

Electron shower energy resolution

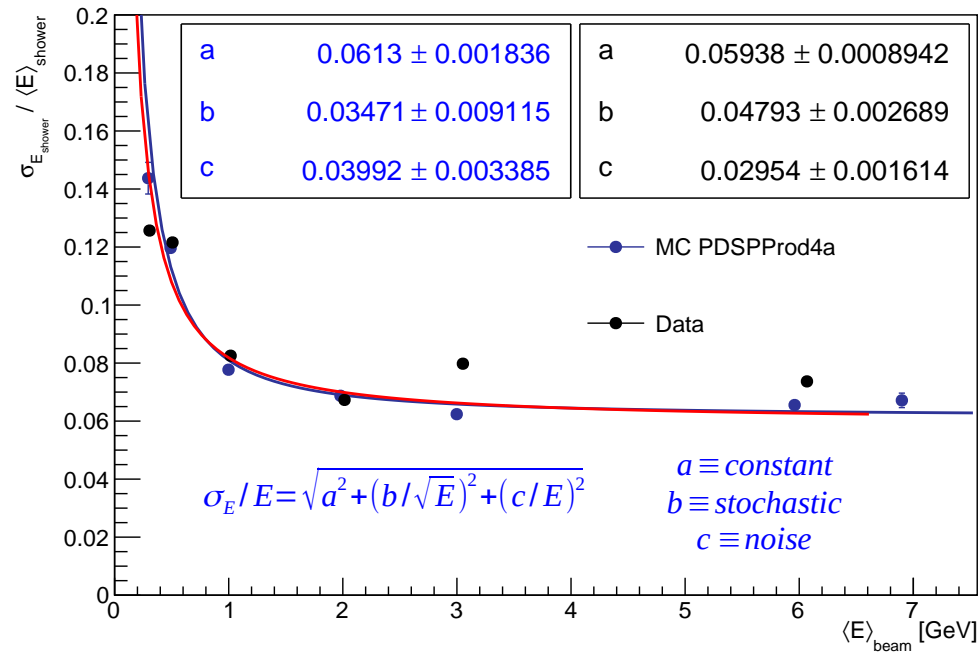
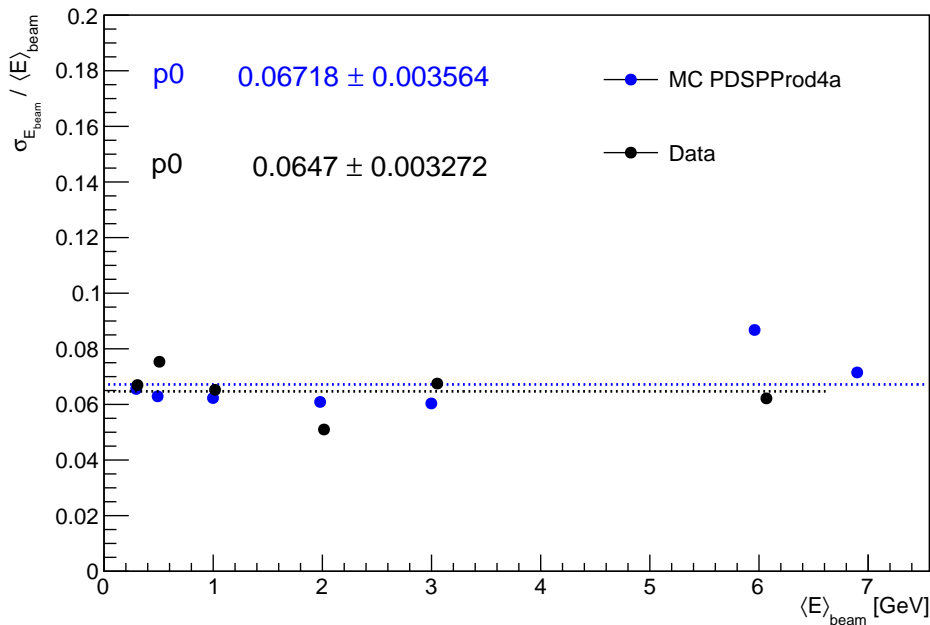
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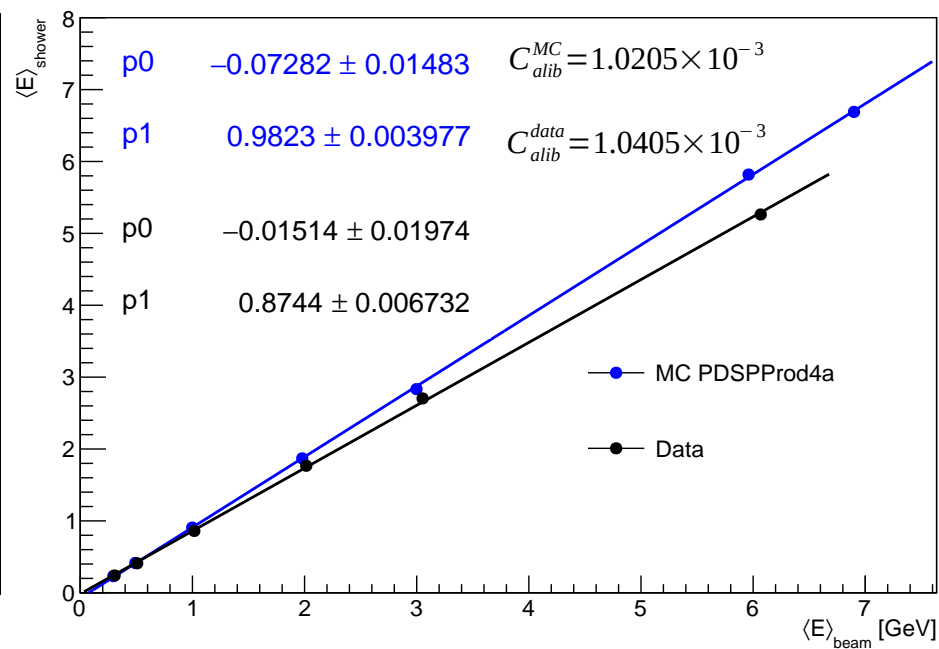
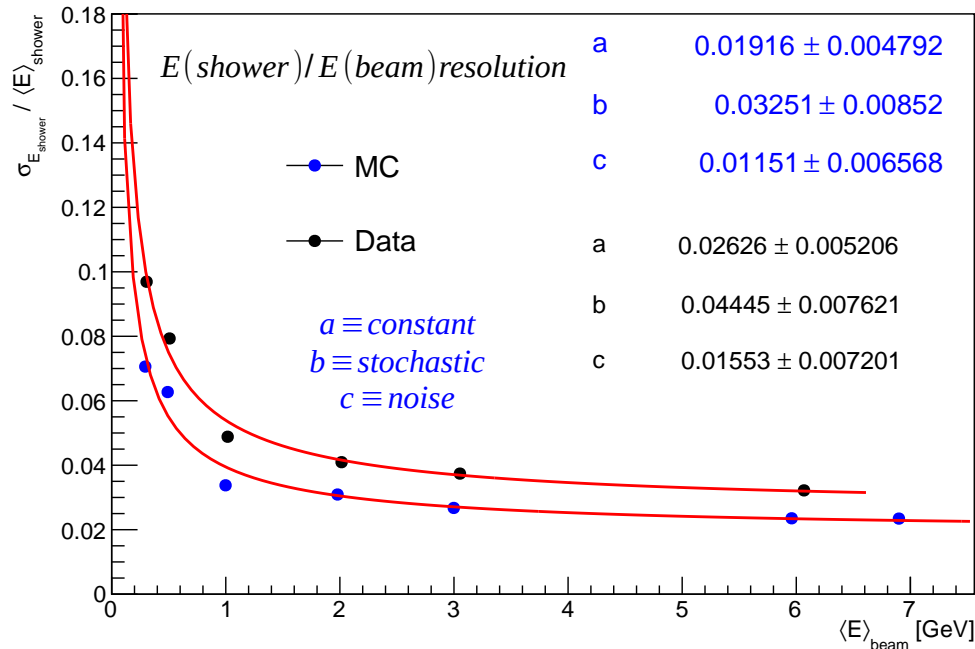
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- Updated plots with more data runs and MC events with Prod4a
- Beam resolution and energy resolution plots (σ/E) for data and MC agree well with each other



- Momentum resolution taken from gaussian fit to corresponding distribution (6.4% for data):
 - dominates constant term in shower energy resolution (as shown in single electron MC [1]).
 - To remove part of its effect we take the ratio $E(\text{shower})/E(\text{beam})$ event-by-event, and make fits to those new gaussian distributions (next slide)

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- New resolution plot (ratio): better fit to data points, constant term is now 2.6% for data
- Stochastic term $b = 4.4\%$ (data).
- Noise term is 15 ± 7 MeV, compatible with upstream energy loss from linearity plot (17 MeV)
- Linearity plot for MC shows some discrepancy compared to previous Prod2 MC results:
 - 94% energy recovery for Prod2 vs 98% in Prod4a (no missenergy reco threshold added yet)
- Same issue for data linearity:
 - 94% energy recovery for Prod2 vs 87% in Prod4a

Ongoing

- Trying to understand the source of discrepancy between Prod4a vs Prod2 data
- Suggestions?

Thanks!

References

[1] <https://indico.fnal.gov/event/54523/contributions/241239/attachments/154992/201738/presentation.pdf>