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Message ID: **4093** Entry time: **Tue Apr 29 11:09:07 2008**

| | |
|----------|---|
| Run: | 279 |
| Author: | TP |
| Type: | Info |
| System: | Analysis |
| Subject: | Geant3 simulation, asymmetry and phase as a function of beam offset |

After discussion with Dima I checked with the old Geant3 simulation the effect of horizontal beam offsets on the asymmetry in L and R detectors. For a shift of 1.0cm the asymmetries A_R and A_L differ by 2-3% only. Any higher observed relative asymmetry indicates that there are not only muons decaying at the sample plate which contribute to the positron histograms, but also muons decaying somewhere else (He shield...).

Parameter for the simulation:

- homogenous beamspot, $r = 1$ cm
- setup with cyrostat and Al sample plate
- 100G Bperp
- no muon depolarization
- no background
- no time-of-flight effects
- ~ 1.25 M events in 4 detectors
- positive x0 means closer to the L detector

| x0 [cm] | y0 [cm] | mean asymmetry | A_R/A_L | NO_R/NO_L (= alphaLR) |
|---------|---------|-----------------|-----------|-----------------------|
| 0.0 | 0.0 | 0.3065(16) | 0.992(10) | 1.002(3) |
| 0.5 | 0.0 | 0.3051(38) (LR) | 1.025(12) | 0.800(2) |
| | | 0.3078(09) (TB) | | |
| 1.0 | 0.0 | 0.3006(36) (LR) | 1.024(11) | 0.643(2) |
| | | 0.3081(11) (TB) | | |

The histograms with fits (depolarization and background fixed at 0, max. likelihood (Poisson stats) fit) are shown in the attachments. The time scale is ns.

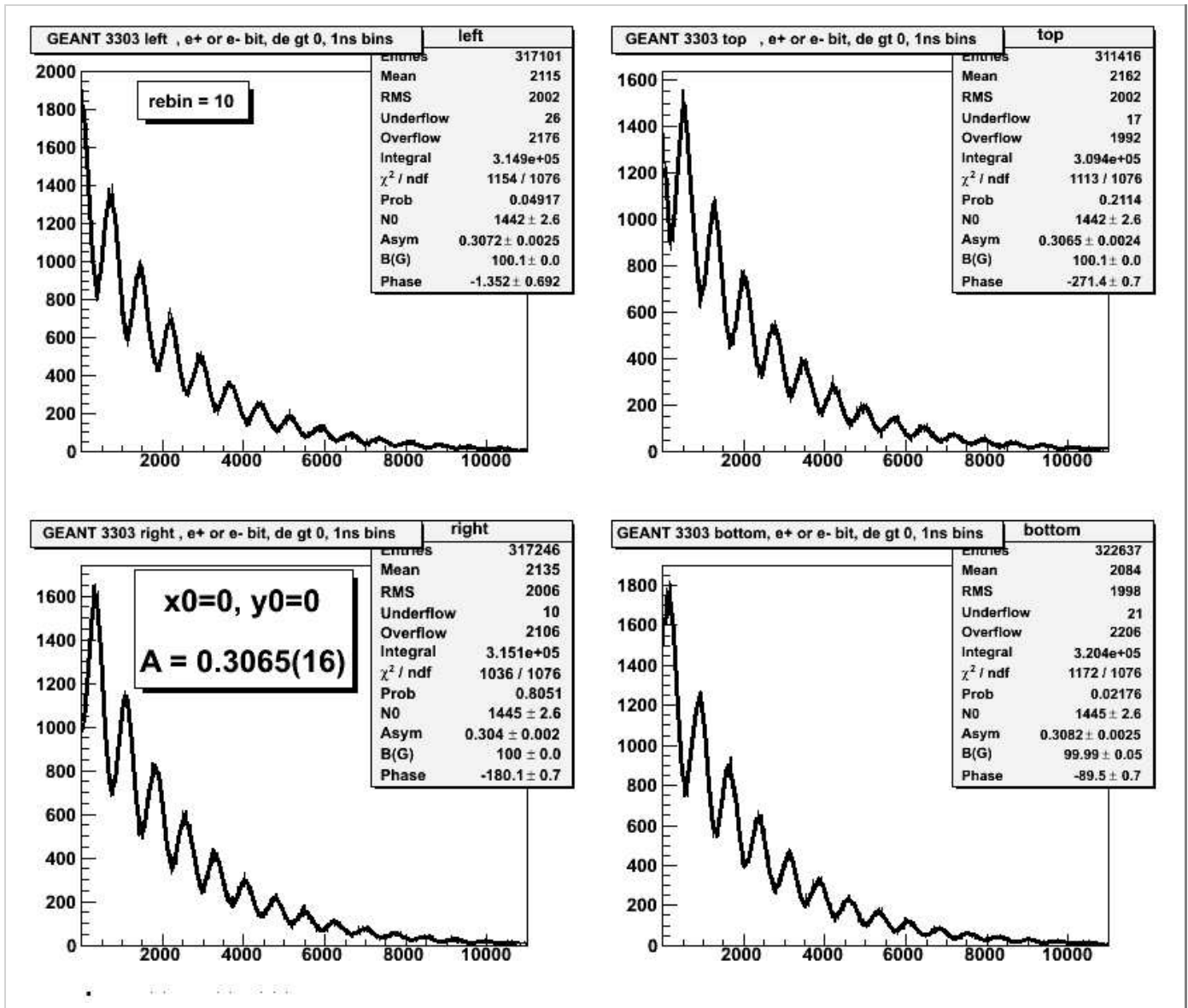
Our measured, max. asymmetry of about 0.275 indicates that the beam polarization is about 90%.

