World Wide Data Day

W2D2_19

Summary

Eighteen Ottawa High School physics students participated in the World Wide Data Day data analysis event in collaboration with students at 43 schools in 21 different countries. The OHS involvement included two and a half days of data analysis and some time spent learning about particle detectors and how the data events analyzed in this event were detected and recorded. We were unable to participate in the scheduled videoconference, but Mr. Deane led the class through the analysis of our data and a comparison of our predictions for the dependence of frequency on phi and theta.

Ottawa students analyzed 800 events from the CMS data set, identifying and measuring 202 dimuon events, which were the target of this particular investigation.

As with last year's analysis, Ottawa's all-groups data for theta and phi are consistent with the world-wide collaboration's final results.

Ottawa Local Results

Count vs. Phi Angle (end on XY view)

Phi (degrees)
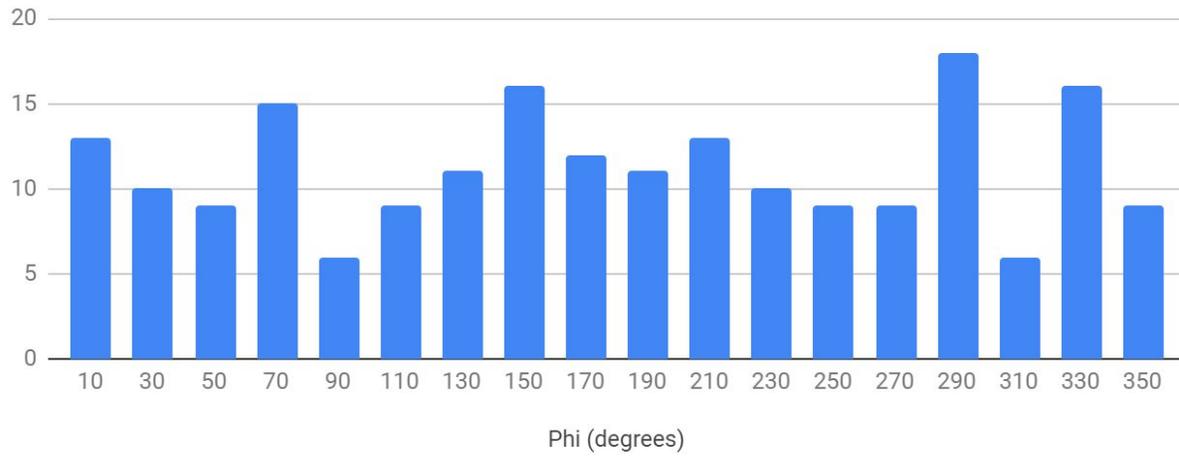
Count vs. Theta Angle (side on YZ view)

