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ATF2 VERY LOW RIPPLE BEAM LINE - II

M.Kumada

(1) Quadrupole parameter of Andrei's optics (version1)

We assume I=5 ampere.(high inductance magnet.) :

"If I were making these quads from scratch and you wanted large inductance I would make the coils from solid wire with a maximum current of about 5 amps and so would have 30 to 150 turns per coil."C.Spencer.

Id	r0(mm)	length(m)	grad(T/m)	NI	N	R	L1(H)	L2(H)
QM16	10.000	0.50000	3.7700	150	30	0.010345	0.018095	0.036190
QM15	10.000	0.50000	11.640	463	92	0.031724	0.17240	0.34480
QM14	10.000	0.50000	-18.470	734	146	0.050345	0.43328	0.86656
QM13	10.000	0.50000	6.4900	258	51	0.017586	0.053532	0.10706
QM12	10.000	0.50000	9.1000	362	72	0.024828	0.10539	0.21078
QM11	10.000	0.50000	0.0000	0	0	0.0000	0.0000	0.0000
QD10	15.000	0.50000	-3.3267	297	59	0.020345	0.070940	0.14188
QD10	15.000	0.50000	-3.3267	297	59	0.020345	0.070940	0.14188
QF9	15.000	0.50000	-3.3267	297	59	0.020345	0.070940	0.14188
QF9	15.000	0.50000	3.9733	355	71	0.024483	0.10135	0.20270
QD8	10.000	0.50000	-6.1100	243	48	0.016552	0.047489	0.094977
QF7	10.000	0.50000	6.6300	263	52	0.017931	0.055627	0.11125
QD6	15.000	0.50000	-6.1133	547	109	0.037586	0.24063	0.48126
QF5	15.000	0.50000	3.9733	355	71	0.024483	0.10135	0.20270
QF5	15.000	0.50000	3.9733	355	71	0.024483	0.10135	0.20270
QD4	10.000	0.50000	-3.3200	132	26	0.008965	0.0140130	.028026
QD4	10.000	0.50000	-3.3200	132	26	0.008965	0.0140130	.028026
QD2B	10.000	0.50000	6.3300	251	50	0.017241	0.050667	0.10133
QF3	10.000	0.50000	-2.8800	114	22	0.007586	0.01045	0.020903
QD2A	10.000	0.50000	-2.7000	107	21	0.00724	0.009207	0.018415
QF1	15.000	0.40000	11.727	1049	209	0.057655	0.70798	1.4160
QD0	10.000	0.50000	-15.350	610	122	0.042069	0.29925	0.5985

L1 is an inductance of a nominal length.

L2 is an inductance of shorter magnet.

Total 22 Total length: 10.9 m

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(2) Parameter of Dipoles of Andrei's optics (version1)

ID	length	B(T)	gap(m)	NI	N	I(A)	L(H)
B5	1.0000	0.071600	0.020000	569.79	113	5.0424	0.12836
B5	1.0000	0.071600	0.020000	569.79	113	5.0424	0.12836
B5	1.0000	0.071600	0.020000	569.79	113	5.0424	0.12836
B5	1.0000	0.071600	0.020000	569.79	113	5.0424	0.12836
B2	1.0000	0.15960	0.020000	1270.1	254	5.0004	0.64857
B2V2	1.0000	0.15960	0.020000	1270.1	254	5.0004	0.64857
B2V1	1.0000	0.15960	0.020000	1270.1	254	5.0004	0.64857
B1	1.0000	-0.12170	0.020000	-968.49	-193	5.0181	0.37446
B5	0.50000	0.14320	0.020000	1139.6	227	5.0202	0.25901
B5	0.50000	0.14320	0.020000	1139.6	227	5.0202	0.25901
B5	0.50000	0.14320	0.020000	1139.6	227	5.0202	0.25901
B5	0.50000	0.14320	0.020000	1139.6	227	5.0202	0.25901
B2	0.50000	0.31920	0.020000	2540.2	508	5.0004	1.2971
B2V2	0.50000	0.31920	0.020000	2540.2	508	5.0004	1.2971
B2V1	0.50000	0.31920	0.020000	2540.2	508	5.0004	1.2971
B1	1.0000	-0.24340	0.020000	-1937.0	-387	5.0051	1.5056