See also [elog:LEM_Experiment/1966](#) and [elog:LEM_Experiment/2636](#).

Phase shift for B-parallel setup:

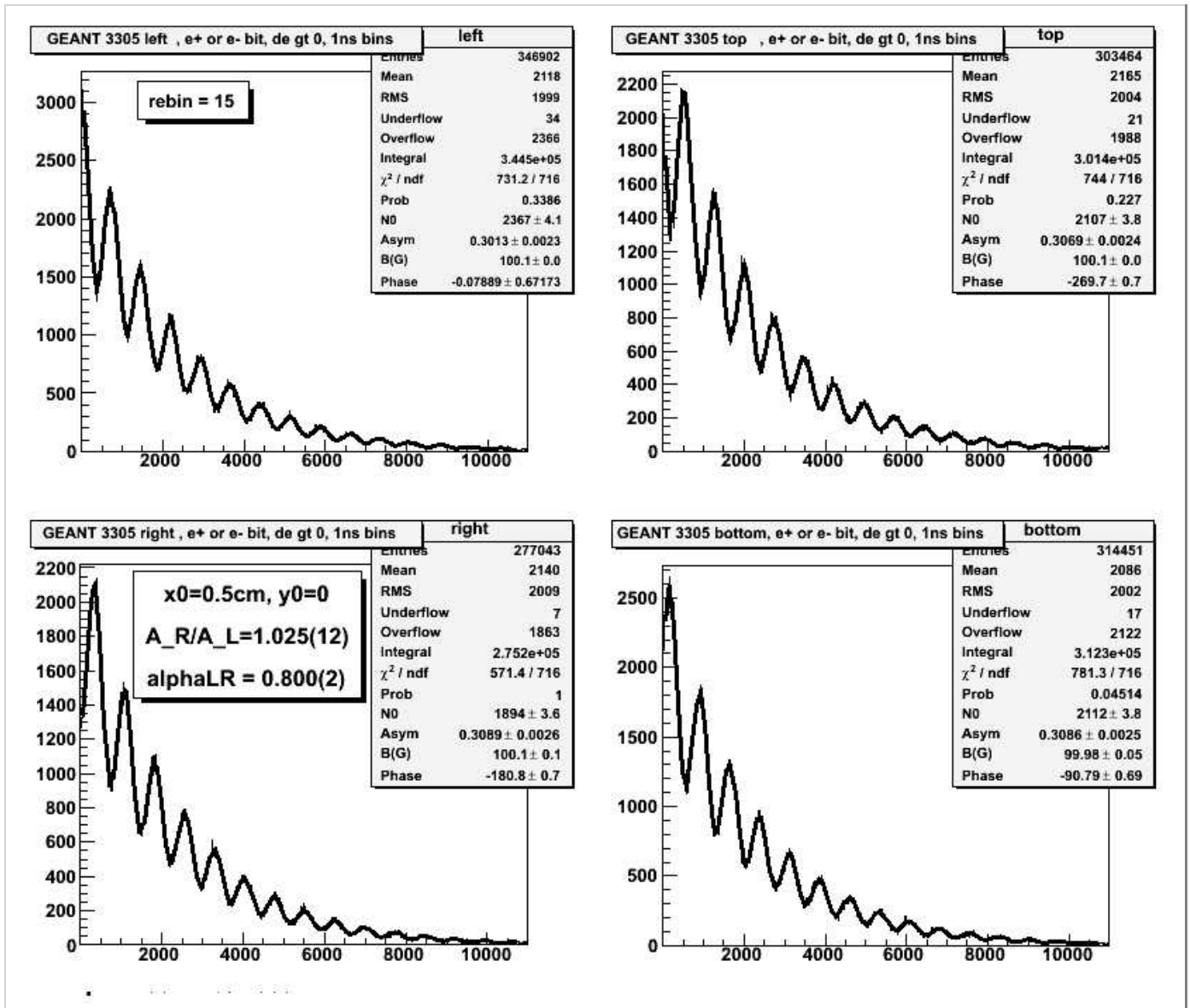
According to a suggestion of Dima I had a look on the phase shift of the L detector for the B-parallel setup, 100G. The result is summarized in Fig. 4; the single histogram fits are in Figs. 5-8.

