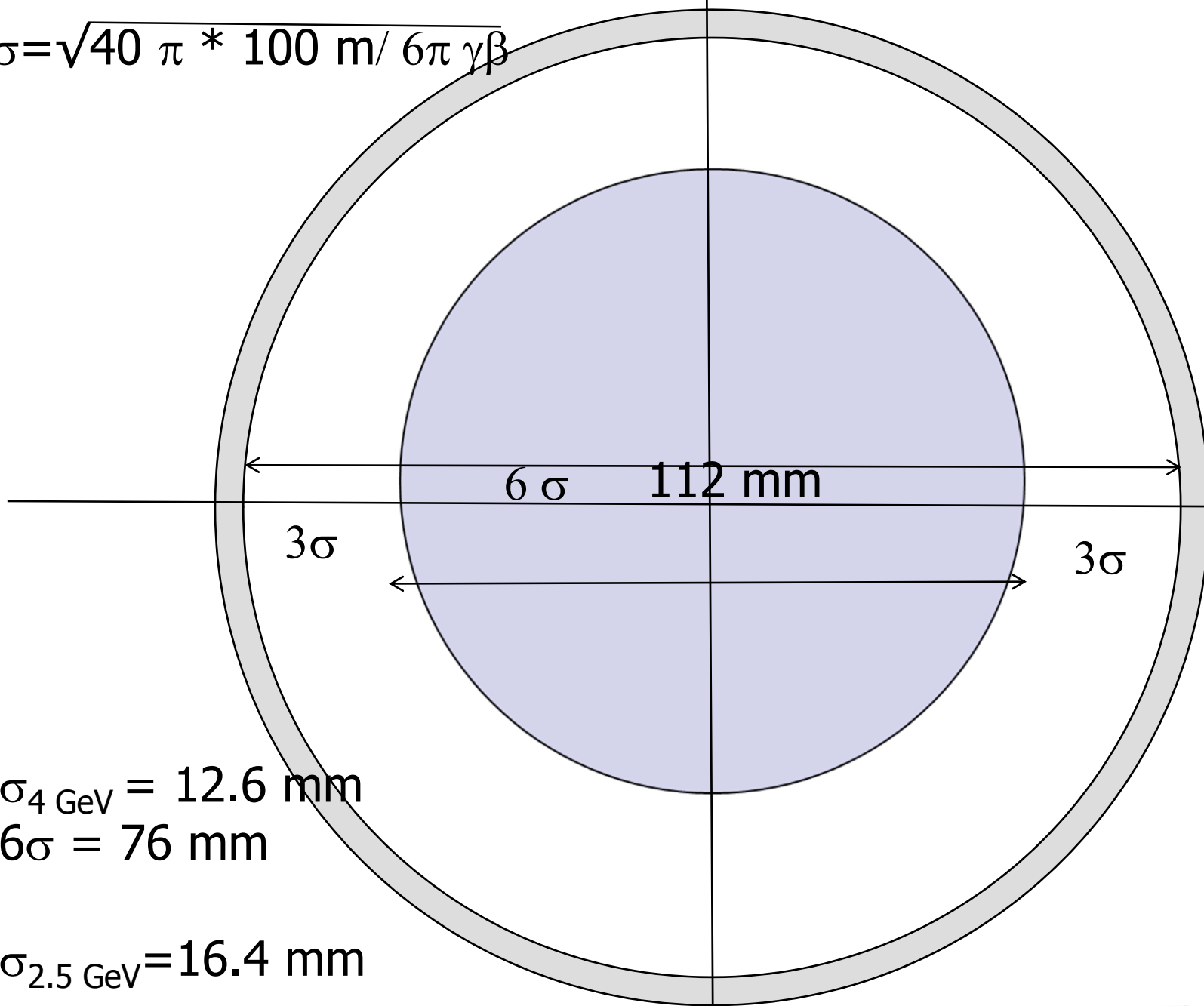


Raising the luminosity ($\beta^* = 10$ m to 1 m) for the Low Energy Run with Additional Small Triplet Magnets

