Coincidence Runs

Problem: How many times will the muon hit both paddles within a certain time?

Hypothesis: As the angle in which the paddles are positioned changes toward a horizontal position, the number of hits will decrease.

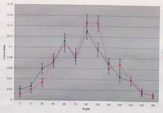
Analysis/Conclusion:

In conclusion, our hypothesis was correct. It proved to be true as the paddles came closer to being at a horizontal position the number of hits did decrease.

Analysis of our data shows through looking at our graph that the error bars between each set of degrees varied differently. Between angles 75 and 90 there was a significant change in the count rate. This shows that every angle after 75 degrees the count rate drops to a lower percentage. 0 and 180 degrees have similar count rate.

Angle	Count Rate (Hz/min0)	Uncertainty	%
0	0.01960198	0.0002116	
15	0.02645264	0.0008501	
30	0.02645264	0.0008501	
45	0.01580396	0.0015821	
60	0.01571251	0.0010958	
75	0.0750577621	0.0011430	
90	0.1063630538	0.0016857	
105	0.0807099571	0.0012007	
120	0.0600589551	0.0010994	
135	0.0445644455	0.0006075	
150	0.0315935735	0.0007814	
165	0.0148621485	0.00495	
180	0.0115211154	0.0040963	

Angle	Count Rate	Uncertainty	%
0	0.02960396	0.004047	
15	0.01980198	0.002716	
30	0.02645264	0.003627	
45	0.0792577621	0.01112	
60	0.10390396	0.01558	
75	0.1063630538	0.01857	
90	0.08580495	0.01003	
105	0.0451455551	0.01048	
120	0.0315935735	0.00781	
135	0.0079207792	0.01094	
150	0.01315735	0.00714	
165	0.0115211154	0.00963	
180	0.00990396	0.00401	



Materials:

1. Angle Stand
2. Muon Telescope Paddles
3. Computer
4. High Voltage Power Supply
5. Angle Indicator
6. C-Clamps
7. Notebook
8. DAQ Board
9. Voltage Divider Box
10. Muon Telescopes
11. Computer Power Supply
12. 2 Signal Cables (Green)
13. 3 High Voltage Cables (Red)
14. Serial Cable
15. Board Power Supply (for DAQ Board)

Procedure:

1. Clamp paddles to series of angle stand.
2. Plug in and start computer.
3. Turn to particle for both logic and processed.
4. When loaded and at minimal type in .muon Data.
5. Plug in high voltage power supply.
6. Attach voltage divider box to high voltage power supply using high voltage cable.
7. Plug serial cable into the back of the computer.
8. Plug Board power supply into DAQ Board.
9. Plug Board power supply into outlet.
10. Plug serial cable from computer into DAQ Board.
11. Plug each paddle into the voltage divider box using the high voltage cables.
12. Using signal cables plug correct number cable into the correct port on DAQ Board.
13. Turn on High Voltage Power Supply.
14. Set voltage to 1.08 volts (for the high voltage power supply).
15. Start coincidence run on day by entering 44 and type in the number of minutes (in seconds) you'll run the run.
16. Record number of events in the amount of seconds when run is complete.
17. Continue on with the testing at different angles.

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