Attachment 1: [lem01_his_3303_geant.png](#) 41 kB | [Hide](#) | [Hide all](#)



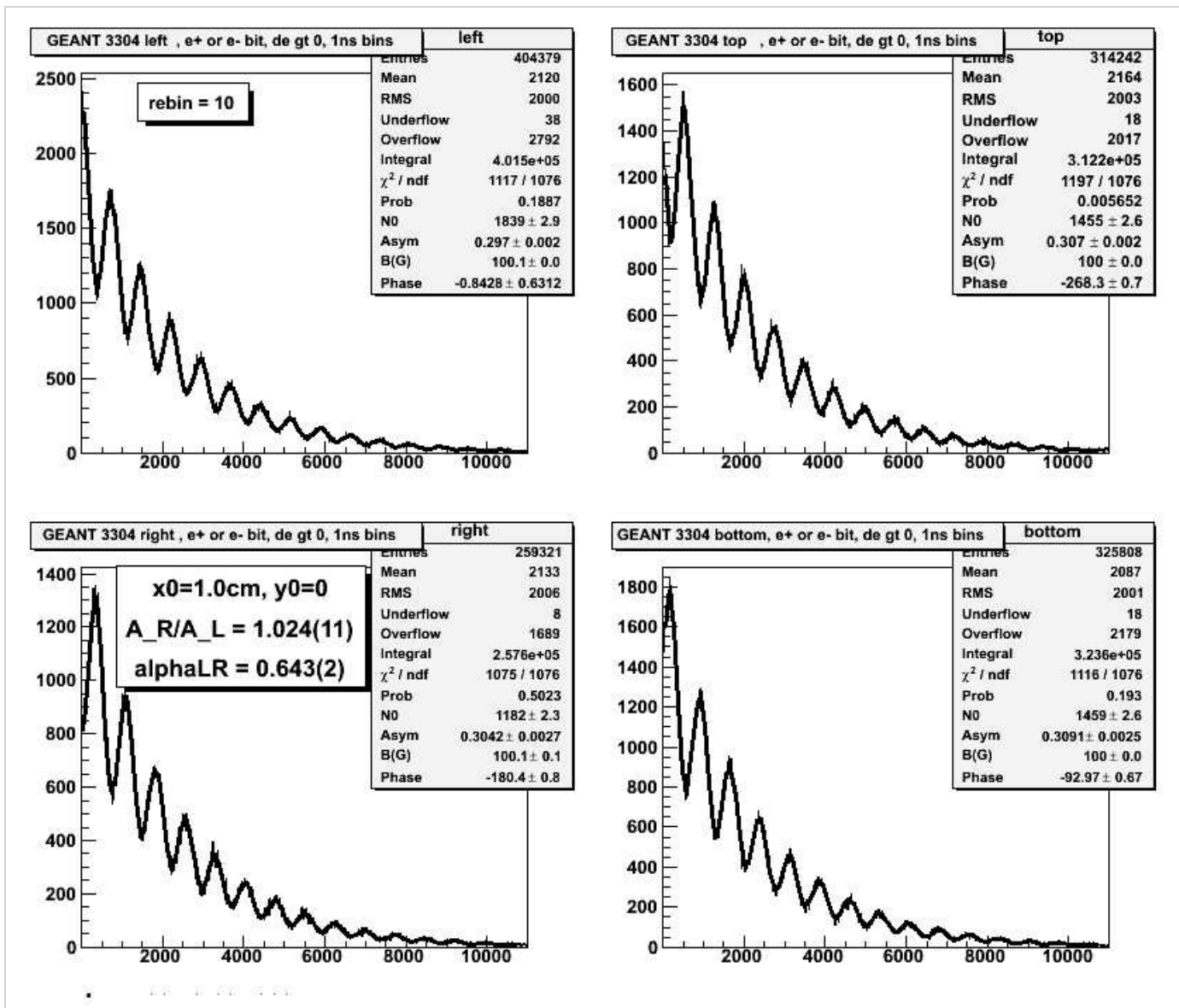
Attachment 2:

[lem01_his_3305_geant.png](#) 41 kB | [Hide](#) | [Hide all](#)



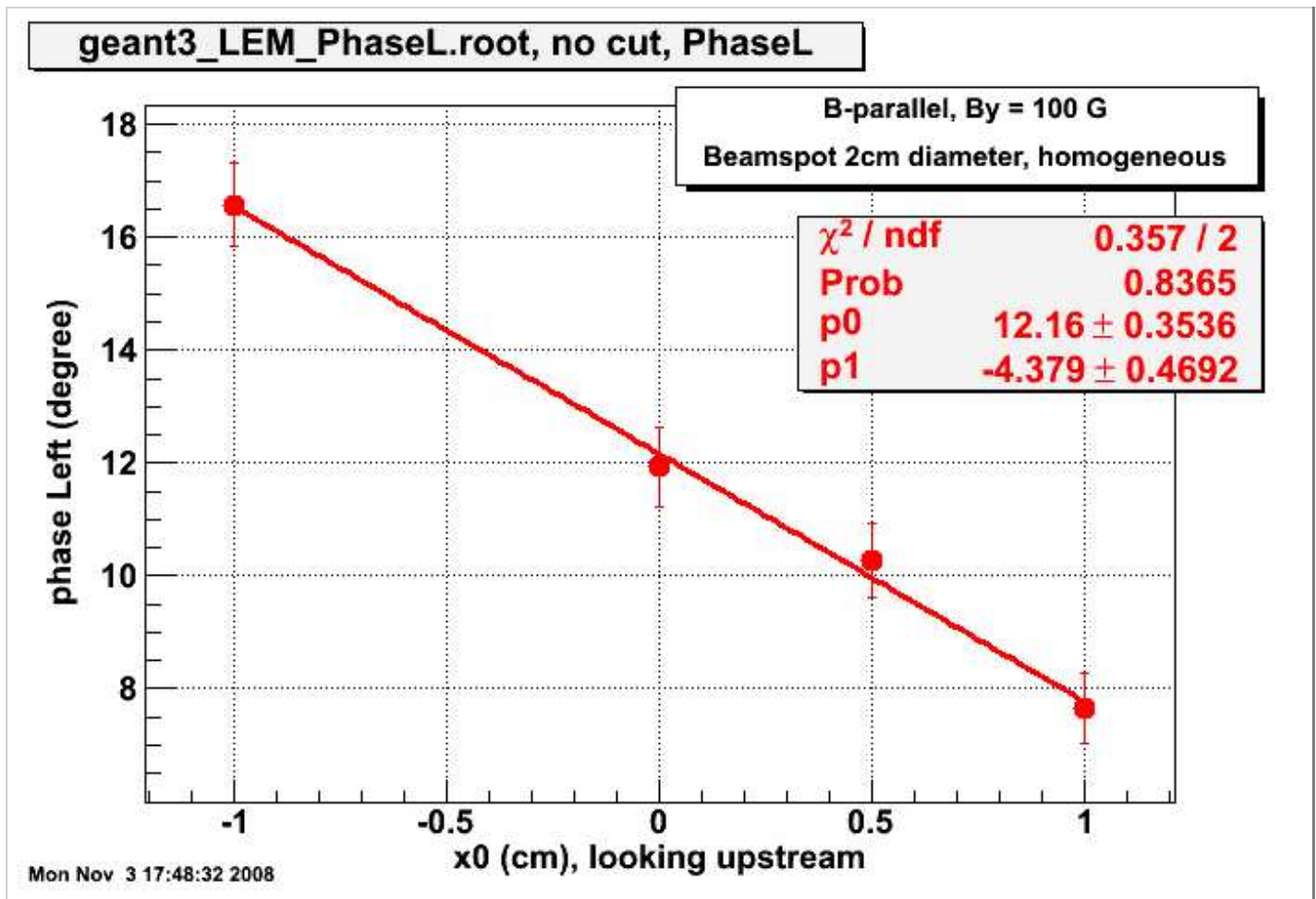
Attachment 3:

[lem01_his_3304_geant.png](#) 41 kB | [Hide](#) | [Hide all](#)



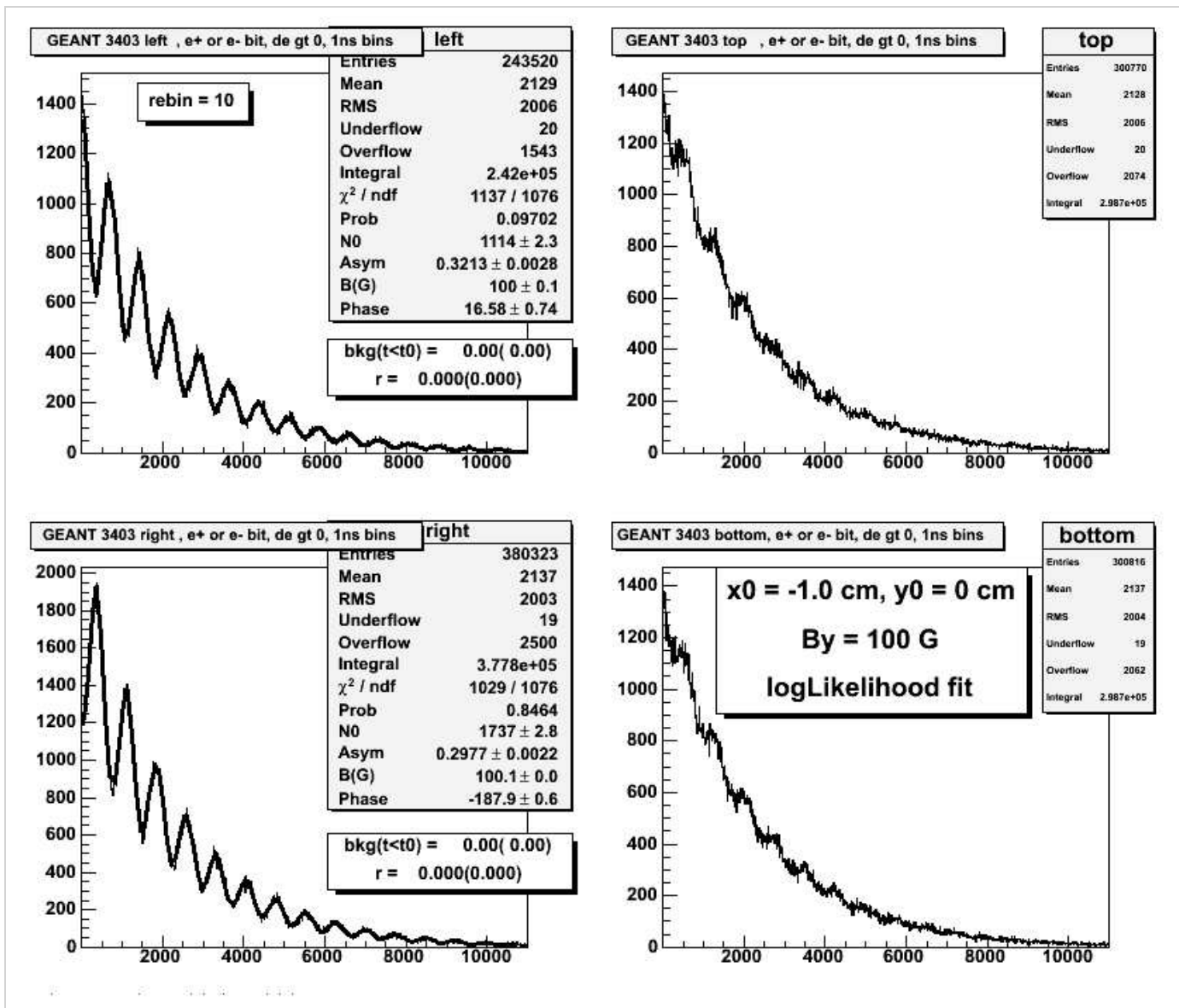
Attachment 4:

geant3_LEM_PhaseL.png 19 kB Uploaded Mon Nov 3 17:52:47 2008
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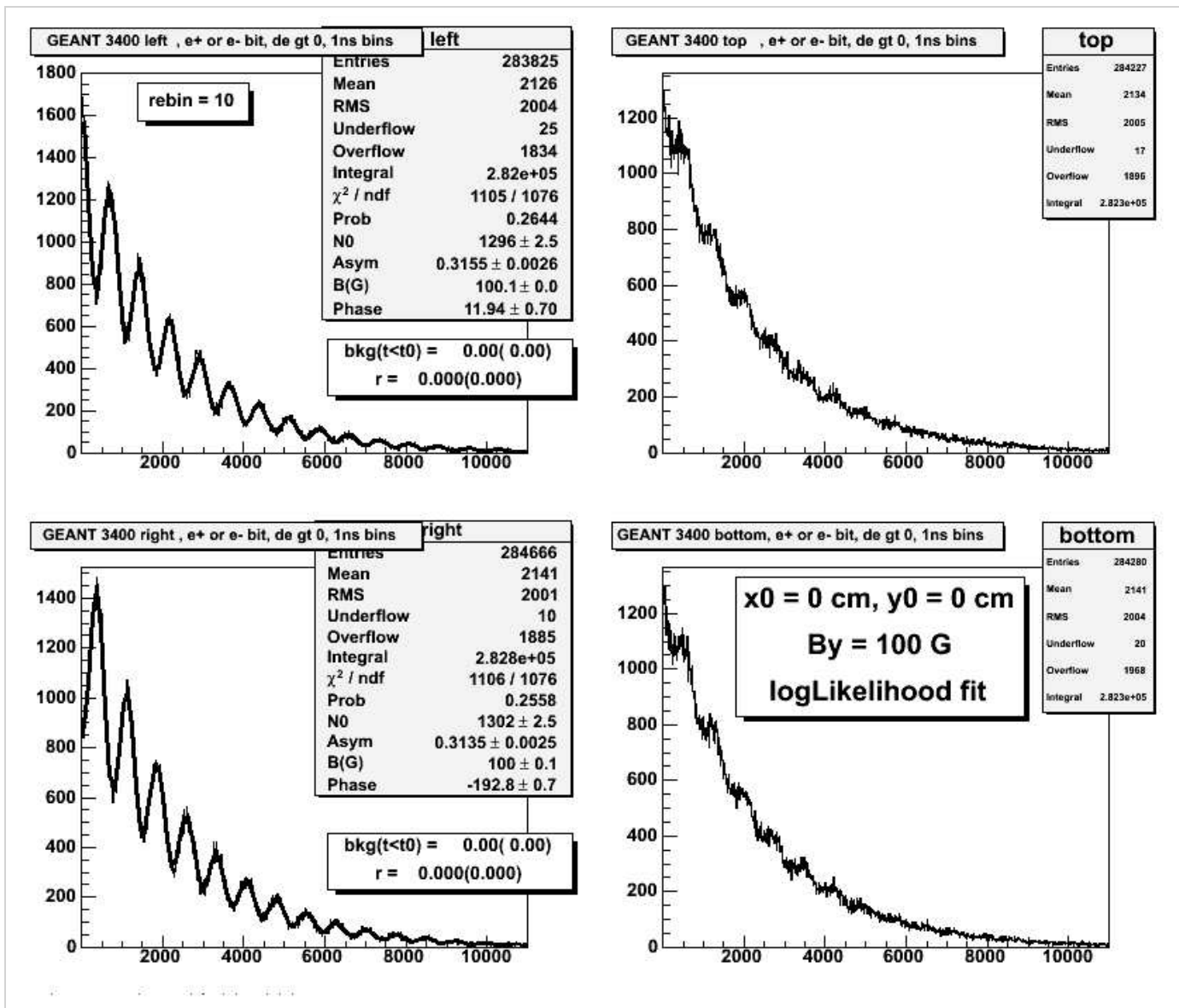
Attachment 5:

[lem01_his_3403_geant.png](#) 43 kB Uploaded Mon Nov 3 17:53:26 2008
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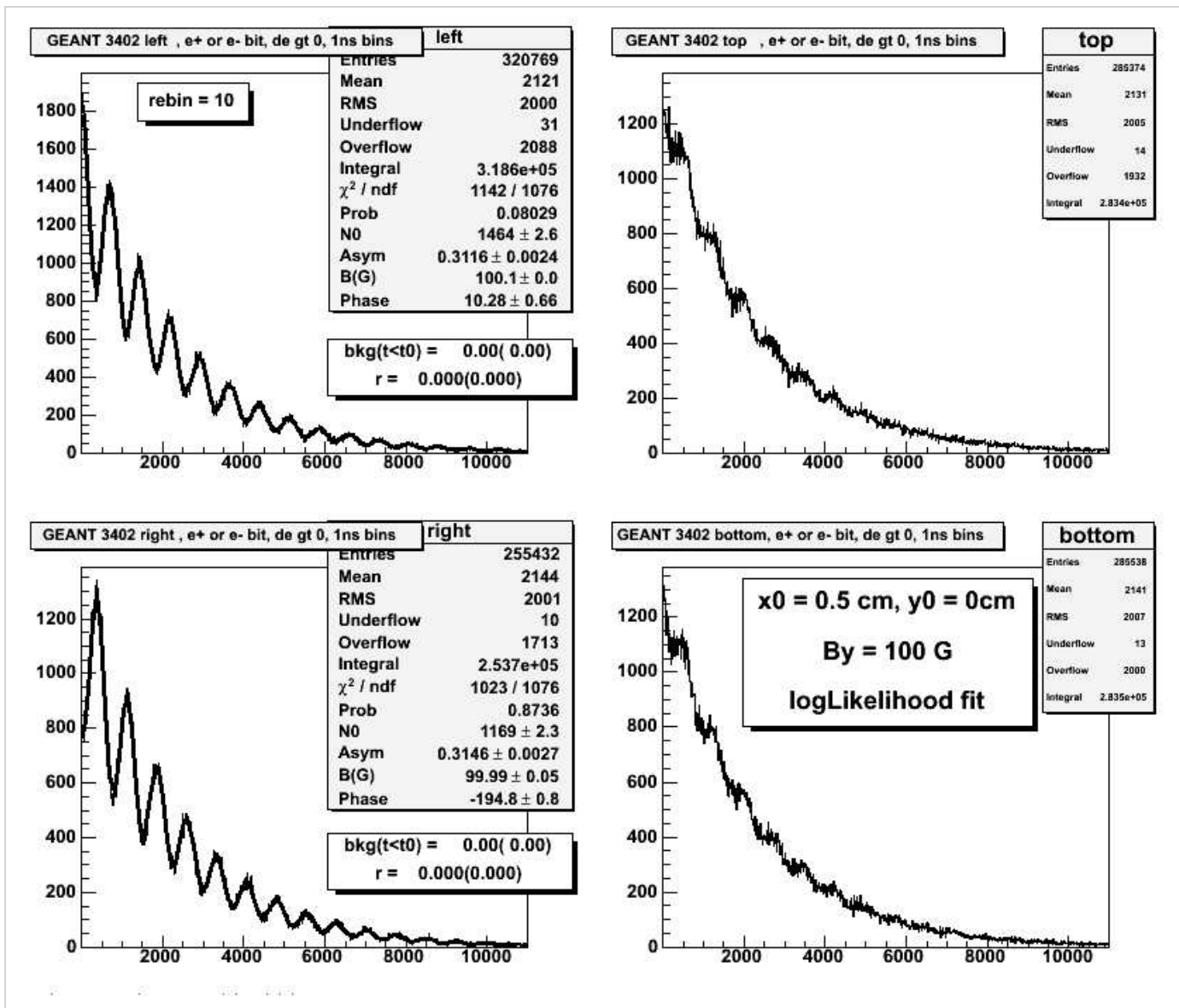
Attachment 6:

lem01_his_3400_geant.png 43 kB Uploaded Mon Nov 3 17:53:37 2008
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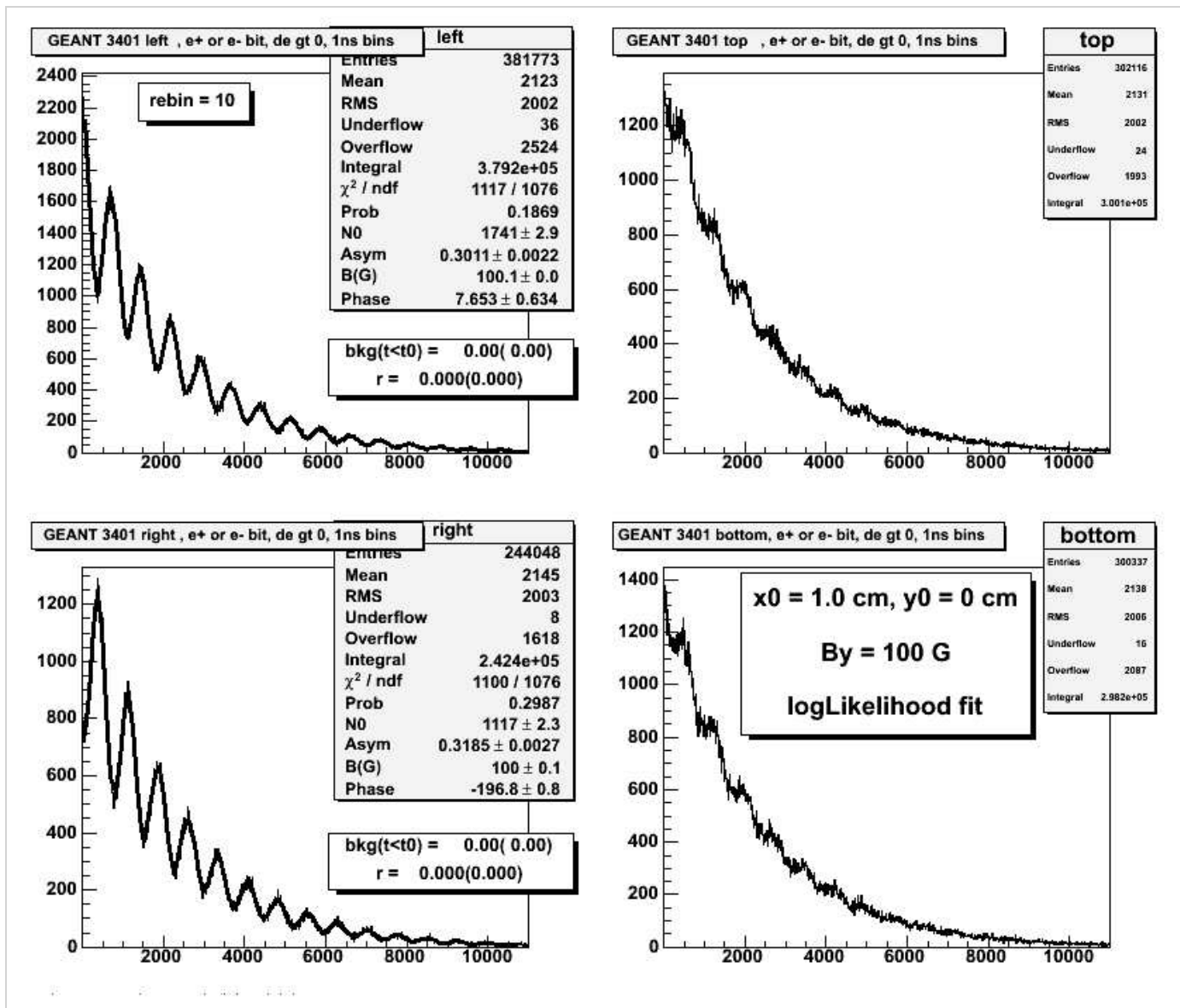
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lem01_his_3402_geant.png 42 kB Uploaded Mon Nov 3 17:53:47 2008
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Attachment 8:

lem01_his_3401_geant.png 43 kB Uploaded Mon Nov 3 17:53:55 2008
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