

# Ar39 Spectrum

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June 27, 2017

# Beta Spectrum

$$N(T) = C_L(T) F(Z, T) p E (Q - T)^2$$

$N(T)$

The Number of particles emitted with a given kinetic energy.

$F(Z, T)$

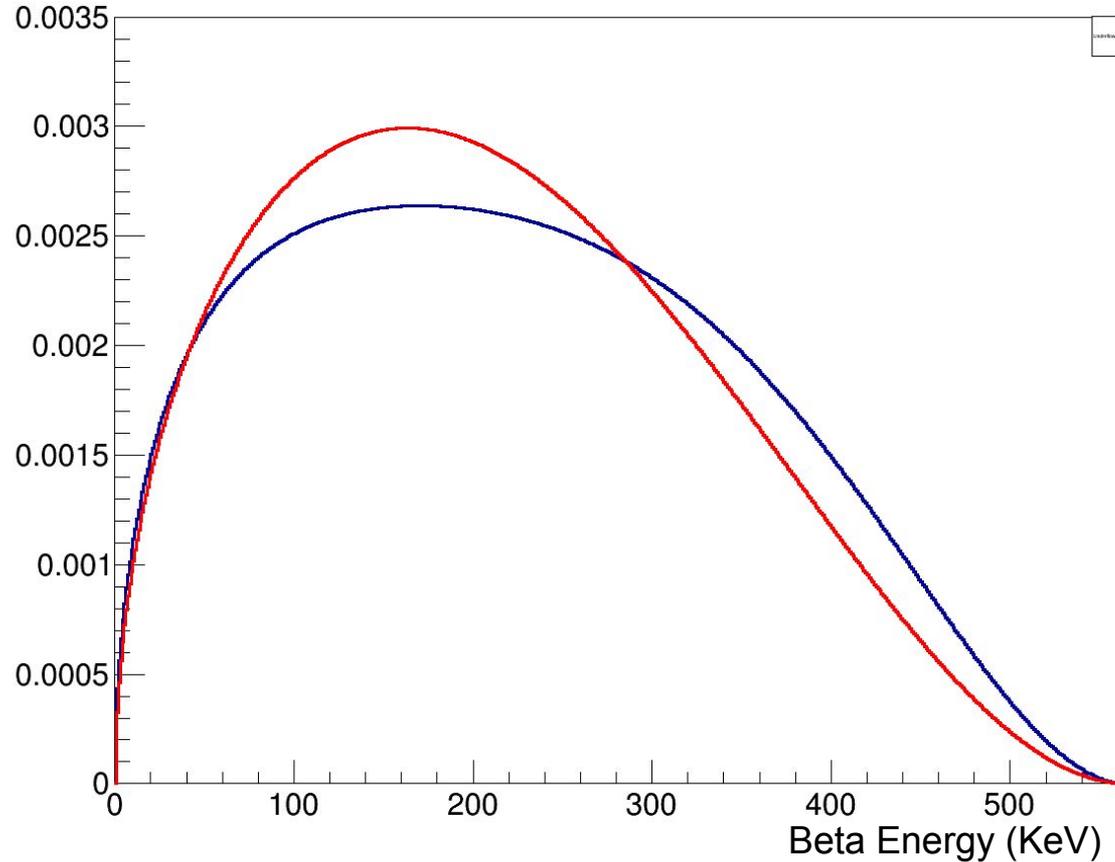
Corrections to the simple beta spectrum accounting for the coulombic interaction of the emitted particle with the nucleus it is emitted from.

$C_L$

Corrections to the simple beta spectrum accounting for the forbiddenness of transitions between excitation states of a given nucleus.

# Comparison of spectra.

Ar39 Spectrums (With and without corrections)