Dejan Trbojevic, Wuzheng Meng
Yousef Makdisi and Philip Pile

$$\sigma = \sqrt{40 \pi * 100 \text{ m} / 6 \pi \gamma \beta}$$



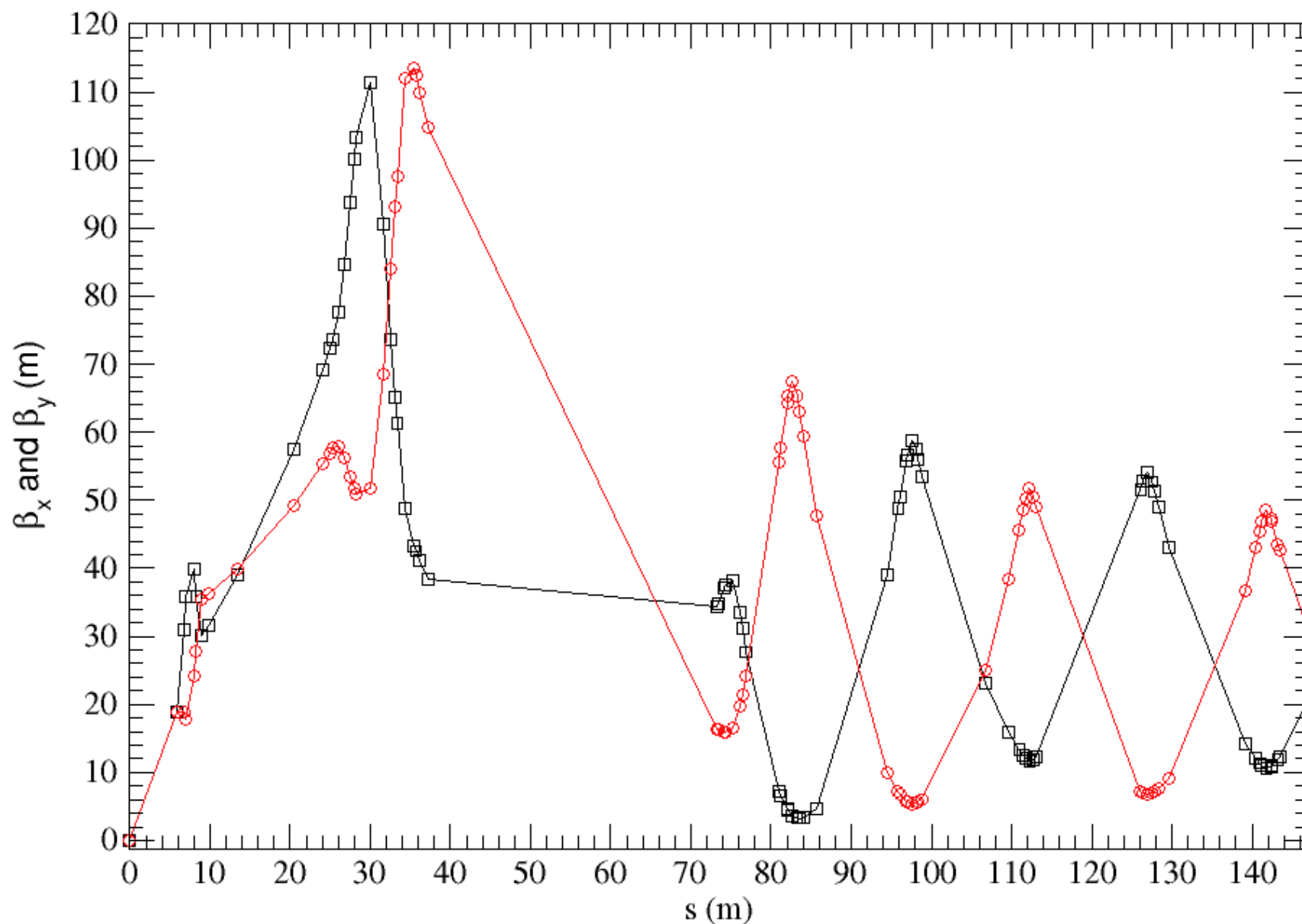
$$\sigma_{4 \text{ GeV}} = 12.6 \text{ mm}$$

$$6\sigma = 76 \text{ mm}$$

$$\sigma_{2.5 \text{ GeV}} = 16.4 \text{ mm}$$

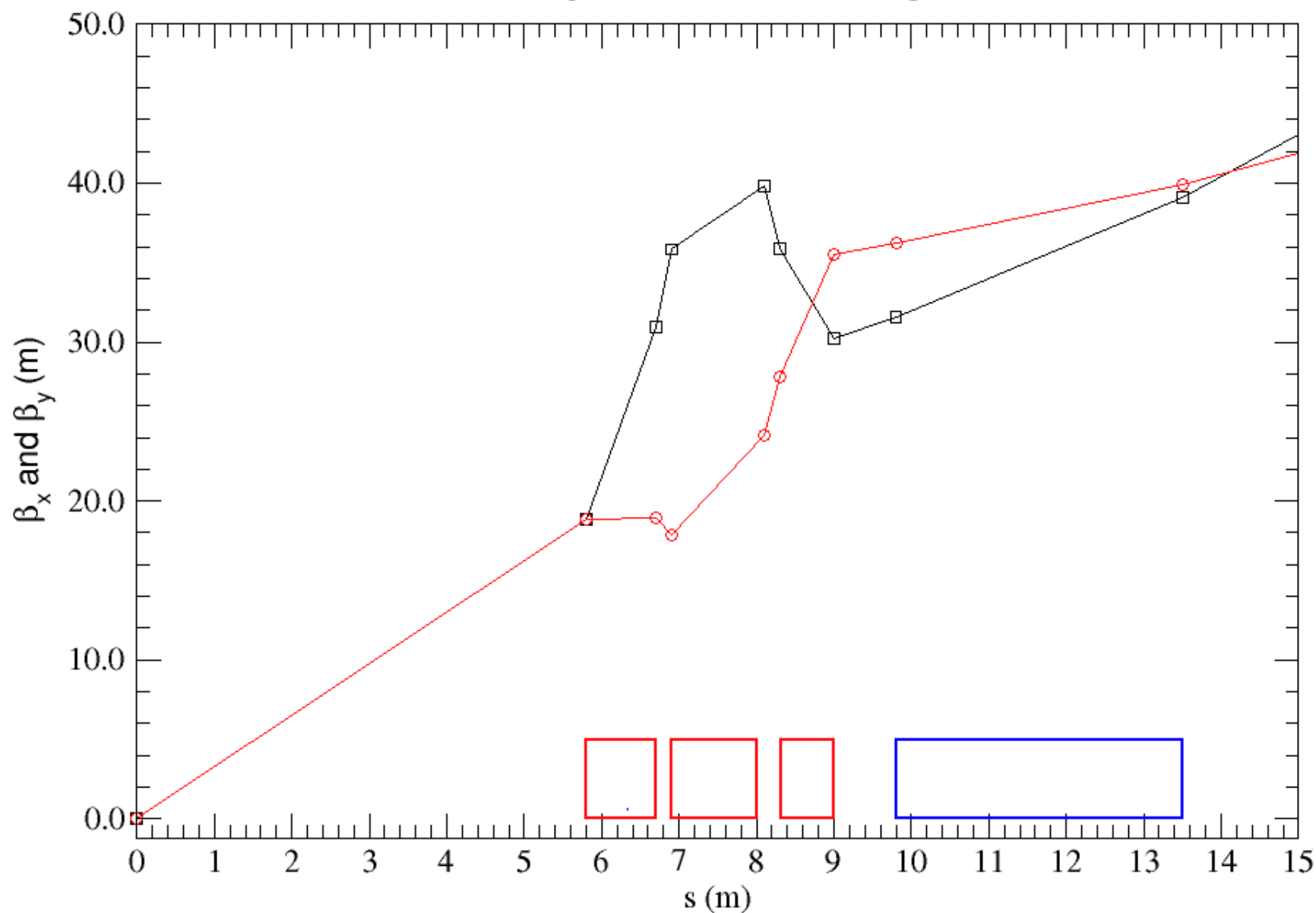
Betatron Functions in the Interaction Region

