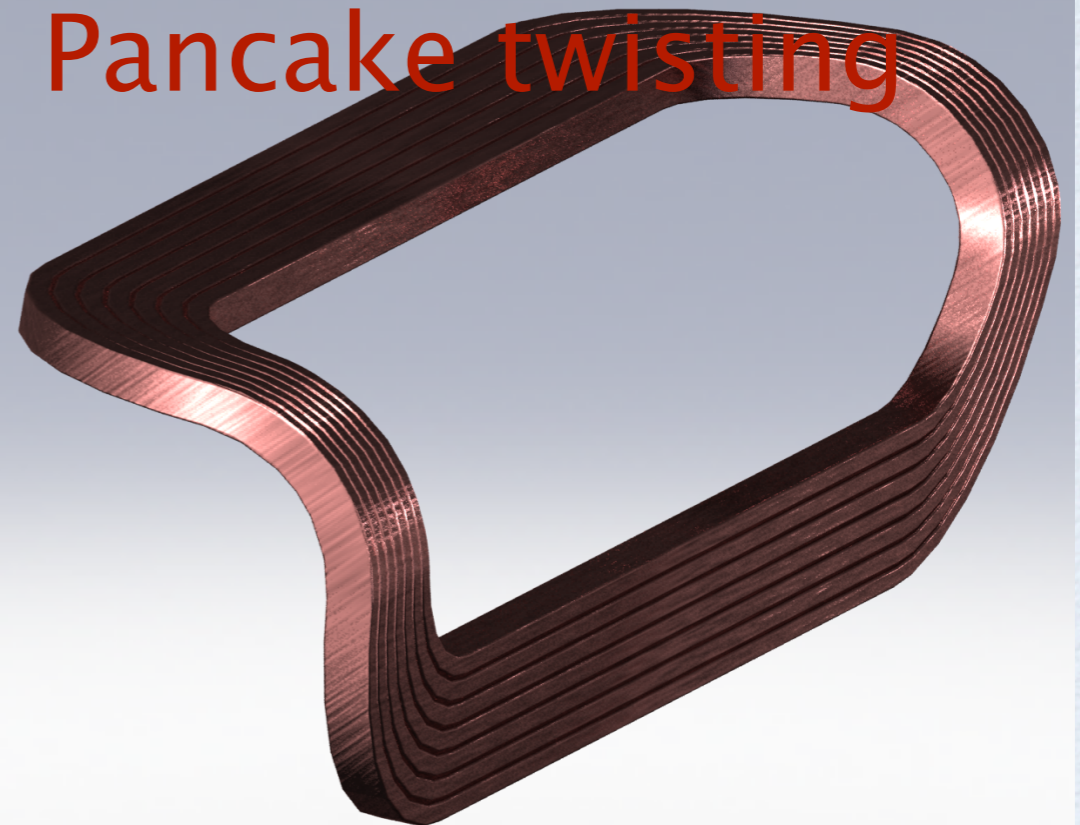
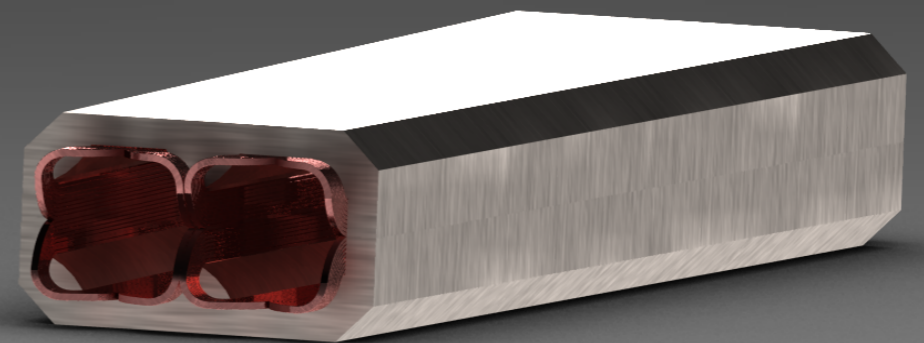Fig. 6. Permeability versus magnetizing force H for annealed 1010 steel and Permendur.
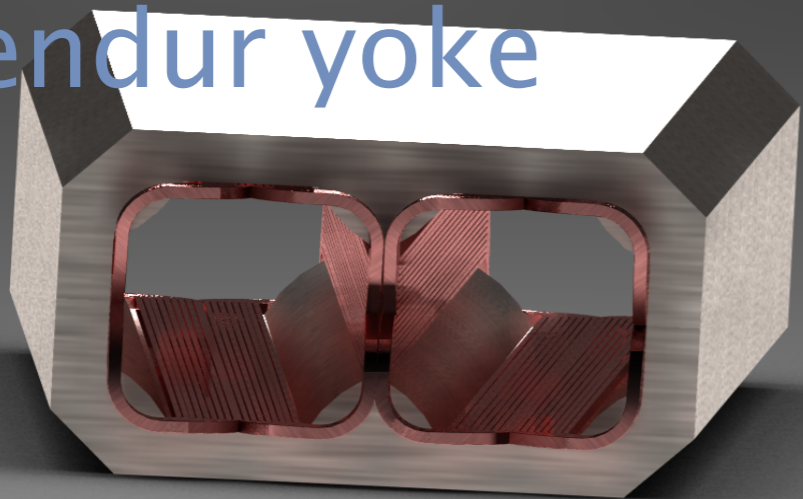
Mechanical Assembly

