Wiggler Field Calculations

– Trim Current in 7-Pole Wiggler Nr 2 –
– Full 8/8 Model for Wiggler Nr 2 –

1. Trim Current in 7-Pole Wiggler Nr 2

- New coil design requires $\simeq$ 7 A trim current to zero horizontal kick for both the 1.9 T and 2.1 T peak field excitations

  $\Rightarrow$ Transfer functions show the field quality with this large trim current to be acceptable

  $\Rightarrow$ Decision to place the two 7-pole wigglers adjacent to each other, allowing trim adjustment to cancel total kick

2. Full 8/8 7-Pole Model for Wiggler 2

- Measurements by KWS of coil-end differences before and after cold test agree at 5-mil accuracy. This accuracy is a factor ten smaller than the Wiggler Nr 1 skew quad effect magnitude (good!), but there are big deviations from the earlier measurements by MGB, NBM/KWS (10/29 and 11/4).

Pole	1	2	3	4	5	6	7
Before (11/5) Top	-35	-19	-28	-24	4	7	-10
After (11/19) Top	-44	-15	-21	-23	6	6	-8
Before (11/5) Bottom	18	31	33	18	-13	21	17
After (11/19) Bottom	23	35	30	25	-17	26	20

- Coil-end differences ΔX modelled by lengthening and displacing coil by an amount ΔX. Note that this introduces a pole/coil gap.

- Compared 8/8 model with and without observed coil-end differences

  $\Rightarrow$ Modelling accuracy is good enough to set limit on skew quad smaller than that measured for Wiggler Nr 1

  $\Rightarrow$ Model of single-coil 50-mil displacement shows skew quad similar to that measured in Wiggler Nr 1 and similar to that of the 3-pole model

  $\Rightarrow$ Predict Wiggler Nr 2 to have skew quad component smaller than that of Wiggler Nr 1