

## A Comparison between Z Boson Decays

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My project involves using the CMS e-lab and the CMS 3D Event Display to compare the two easily identified Z boson events: its decay into the  $e^-/e^+$  pairs and its decay into  $u^-/u^+$  pairs. While looking through the data from the 2010 LHC run, a discrepancy between the average mass of the  $e^-/e^+$  pairs and the  $\mu^-/\mu^+$  pairs is found. A wider mass distribution of the  $e^-/e^+$  pair mass is also present. Although this evidence could suggest the unlikely erroneous calibration of the detectors at CERN, it could also be that the  $e^-/e^+$  pairs simply have lower measured masses because the electron events have different interactions during the decay than the other events. To investigate this difference, individual events are analyzed and compared from the 3D event display in search for any differences between the two types of decays. I found that the average number of jets involved in  $e^-/e^+$  events is higher than that of the  $\mu^-/\mu^+$  events. Also the jets in the  $e^-/e^+$  events tend to travel alongside the electrons and positrons, whereas such jet behavior is not observed with the  $\mu^-/\mu^+$  events. There seems to be a correlation between the number of jets and the mass of the parent particle; however, more data is needed to confirm this finding.

First sentence: "...Z boson events, the decay into  $e^-/e^+$  pair and the decay into  $u^-/u^+$  pairs." I would change this to "...Z boson events: its decay into the  $e^-/e^+$  pairs, and its decay into  $u^-/u^+$  pairs."

"A wider mass distribution of the  $e^-/e^+$  pairs... are simply different from the other events." Consider elaborating on what "simply different" means. Then, after this sentence, I would put in some kind of transition between it and the next sentence. For example, "To investigate this difference,"

Define "it" in line

You may want to try making the abstract a little more personal, like by using the word "I" more, if you are the one that did something. For example, "It is found that the average number of jets involved in..." if you found that out, maybe use "I found that" or "my research," etc. Just so they know that you did a lot of research and what not.

I think this is a very good intro/description of your research.