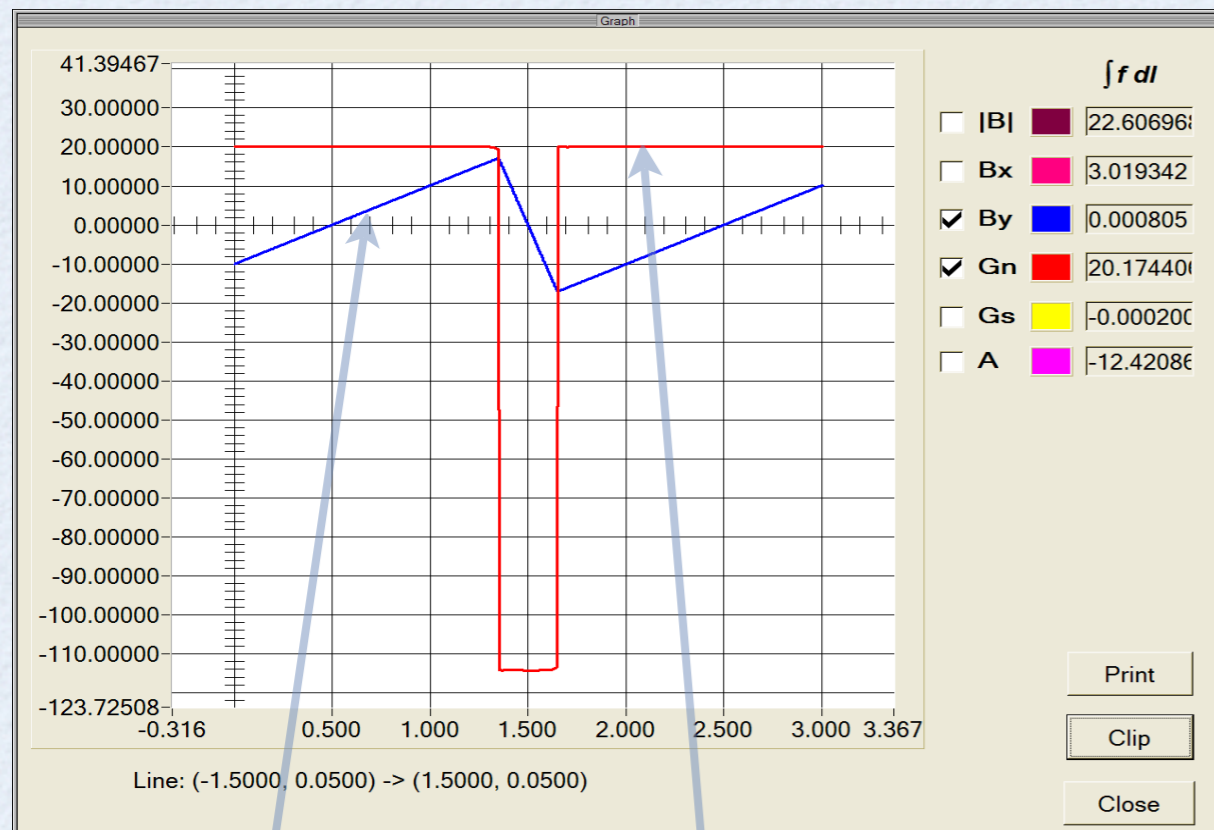Pancake winding

Pancake twisting

Insertion in the permendur yoke

Pavel Vobly

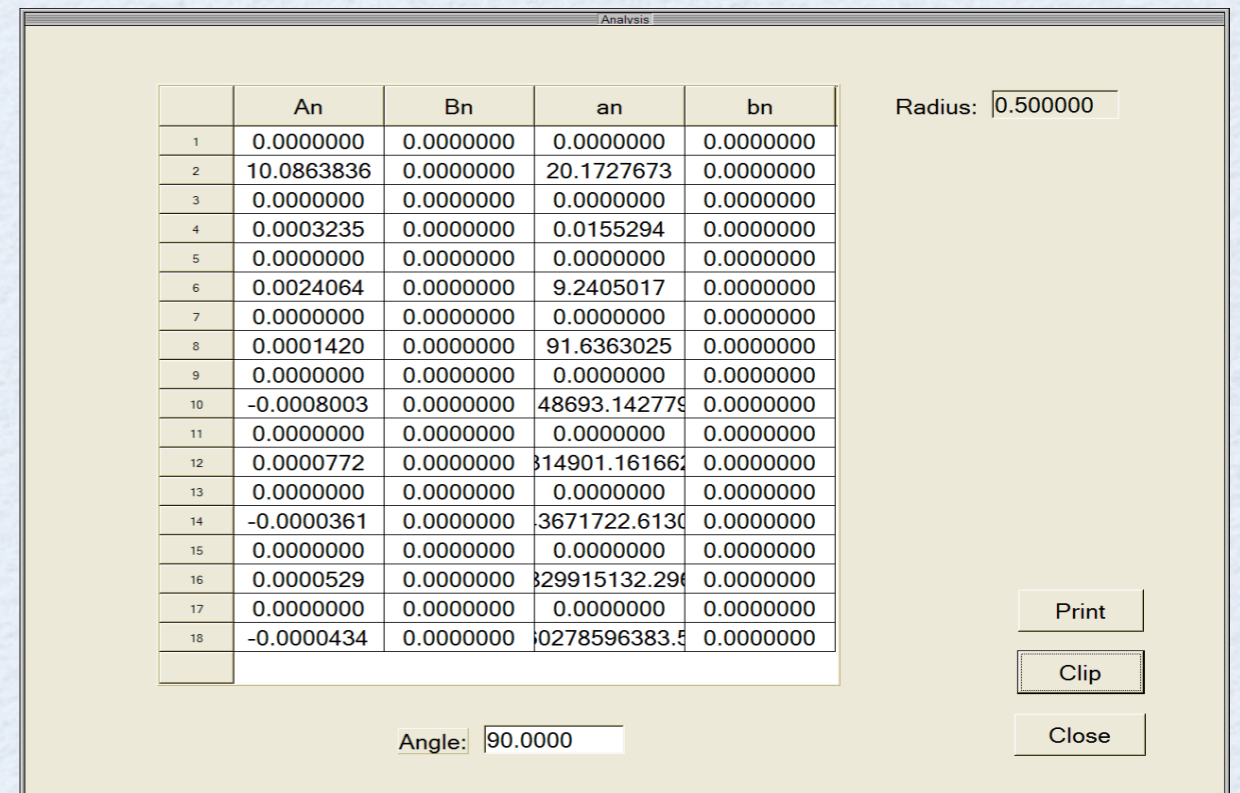# Panovsky QDO

- PROS

  - Well established technology

  - Easier winding procedure

  - Possibility to tilt the magnetic axis

  - Possibility to have a "trumpet" shaped profile

- Cons

  - Maximum field on conductors ~ 2T

  - Same gradients on HER and LER

Field quality: not an issue

Field(kG) and gradient (kG/cm)

Fourier analysis (R= 0.5 cm)

