Dipole Cooling Ring Fields Update

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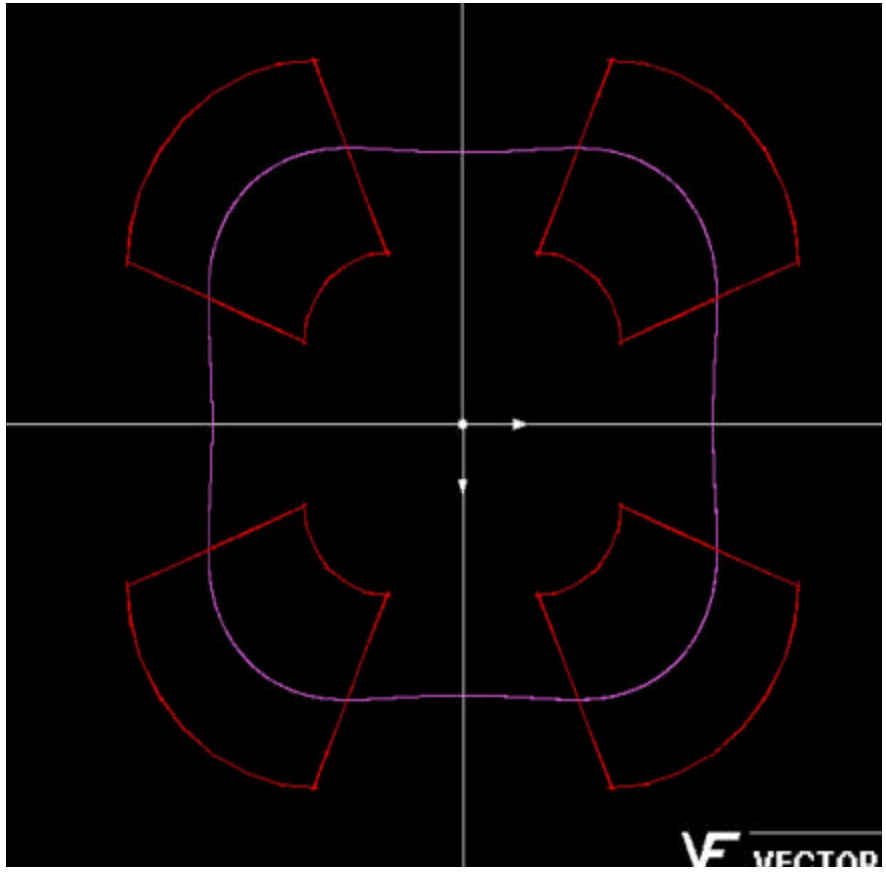
Closed Orbit

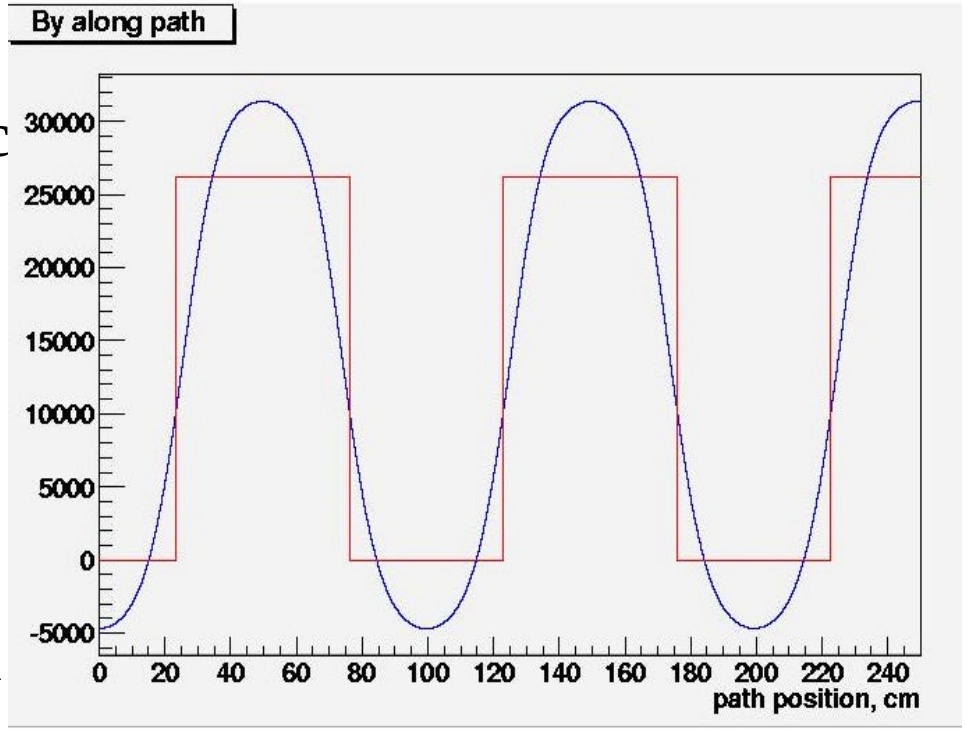


Closed orbit trajectory for 250 MeV/c μ started at x=55.02994 cm.