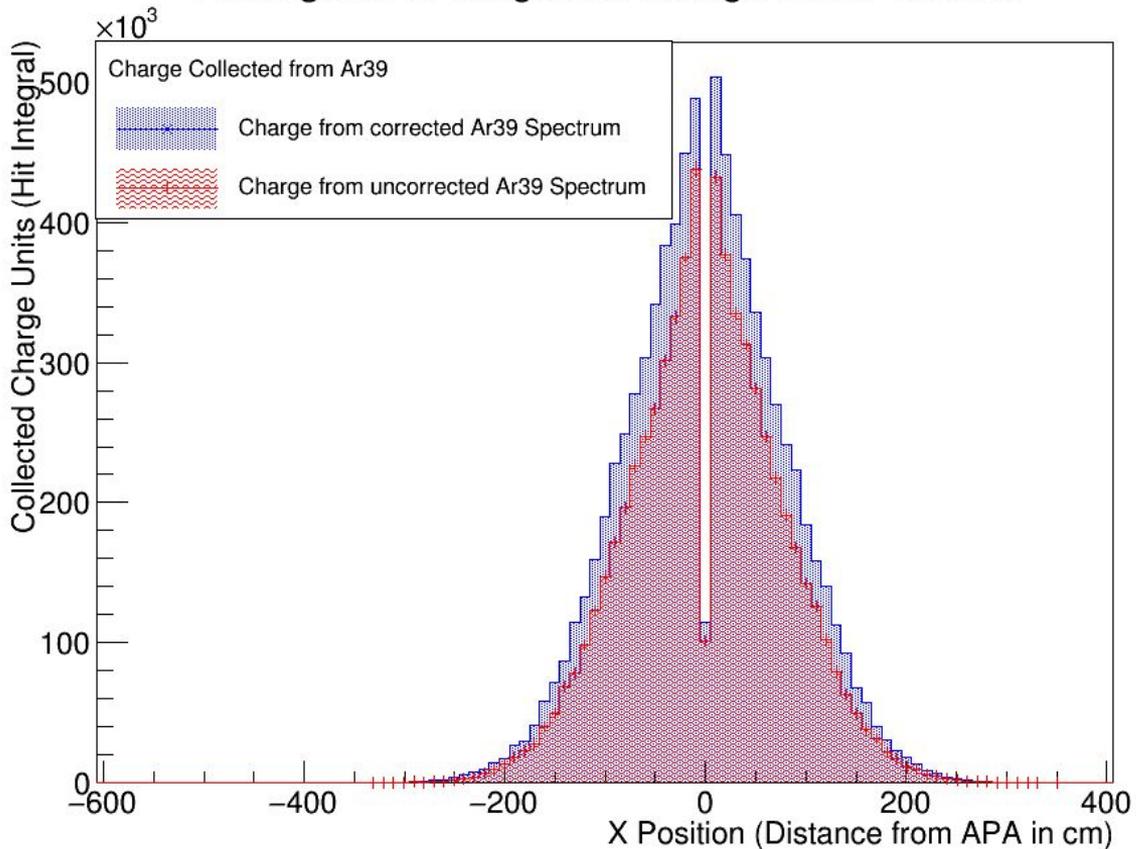


# Simulation of impact.

- dunetpc v06\_39\_00
- Dune10KT\_1x2x6 geometry.
- 100 Events
- Only Ar39 Background

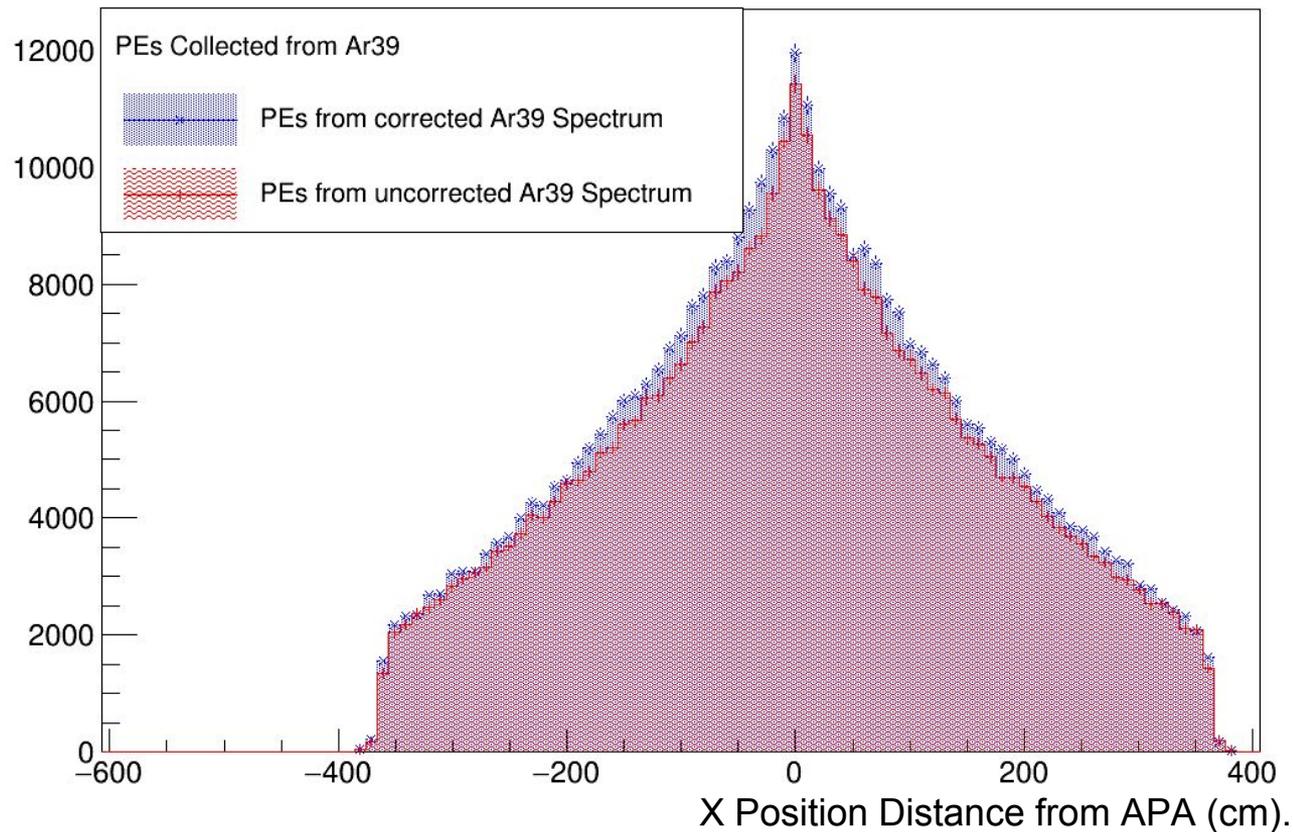
# Comparison of charge collected using the spectra.

Histogram of Integrated Charge vs X Position.



# Comparison of PEs collected using the spectra.

## Histogram of Detected PEs vs X Position



# Comparison of rates and collections

<b>Charge</b>	Old Spectrum	New Spectrum	Change
Num Hits	165143	202705	+23%
Integrated Charge	$6.7 \cdot 10^6$	$8.3 \cdot 10^6$	+24%

<b>PEs</b>	Old Spectrum	New Spectrum	Change
Num Hits	241412	256263	+6%
Integrated NPEs	$3.8 \cdot 10^5$	$4.1 \cdot 10^5$	+8%

Questions?