Pavel Vobly
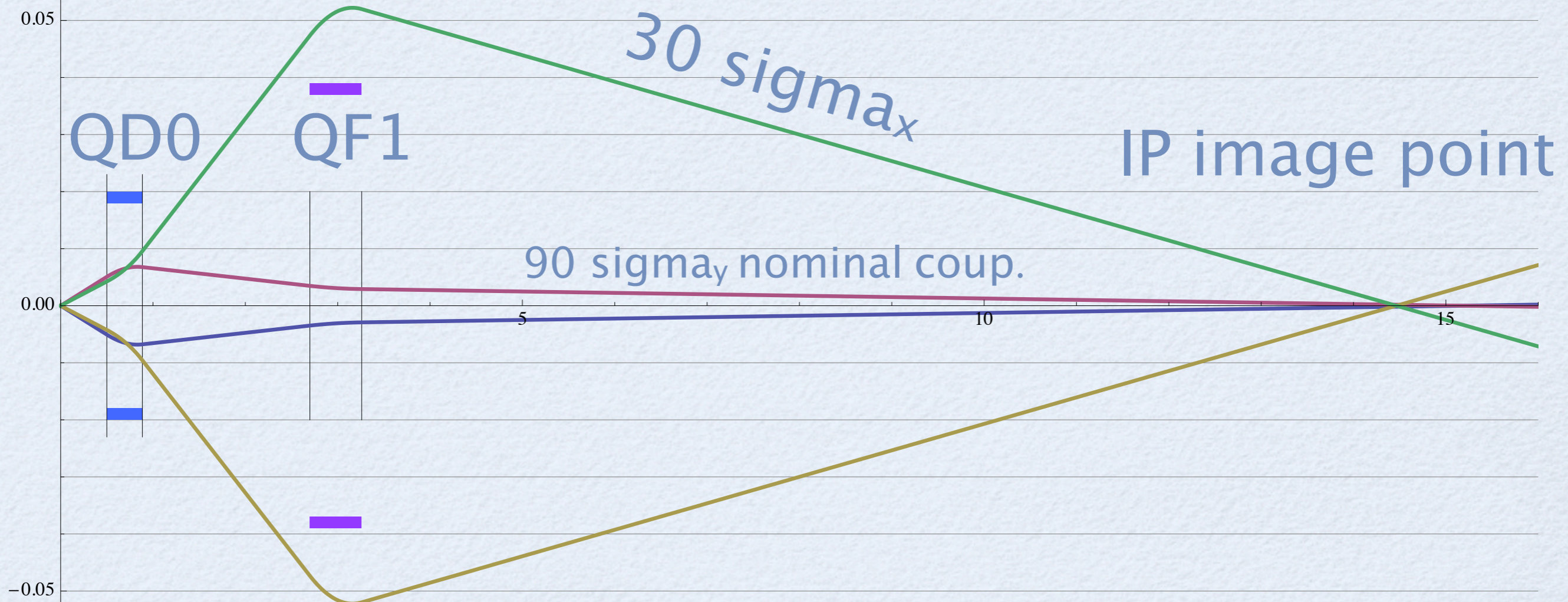
Same gradients for HER & LER

- Assuming the horizontal stay clears of Mike P3 design

- ~5 mm for the warm to cold transition

- 2 T on the SC wires

- G ~ 1.1 T/cm seems achievable

HER @ 6.7 GeV

- I* = 0.5 cm
- QD0: length 38.5 cm, G = 110 T/m
- Drift **1.77** m
- QF1 HER: length 56.1 cm, G= –20 T/m

30 sigma$_x$

QD0   QF1

IP image point

90 sigma$_y$ nominal coup.

LER @ 4.19 GeV

- I* = 0.5 cm

- QD0: length 38.5 cm, G = 110 T/m

- Drift **10** cm

- QF1 LER: length 28.6 cm, G= –90 T/m

QD0

QF1

30 sigma$_x$

90 sigma$_y$ nominal coup.

