Moon Shadow Update  
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May 31, 2005  

• Now have code which loops over energy scale factor to make graphs of $\chi^2$ vs. esf. Test overall code by taking a set of (Geant3) MC proton data (25K evts), splitting it in half, use one half as “data”, and the other as Monte Carlo.

![Graph](image)

Figure 1: $\chi^2$ vs. esf for half of proton MC data compared with the other half.

• Fluctuations due to re-binning for each esf.
Fluctuations reduced for simulated MC data sets with more events.

- Energy vs. $\alpha$-displacement.
• Shadow results $-7^\circ : 2^\circ$. Now using Geant 4, but with dry cover.

![Graph](image)

Figure 2: Data and MC along max direction, $esf = 1.0 \ \chi^2 = 46/44df$
Figure 3: Data and MC along min direction, $esf = 1.0 \chi^2 = 56/49df$
Figure 4: $\chi^2$ vs. esf for g4vme55phe18apr.tpl
- Shadow results $-10^\circ : 5^\circ$.

Figure 5: $\chi^2$ vs. esf for g4vme55phe18apr.tpl
- Compare MC shadows for $esf = 0.66, 1.00$.
  $esf = 0.66$ suppresses tail.

Figure 6: Compare MC shadows for $esf = 0.66, 1.00$
• Shadow with $esf = 1$.

![Graph](image)

Figure 7: $esf = 1$, max deflection direction.
- Shift MC wrt data along max direction.
- Make some (illegal) cuts on MC data:
- $10 : 2 \quad E > 100\text{GeV} \quad R < 100\text{m}$

Figure 8: $10 : 2 \quad E > 100\text{GeV} \quad R < 100\text{m}$
• 10 : 2 $MC \ N_{fit} > 23$ (instead of 20)

![Chi² vs. Energy Scale Factor](image)

Figure 9: $MC \ N_{fit} > 23$

• Directions: more shadow data, more MC with wet cover.