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A data-driven method to estimate the antiproton background in Mu2e

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The Mu2e experiment will search for the CLFV process of neutrinoless coherent conversion of muon to electron in the field of an Al nucleus. The experimental signature is a monochromatic conversion electron with energy $E_{CE} = 104.97$ MeV/c. One of the possible background processes is $\bar{p}$s produced by the proton beam at the Production Target, annihilating in the ST. The background expected from $\bar{p}$ is very low but highly uncertain. It cannot be efficiently suppressed by the time window cut used to reduce the prompt background. Therefore, we have developed a method for the in-situ measurement of this background. In Mu2e, $p\bar{p}$ annihilation in the ST is the only source of events with multiple tracks coming from the ST, simultaneous in time, each with a momentum in the signal window region. We exploit this unique feature and reconstruct the multi-track events to estimate the $\bar{p}$ background by comparison.

Alternate track

1. Beyond the Standard Model

I read the instructions above

Yes

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