Determining the Speed of a Muon

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Let’s Get It Started

• We began our journey into the world of muons around 3:30 on June 25th, 2007.

• First we began plateauing counter 3 and the baby counter.
Plateauing Results

Plateau of Counters

Voltage: About 2.9-3.0
After a hard day’s work we left the lab and continued to collect data over night.

- Counter 1 (top)-Channel 2
- Counter 3 (bottom)-Channel 1
The Next Day

• With the data collected overnight we connected the cables to the scope and determined the time difference.
  • 11 nanoseconds
Then we calibrated the data collected and at the same time we began to collect new data after switching the position of the counters.
Results of the Calibrated Data (Set 1)

DT 1 ns bins

-11 ns
With the newly collected data, we connected the cables to the scope and determined the time difference.
- 4 nanoseconds
Results of Calibrated Data (Set 2)

DT 1 ns bins

-7 ns
End Results

- Time Rate Data Set 1: -11 ns
- Time Rate Data Set 2: -7 ns
- Time Difference: -18 ns/2 = -9 ns
- Displacement: 9 ft. = 2.62 m
- Speed = Displacement / Time
Final Answer...YAY!!!

2.91 \times 10^8 \text{ m/s}