The Triplet is close to the DX magnet



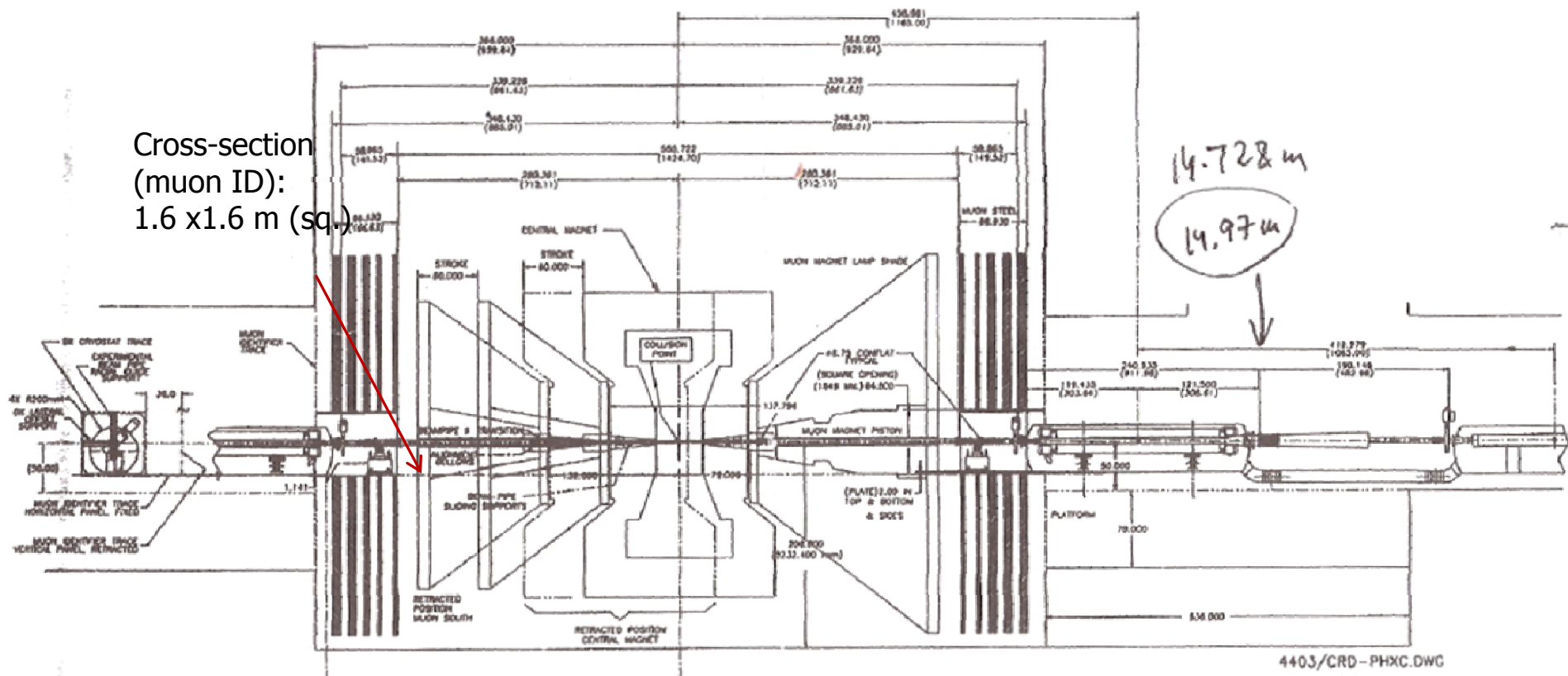
Betatron Functions in the Interaction Region

The Triplet is close to the DX magnet



PHENIX Experimental Region

Cross-section
(muon ID):
1.6 x 1.6 m (sq.)



South

North

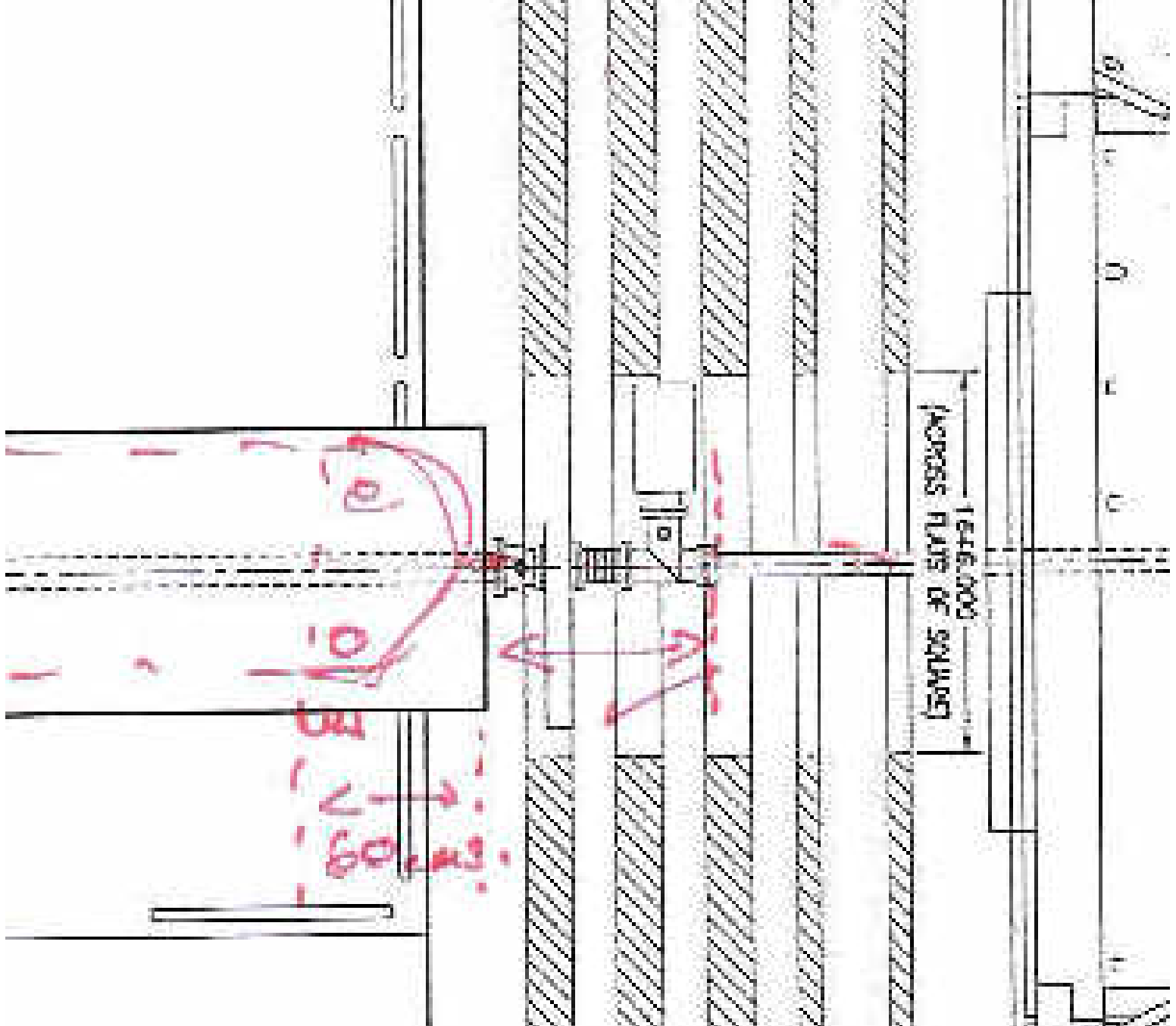
3.7 m (?)