> total: 8

> total length:8 m

(3) Multipoles

> Sextupoles	L(m)	B(kGs)	at R(mm)
> SF6	0.20	-0.1643	10
> SF5	0.20	-0.0044	10
> SD4	0.20	-0.2242	10
> SF1	0.20	0.0455	10
> SD0	0.20	-0.0706	10

> total: 5

> total length 1 m

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> Octupoles L(m)

> (field not yet optimized)

> OC10 0.20

> OC1 0.30

> OC0 0.10

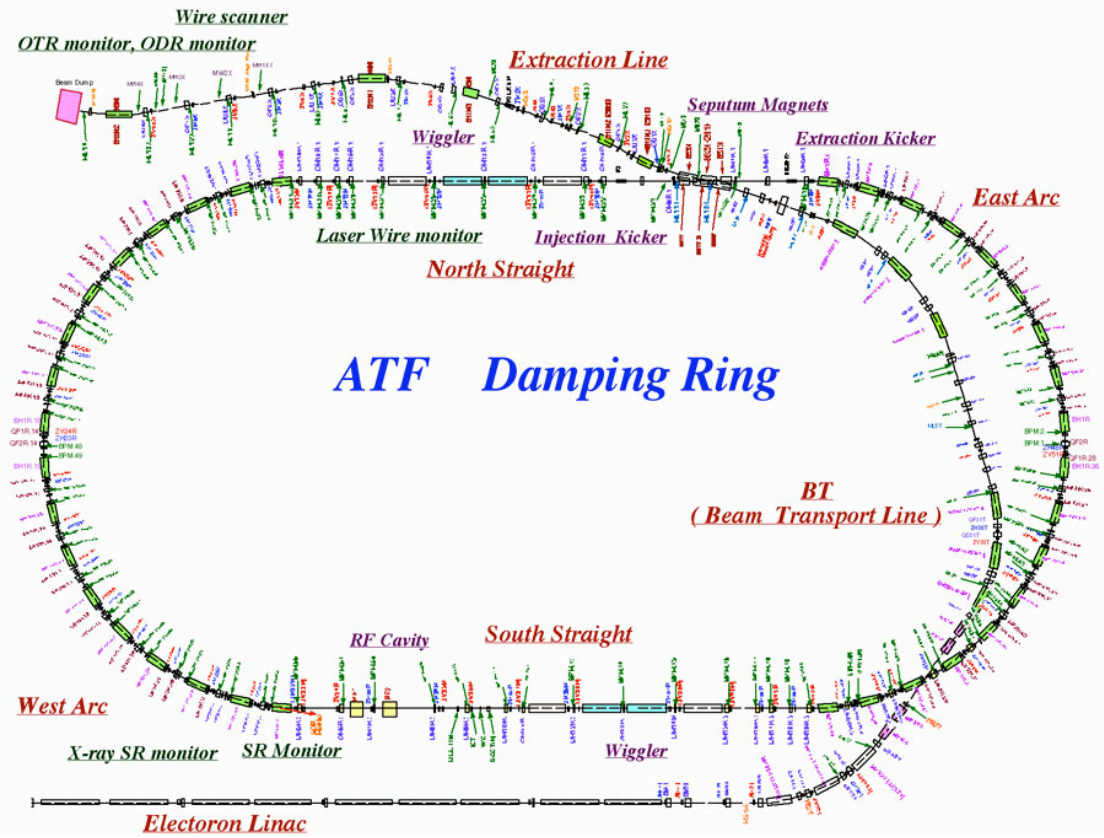
- total: 3
- total length: 0.6m

total number of all magnets:28

length of sum of all magnets: 10.9+8+1+0.6=20.5 m (1)

need a space for coil and separation: 0.2x28=5.6m (2)

(1)+(2)= 26.1m



Appendix:

Dipole inductance: $L=2\ \mu_0\ w/g\ N^2\ l_B$

Quadrupole inducance: $L=8\ \mu_0\ (w_x/r_0)^2\ N^2\ l_G$