Theta (degrees)
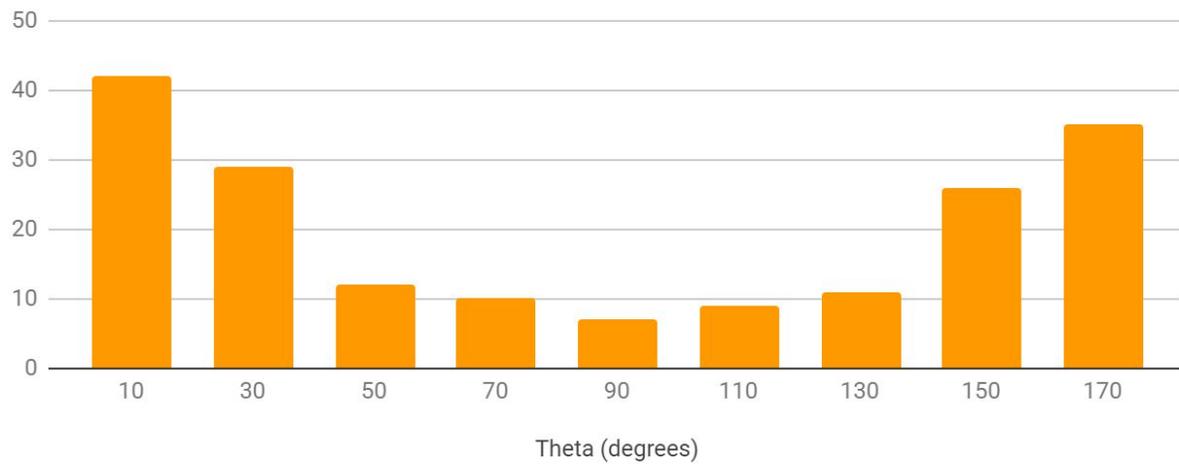
Collaboration Results (10,000 event dataset)
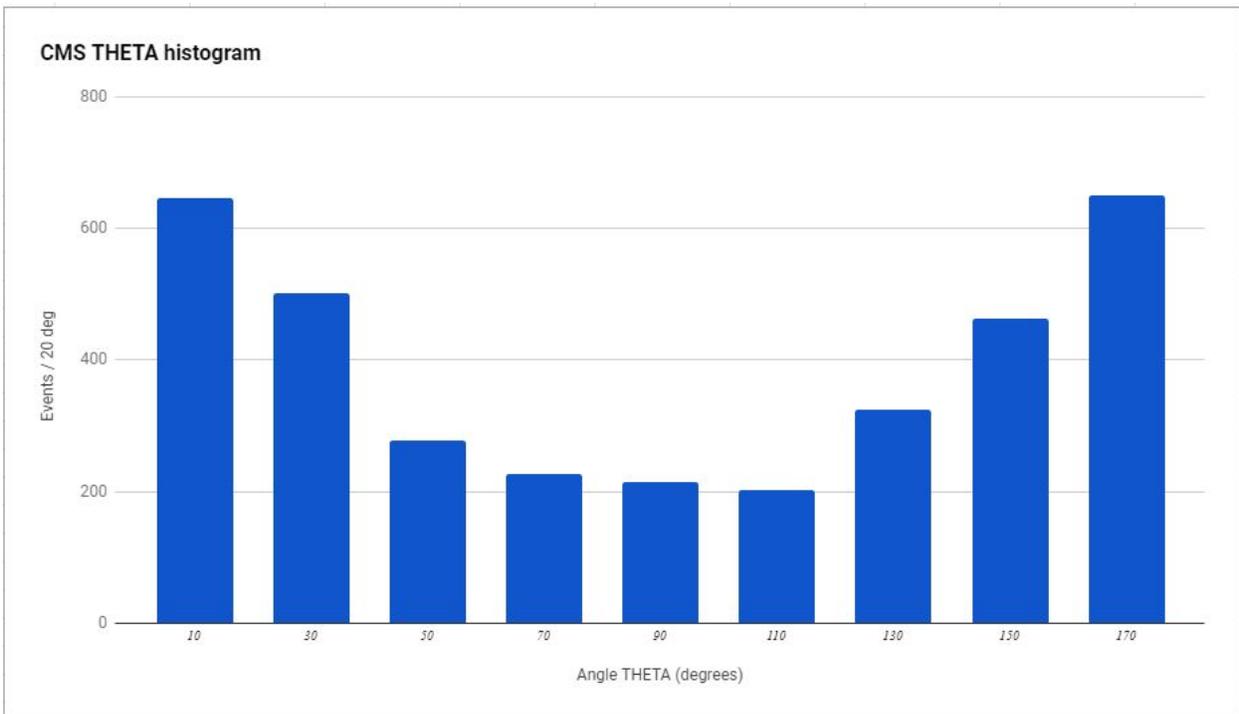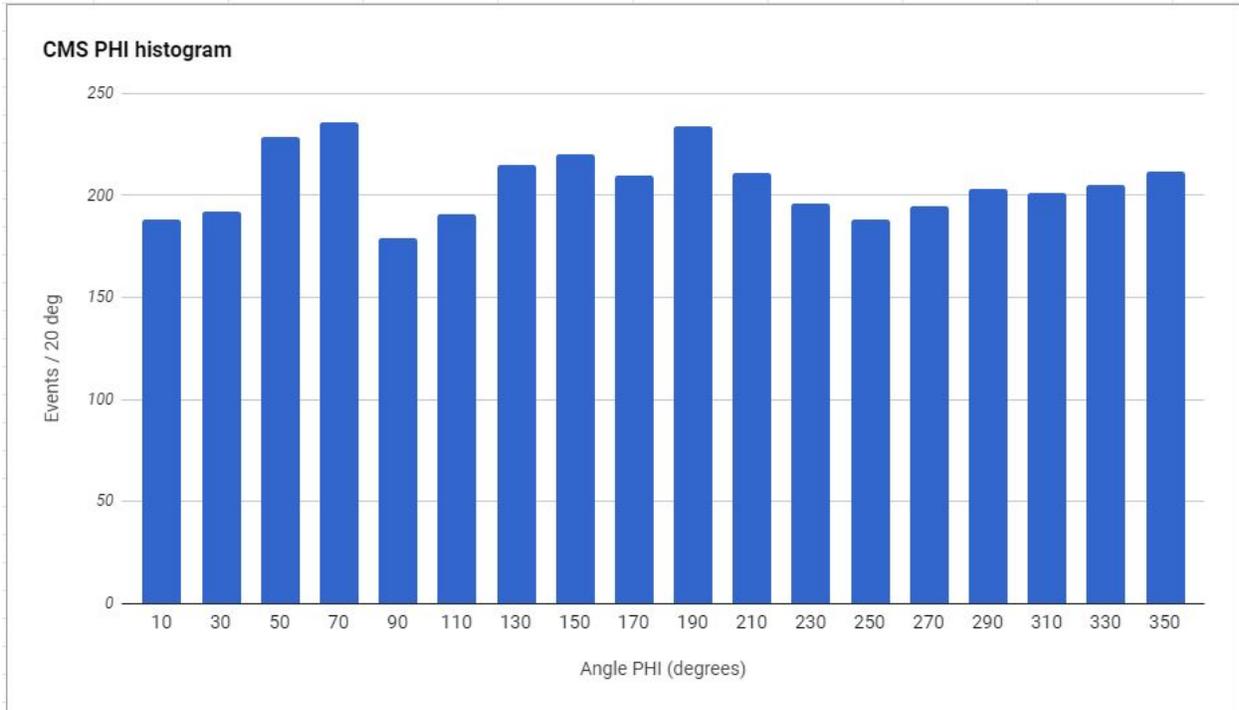
Comparison, Ottawa vs. Collaboration Results

No formal data analysis was performed to determine a correlation. Ottawa's results are part of the collaboration's results, but account for only 5% of the collaboration's total dimuon event counts. Some dimuon events were counted multiple times by different groups in the collaboration. Qualitative comparison shows a high degree of similarity between the phi resutls, and an extremely strong similarity between the theta results.

Conclusion

As with the 2018 W2D2 analysis, the data analyzed by the Ottawa physics group was very consistent with the results of the entire collaboration. We found that the counts for phi angle did not depend strongly on angle, and we found that the counts for theta were highest along the beampipe (close to 0 and 180 degrees) and lowest close to perpendicular (90 degrees) to the beampipe.