ATF2 Q magnets

FF magnets

Qname	length[m]	K1[1/m]	#	T/m
QM16	0.2	-0.366	1	-9.394
QM15	0.2	0.564	1	14.476
QM14	0.2	-1.664	1	-42.709333
QM13	0.2	0.52	1	13.3466667
QM12	0.2	0.882	1	22.638
QM11	0.2	-0.002	1	-0.0499473
QD10	0.2	-0.314	2	-8.0593333
QF9	0.2	0.374	2	9.59933333
QD8	0.2	-0.56	1	-14.373333
QF7	0.2	0.6	1	15.4
QD6	0.2	-0.56	1	-14.373333
QF5	0.2	0.374	2	9.59933333
QD4	0.2	-0.314	2	-8.0593333
QD2B	0.2	0.588	1	15.092
QF3	0.2	-0.25	1	-6.4166667
QD2A	0.2	-0.274	1	-7.0326667
QF1	0.4	0.914	1	11.7296667
QD0	0.5	-1.494	1	-15.3384
			22	

EXT→FF magnets

Qname	length[m]	K1[1/m]	#	T/m
Q1C	0.2	1.59	1	40.81
Q2C	0.2	0.894	1	22.946
Q3C	0.2	-0.64	1	-16.42667
Q4C	0.2	0.894	1	22.946
Q5C	0.2	1.59	1	40.81

Field gradient T/m is estimated at E=1.54 GeV.
All the Q has its bore 32ϕ.
B'=45T/m → pole-tip field of 0.72T @r=16mm.

? Tolerance for stability
multipole comp.

Estimation of SX component limit in Q

Calculate $\Delta\sigma$ for K2=10 for each Q.

Then $d\sigma/dK2 = \Delta\sigma / 10$

beam size								
sigx[m]	2.37E-06							
sigy[m]	3.36E-08							
			K2 for 10% beam size increase					
Qname	dsigx/dK2	dsigy/dK2	x	y	minK2	B2@r=16mm	K1	B2/B1@r=16mm
QM16	-8.19E-09	2.07E-10	-2.89E+01	1.62E+01	1.62E+01	1.77E-02	-0.366	-7.10E-01
QM15	4.70E-09	2.94E-11	5.04E+01	1.14E+02	5.04E+01	5.51E-02	0.564	1.43E+00
QM14	7.82E-09	9.27E-11	3.03E+01	3.62E+01	3.03E+01	3.31E-02	-1.664	-2.91E-01
QM13	3.33E-09	2.39E-10	7.12E+01	1.41E+01	1.41E+01	1.54E-02	0.52	4.33E-01
QM12	1.45E-08	5.83E-10	1.63E+01	5.76E+00	5.76E+00	6.30E-03	0.882	1.05E-01
QM11	8.55E-10	7.38E-09	2.77E+02	4.55E-01	4.55E-01	4.97E-04	-0.002	-3.64E+00
QD10	1.21E-08	1.01E-07	1.96E+01	3.33E-02	3.33E-02	3.63E-05	-0.314	-1.70E-03
QD10A	1.33E-07	1.84E-07	1.78E+00	1.83E-02	1.83E-02	1.99E-05	-0.314	-9.30E-04
QF9	2.09E-06	1.04E-07	1.13E-01	3.23E-02	3.23E-02	3.53E-05	0.374	1.38E-03
QF9A	2.42E-06	5.71E-08	9.79E-02	5.88E-02	5.88E-02	6.43E-05	0.374	2.52E-03
QD8	3.46E-08	1.19E-08	6.85E+00	2.82E-01	2.82E-01	3.08E-04	-0.56	-8.07E-03
QF7	2.68E-08	1.46E-10	8.84E+00	2.30E+01	8.84E+00	9.66E-03	0.6	2.36E-01
QD6	5.38E-08	1.05E-08	4.41E+00	3.20E-01	3.20E-01	3.50E-04	-0.56	-9.14E-03
QF5	2.65E-06	5.59E-08	8.94E-02	6.01E-02	6.01E-02	6.57E-05	0.374	2.57E-03
QF5A	2.53E-06	1.03E-07	9.37E-02	3.26E-02	3.26E-02	3.56E-05	0.374	1.40E-03
QD4	1.93E-07	1.93E-07	1.23E+00	1.74E-02	1.74E-02	1.90E-05	-0.314	-8.87E-04
QD4A	-2.42E-09	1.12E-07	-9.79E+01	3.00E-02	3.00E-02	3.28E-05	-0.314	-1.53E-03
QD2B	-9.92E-09	1.76E-09	-2.39E+01	1.91E+00	1.91E+00	2.09E-03	0.588	5.19E-02
QF3	-5.70E-09	4.54E-10	-4.16E+01	7.40E+00	7.40E+00	8.08E-03	-0.25	-4.74E-01
QD2A	1.64E-07	2.37E-09	1.45E+00	1.42E+00	1.42E+00	1.55E-03	-0.274	-8.28E-02
QF1	1.51E-05	2.87E-07	1.57E-02	1.17E-02	1.17E-02	1.28E-05	0.914	2.05E-04
QD0	4.48E-07	3.83E-07	5.29E-01	8.77E-03	8.77E-03	9.58E-06	-1.494	-9.40E-05

SX component might be corrected by SEXT magnets.

The above estimation does not include the correction.