IP image point
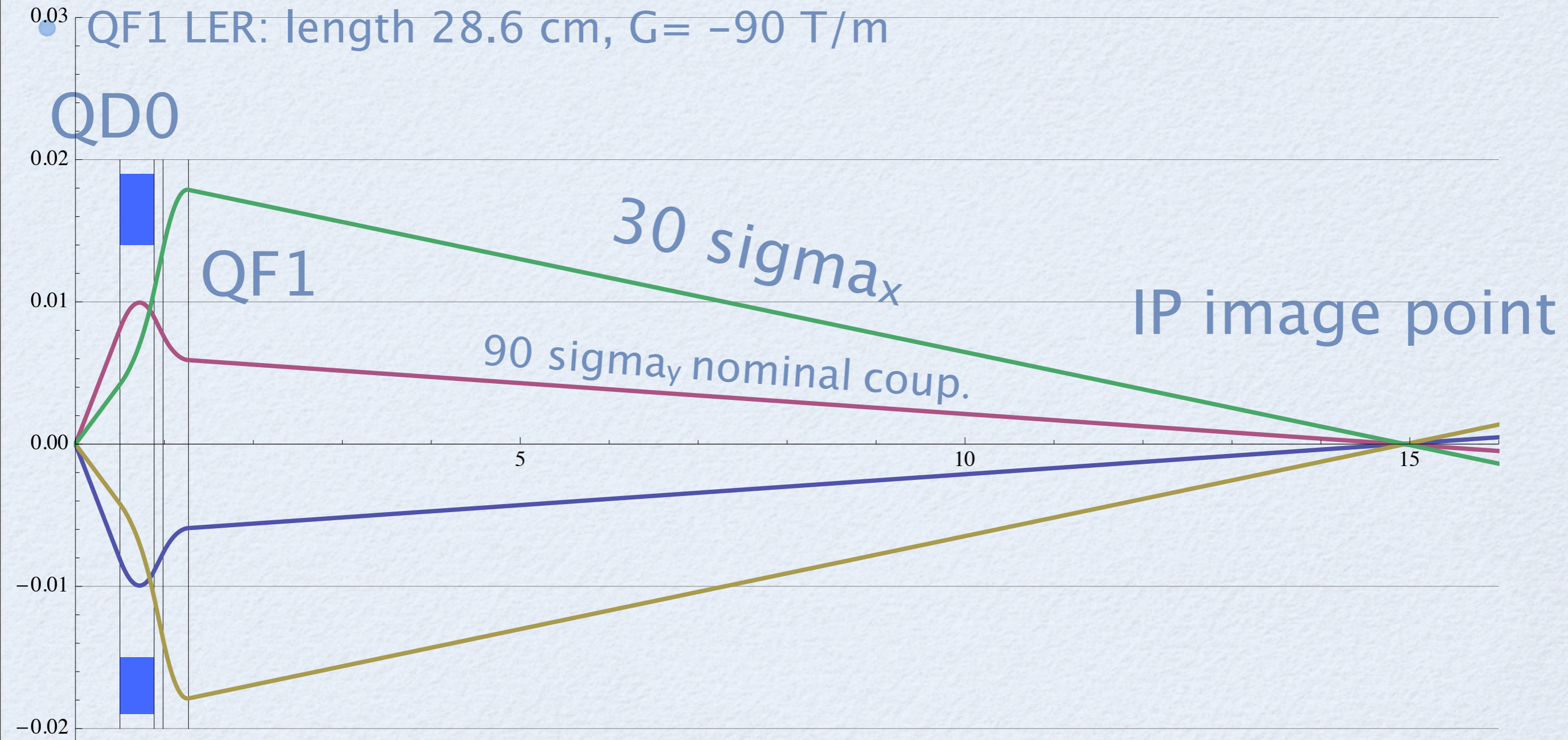
Conclusions I

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{QD0Len → 0.384871, QF1LLen → 0.28595}
Ler focal length (cm) = 0.369419
Vert. Linear magnification @ IP = -37.6505
Hor. Linear magnification @ IP = -6.45088
{δH → 1.77414, QF1HLen → 0.560958}
15.
Her focal length (cm) = 0.318749
Vert. Linear magnification @ IP = -40.5915
Hor. Linear magnification @ IP = -1.94887
```

- Start point configuration found.

- Harder to find a solution for the 7 on 4 machine (1.1 T/cm too small for the HER)

QDO: italian style

- First contacts with Pasquale Fabbricatore and Giovanni Volpini

- Very first steps toward the import of the magnetic design into a CAD/CAM program (Tomassini)

- Present issue:

  - SC wire procurement: crucial to take advantage of the progress made by Mike