2.2 m (?)

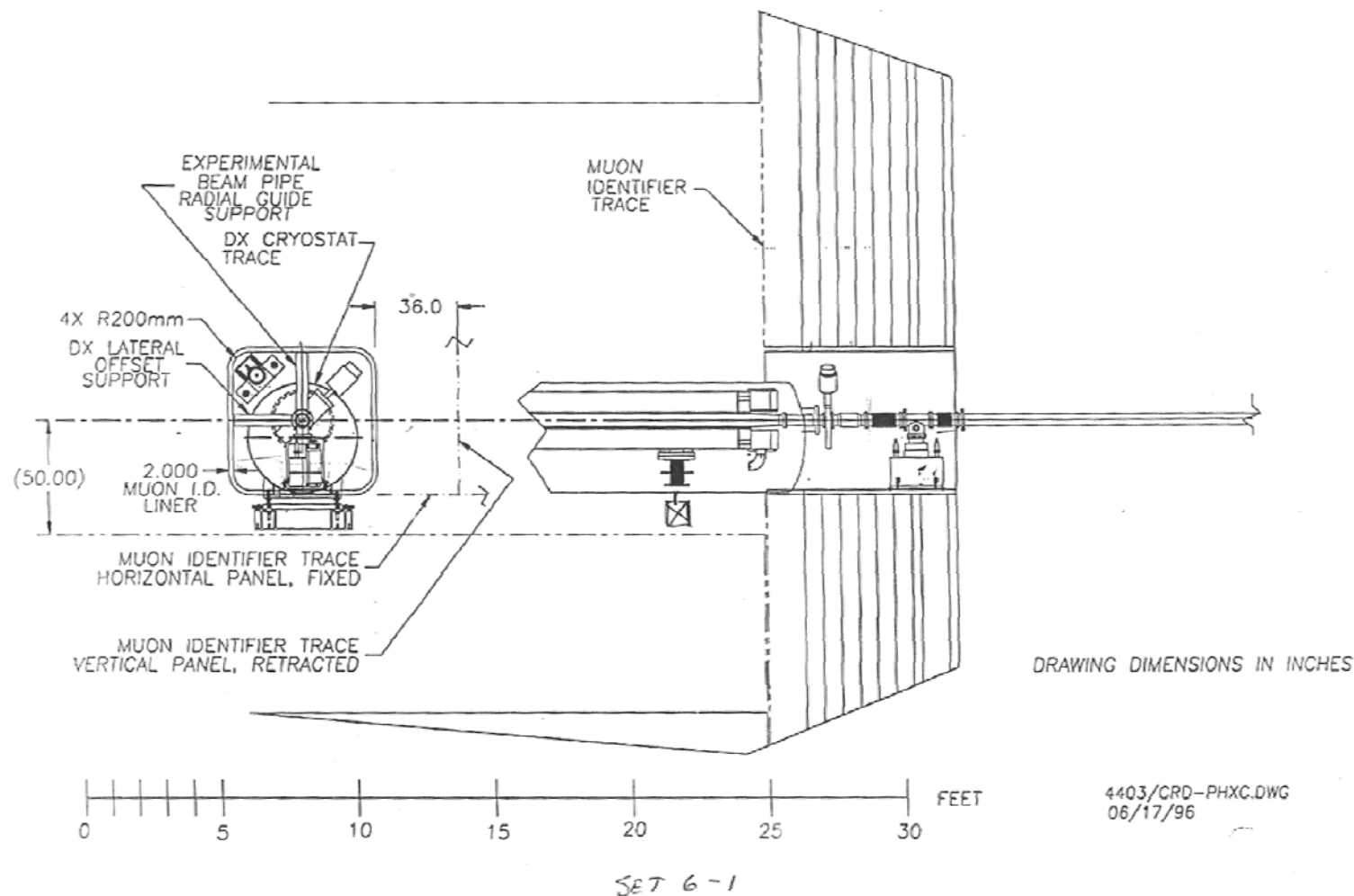


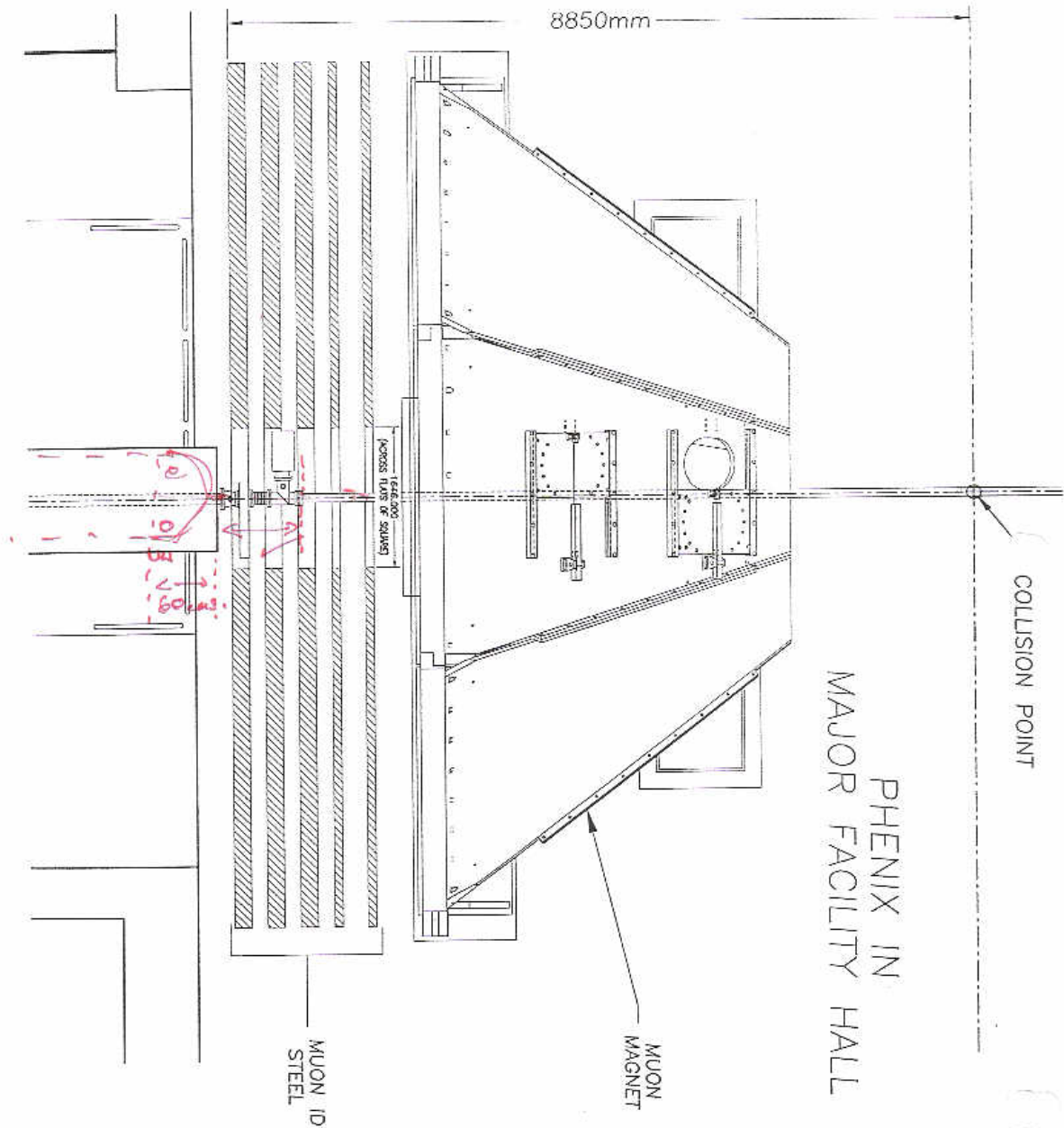
Page 6

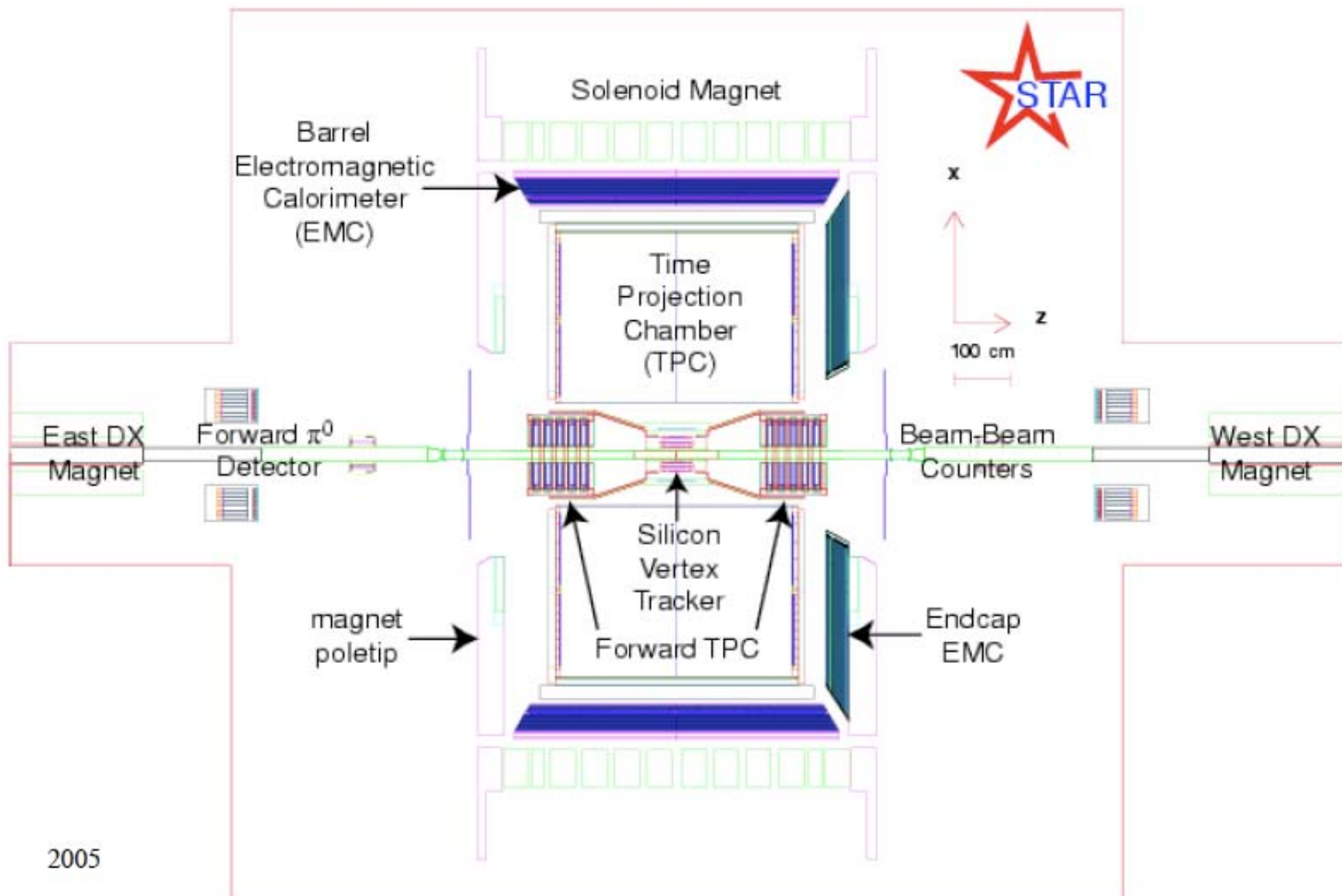
Experimental Region Vacuum



PHENIX Experimental Region





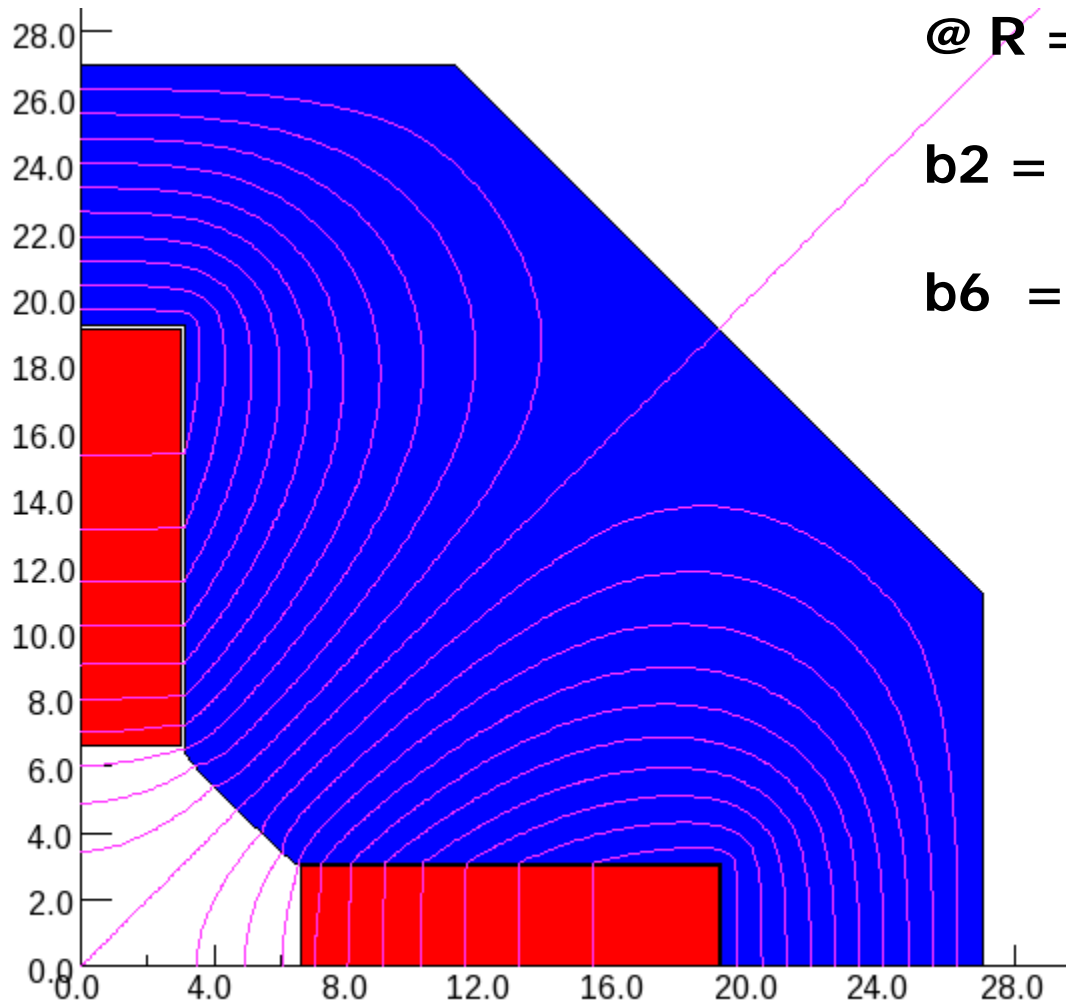


2005

TRIPLET magnets for the low energy run 4 GeV gold ions energy:

<u>Quadrupole</u>	length	<u>$\beta^*=2$ m</u>		<u>$\beta^*=1$ m</u>	
	L (m)	Gradient G(T/m)	Pole tip field B(T)@ 6.5 cm	Gradient G(T/m)	Pole tip field B(T)@ 6.5 cm
Qd ₁	0.900	-10.665	0.6932	-13.787	0.896
Qf ₂	1.200	+15.374	0.9993	+16.673	1.09
Qd ₃	0.700	-14.367	0.9338	-13.204	0.858

Conventional Magnet



@ R = 6 cm

b2 = 10005.17 G (16.6 T/m)

b6 = 2.8 G (3E-4)