Note that there is curvature in region between magnets since there is still a significant field.

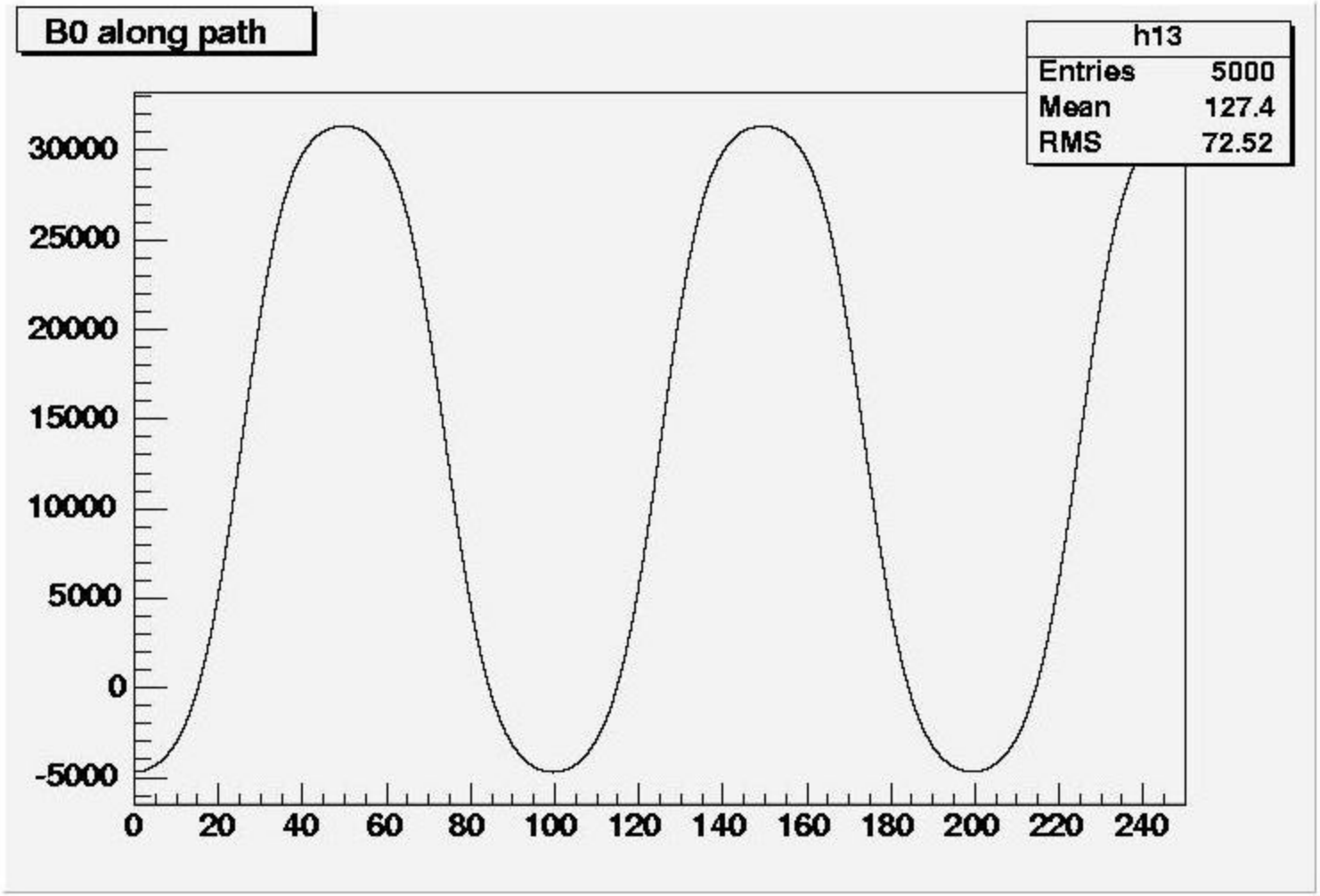
Field Along the Reference Path

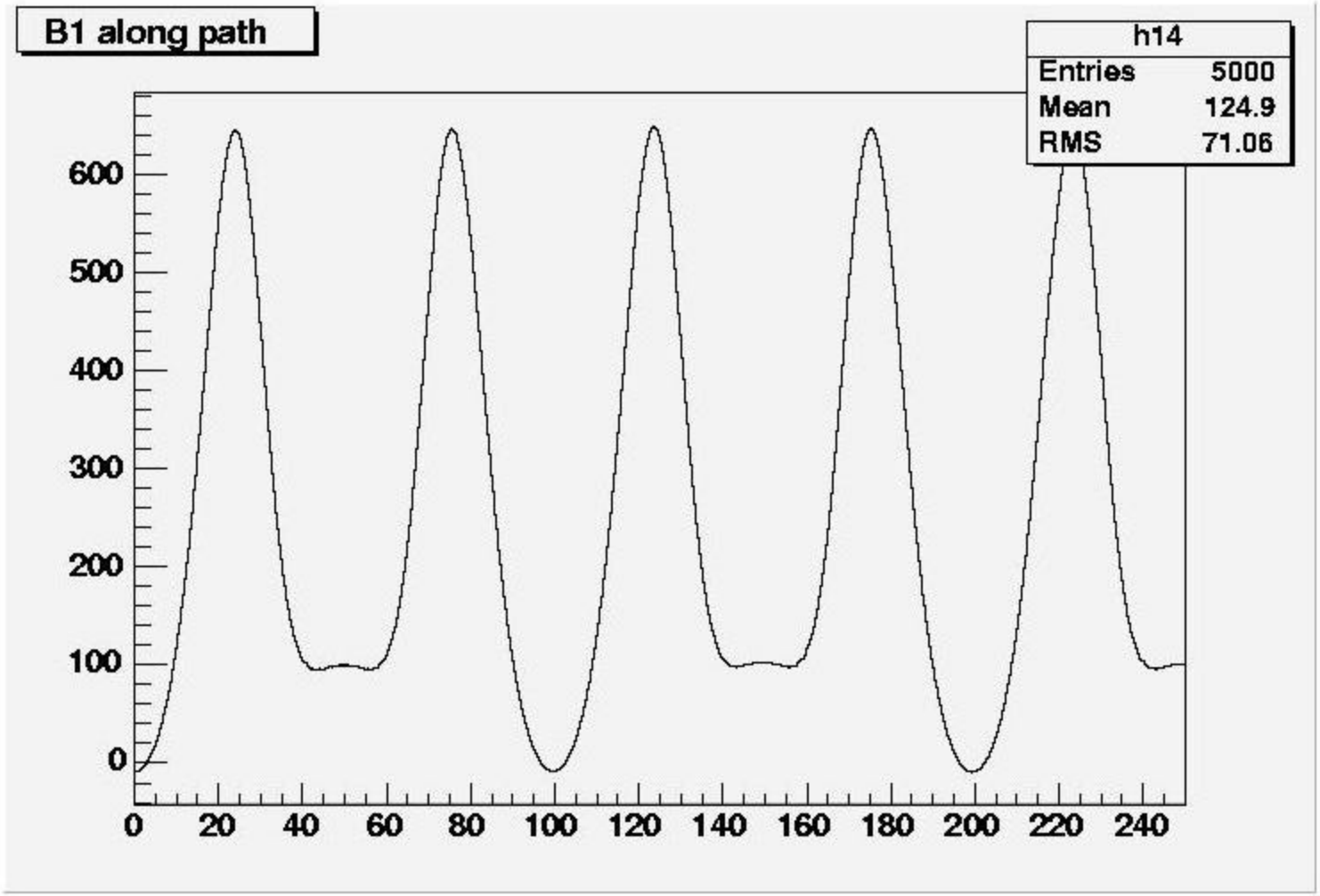
- Figure shows B_y along the 250 MeV/c reference path.
  - The blue curve indicates the field from the Tosca field map.
  - The red curve is the hard edge field.
- Note the –0.5 T field in the gap mid-way between the magnets.

