7-Pole Wiggler Field Calculations

Systematic studies since April 5

1. **Found mistake in end-pole current used until now in Vector Fields**

Incorrect:	57.5 kA (value from earlier coil design)
Correct:	378 turns $\times$ 161 A = 60.9 kA

- Trim current of 10 A (see 3.28 and 4.5) was compensating for this low current
- With corrected end-pole current, trim current of 0.7 A gives previous tracking result (see slide)
- But why do Mermaid and Vector Fields tracking disagree on net horizontal kick?

2. **Rediscovered truncation problem in Mermaid data file used for fit**

- Need to perform fit on more recent, finer grid, where MERMAID and VF agree at 10^{-4} level
- DCS fit (Numerical recipes) converged, but insufficient accuracy
- CERN package MINUIT now running using DCS result as initial estimate (80 parameters, 67k field points)

3. **Calculated 7-pole field with gap increased by 2 mm**
   → Results by Monday

19.8950	0.0000	0.0000	−0.0010	0.0000	0.6009
20.7600	0.0000	0.0000	0.0018	0.0000	1.4630
21.6250	0.0000	0.0000	−0.0260	0.0000	2.9287
22.4900	0.0000	0.0000	0.0007	0.0000	4.9546
23.3550	0.0000	0.0000	0.0009	0.0009	7.4779
24.2200	0.0000	0.0000	0.0006	0.0004	10.1630
25.0850	0.0000	0.0000	0.0003	0.0000	12.1860
25.9500	0.0000	0.0000	0.0000	0.0000	13.6630
26.8150	0.0000	0.0000	0.0000	0.0000	14.6420
27.6800	0.0000	0.0000	0.0004	0.0000	15.2160
28.5450	0.0000	0.0000	0.0000	0.0000	15.4690
29.4100	0.0000	0.0000	0.0000	0.0000	15.4420
30.2750	0.0000	0.0000	0.0000	0.0000	15.1290
31.1400	0.0000	0.0000	0.0006	0.0000	14.4660
32.0050	0.0000	0.0000	0.0014	0.0000	13.3440
32.8700	0.0000	0.0000	−0.0010	0.0004	11.6210
33.7350	0.0000	0.0000	0.0000	0.0000	9.2172
34.6000	0.0000	0.0000	−0.0050	0.0004	6.1260
35.4650	0.0000	0.0000	−0.0040	0.0000	2.5494
36.3300	0.0000	0.0000	0.0005	0.0000	−1.2910
37.1950	0.0000	0.0000	−0.0030	0.0000	−5.2520
38.0600	0.0000	0.0000	−0.0030	0.0001	−9.0740
38.9250	0.0000	0.0000	0.0009	0.0000	−12.5000
39.7900	0.0000	0.0000	0.0000	0.0006	−15.3200
40.6550	0.0000	0.0000	0.0010	0.0000	−17.4100
41.5200	0.0000	0.0000	0.0001	0.0000	−18.8800
42.3850	0.0000	0.0000	0.0007	0.0000	−19.8500
43.2500	0.0000	0.0000	0.0000	0.0000	−20.4800
44.1150	0.0000	0.0000	0.0000	0.0000	−20.8700
44.9800	0.0000	0.0000	0.0001	0.0000	−21.0900
45.8450	0.0000	0.0000	0.0000	0.0000	−21.2000
46.7100	0.0000	0.0000	0.0000	0.0000	−21.2200
47.5750	0.0000	0.0000	0.0000	0.0000	−21.1400
48.4400	0.0000	0.0000	−0.0010	0.0000	−20.9600
49.3050	0.0000	0.0000	−0.0010	0.0000	−20.6400
50.1700	0.0000	0.0000	−0.0020	0.0000	−20.1100
51.0350	0.0000	0.0000	−0.0030	0.0000	−19.2700
51.9000	0.0000	0.0000	−0.0030	0.0002	−17.9900
52.7650	0.0000	0.0000	0.0000	0.0000	−16.0900
53.6300	0.0000	0.0000	0.0003	0.0002	−13.4500
54.4950	0.0000	0.0000	0.0009	0.0000	−9.9950
55.3600	0.0000	0.0000	0.0060	0.0000	−5.8700
56.2250	0.0000	0.0000	−0.0080	0.0000	−1.3540