27000 A-t (per pole)

J(ave) = 766 A/cm²

> J(Cu) = 15.3 A/mm²

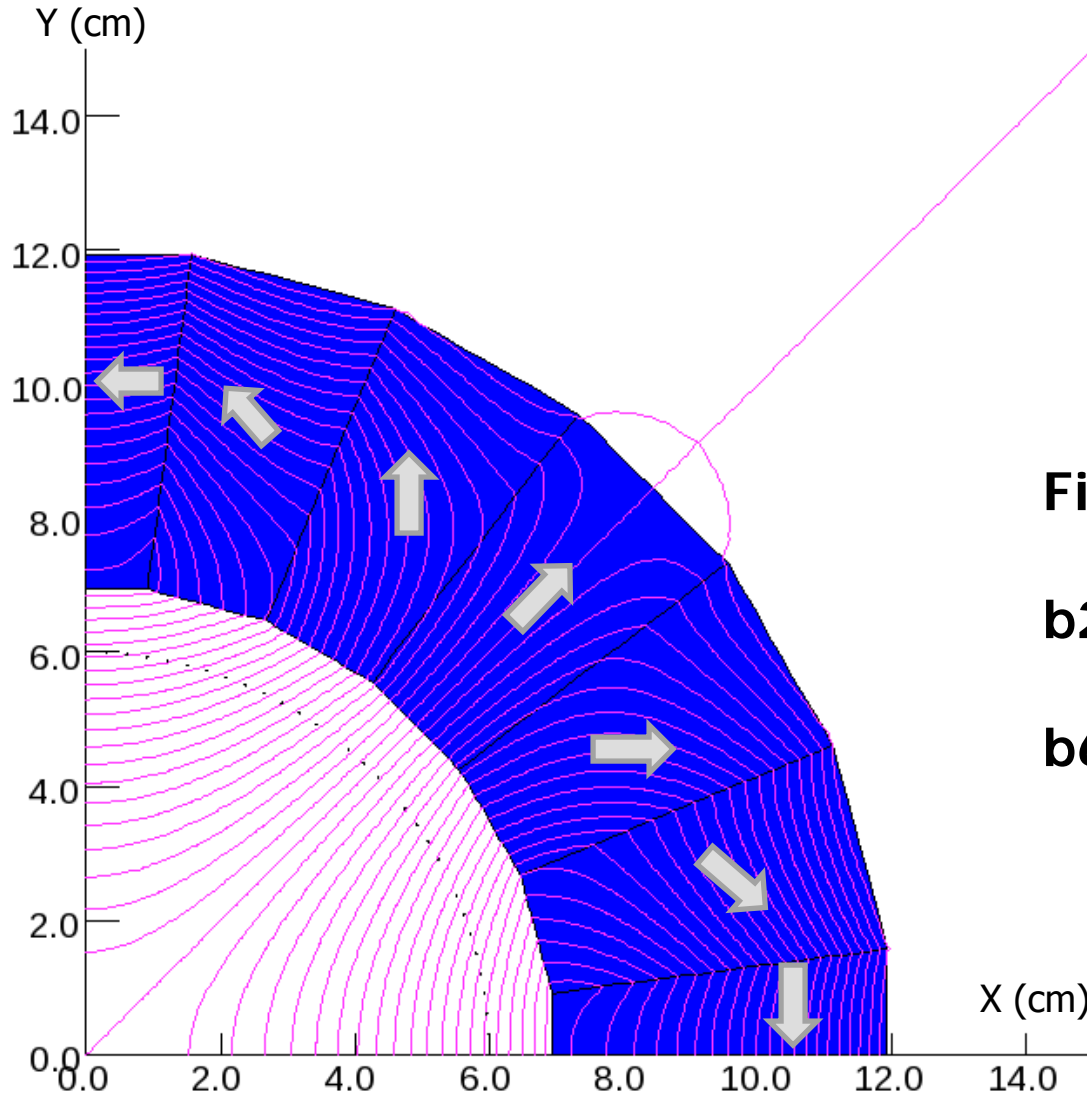
Permanent Magnet (K. Halbach)

Material: **NdFeB** n5563

$B_r = 15000 \text{ G}$

$H_c = -13000 \text{ Oe}$

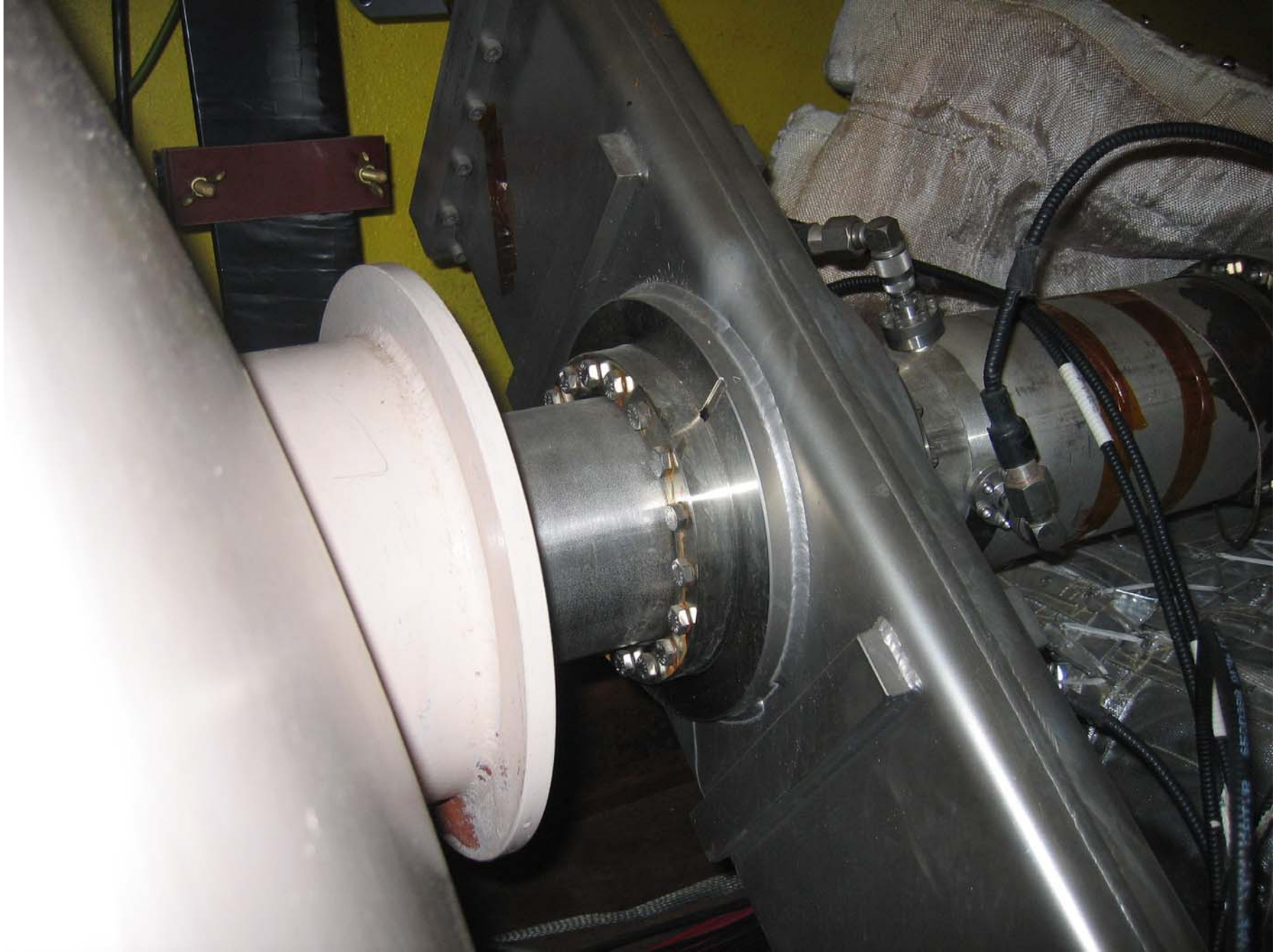
(www.mceproducts.com)