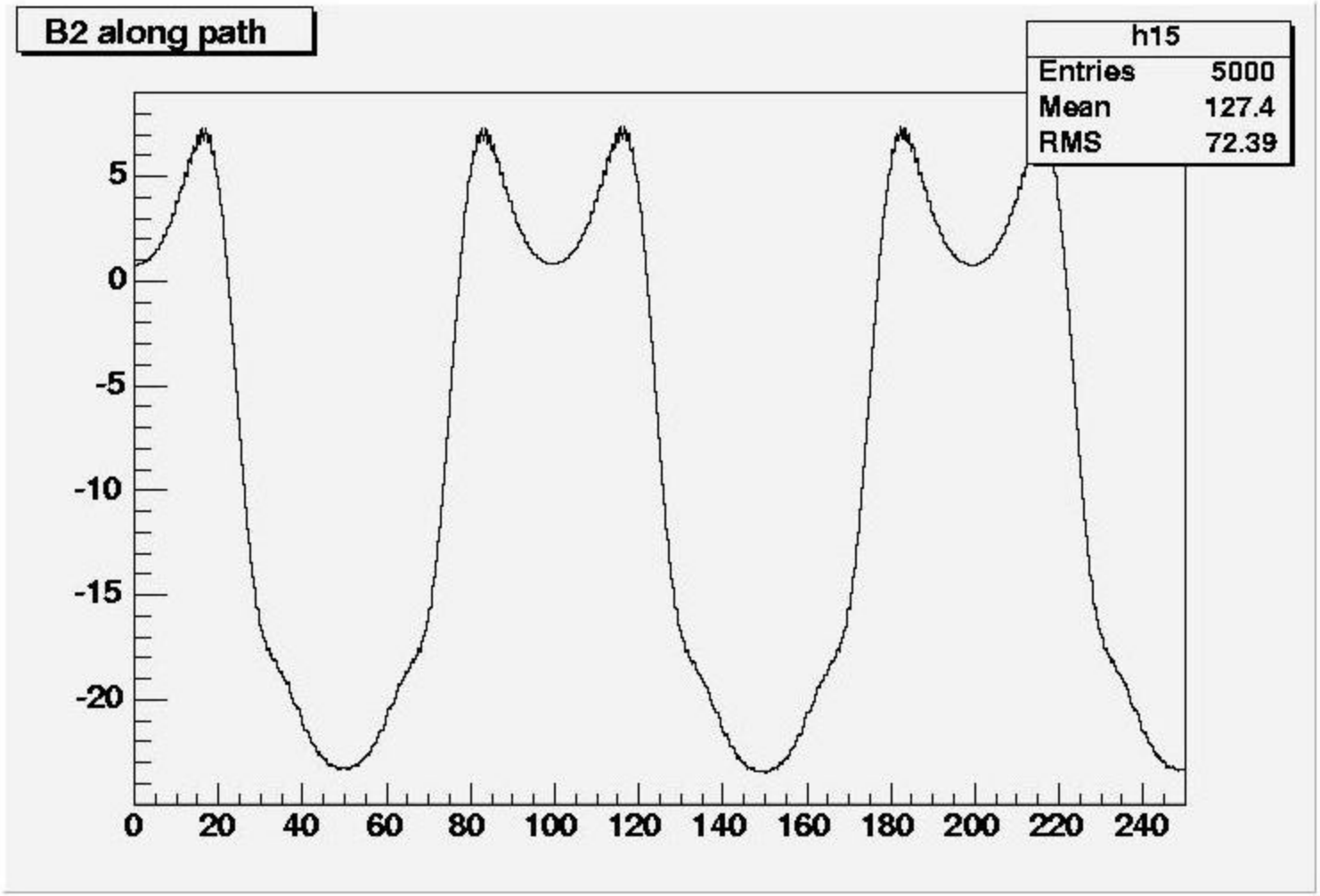


Calculating Field Harmonics

- For each point along the reference path we know its position and its tangent direction.
- We go into the transverse plane at that point and calculate its mid-plane field.
- We fit that field to a polynomial to get the harmonics.
  - We calculate them to 6 the order.


B0 along path
h13
Entries 5000
Mean 127.4
RMS 72.52
30000
25000
20000
15000
10000
5000
0
-5000
0 20 40 60 80 100 120 140 160 180 200 220 240


B1 along path
h14
Entries 5000
Mean 124.9
RMS 71.06
600
500
400
300
200
100
0
0 20 40 60 80 100 120 140 160 180 200 220 240


B2 along path
h15
Entries 5000
Mean 127.4
RMS 72.39
5
0
-5
-10
-15
-20
0 20 40 60 80 100 120 140 160 180 200 220 240

Fourier Coefficients

- ICOOL can use the use a Fourier decomposition of the harmonic components along a reference path as the field description.
  - This is easy to obtain from these previous figures.
- We plan to put this into ICOOL as the next step.
- As mentioned previously we have a $1 \times 1 \times 1$ cm grid of this field map on a file and we have the closed orbit path on a file.
  - This can go into GEANT.