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

*Monday, 4 December 2023 16:40 (20 minutes)*

The Mu2e experiment at Fermilab will search for the CLFV neutrinoless coherent conversion of muon to electron, in the field of an Al nucleus. The experimental signature of the process is a monochromatic conversion electron (CE) with 104.97 MeV/c energy. CE-like electrons could also come from background processes like the cosmic muons, Decay in Orbit (DIO) of muons stopped in the Stopping Target (ST) or antiprotons produced by the proton beam at the Production Target and annihilating in the ST. The background induced by antiprotons is low but highly uncertain. This background cannot be efficiently suppressed by the time window cut used to reduce the prompt background because antiprotons are significantly slower than the other beam particles. We are developing a method for the in-situ measurement of this background. ppbar annihilation in the ST is the only source of events in Mu2e with multiple tracks, simultaneous in time, each with a momentum in the signal window region. We plan to exploit this unique feature. The idea is to identify and reconstruct events with multiple tracks and use them to estimate the antiproton background. The Mu2e detector and event reconstruction are optimised for efficient single-track event reconstruction, we are developing algorithms to reconstruct multi-track events. The talk will present its status and discuss the prospects of the in-situ estimate of the antiproton background.

### **Name of collaboration or list of co-authors**

Mu2e Collaboration

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