Field Quality @ $R=6 \text{ cm}$

$b_2 = 10248.0 \text{ Gauss (17 T/m)}$

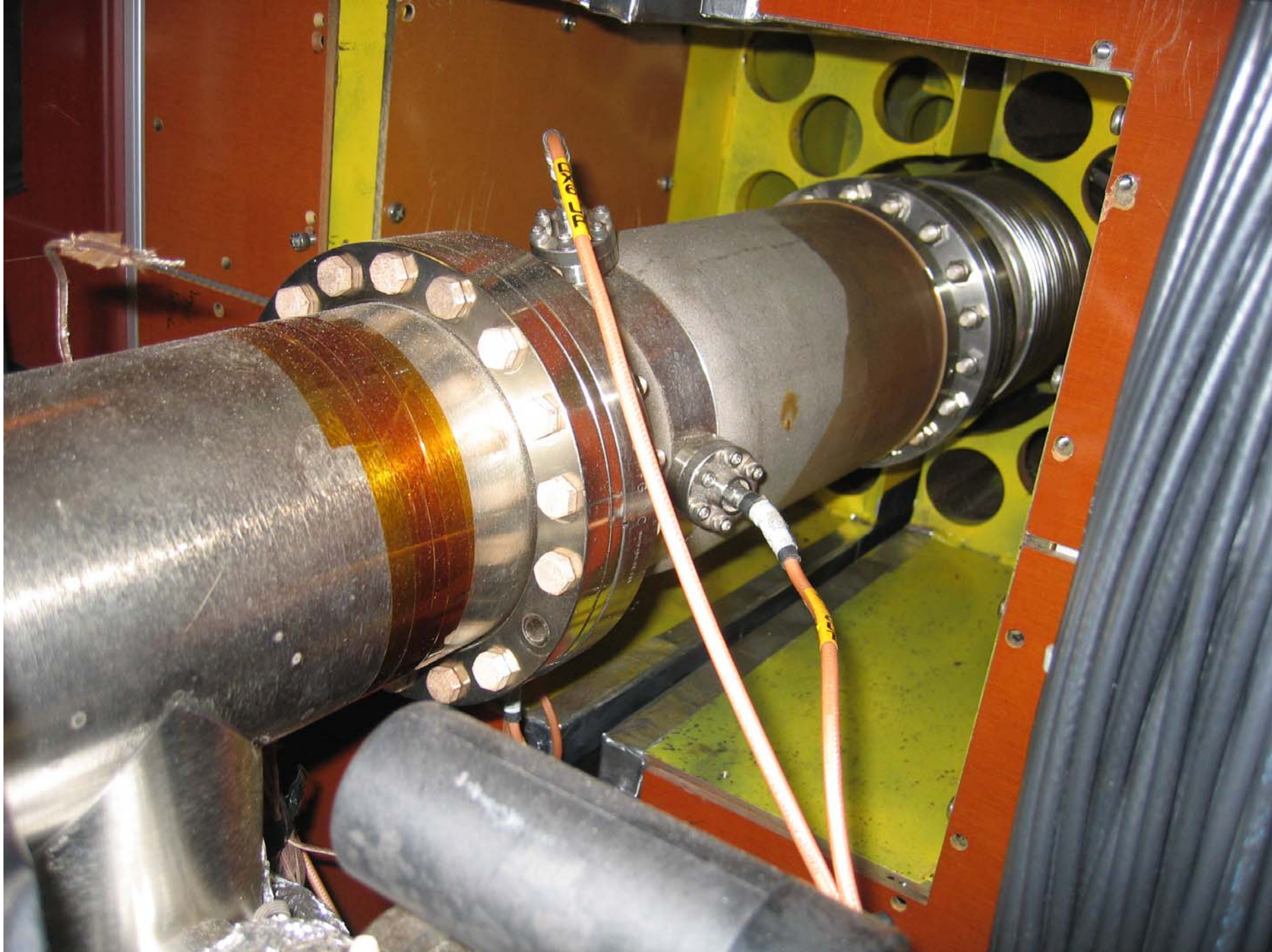
$b_6 = 44.3 \text{ Gauss (4.3E-3)}$







Dejan Trbojevic, December 1, 2009





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