

LDMX BDT Variables (shower profile):

Variable Name	Full Name	Definition
nReadoutHits	Number of readout hits	Total number of hits in ECal (hit = energy above readout threshold deposited in cell)
summedDet	Total energy deposited	Energy sum of all ECal hits
summedTightIso	Total tight isolated energy deposited	Energy sum of isolated hits in ECal, when no neighboring cells in same plane fire
maxCellDep	Highest energy in a single cell	The highest amount of energy deposited in a single cell
deepestLayerHit	Deepest layer hit	Layer number of the deepest ECal layer with a hit (34 layers total in ECal as of v14)
avgLayerHit	Average layer hit	Energy-weighted average of layer numbers corresponding to all hits in an event
stdLayerHit	Standard deviation of layer hits	Standard deviation of energy-weighted layer numbers
showerRMS	Transverse RMS	The centroid is the ECal cell closest to the center of energy for all hits. showerRMS is the root mean square of the value $E \cdot R$, for all hits with energy E and euclidean distance R from the centroid.
xStd	Standard deviations of x positions	Energy-weighted standard deviations of x and y positions of all hits in an event
yStd	Standard deviations of y distributions	

ele68ContEnergy	Electron containment energy	Sum of energy contained in one containment radii around electron/photon (radius of containment defined to contain 68% of shower energy on average, two radii is 95%)
photon68ContEnergy	Photon containment energy	

LDMX Abbreviations:

DM - Dark Matter

LDM - Light Dark Matter

p_T - Transverse momentum (i.e., momentum transverse to direction of incoming beam)

ECal - Electromagnetic Calorimeter

HCal - Hadronic Calorimeter

TS - Trigger Scintillator

EoT - Electrons on Target

PE - Photoelectrons

PN - Photonuclear (background)

EN - Electronuclear (background)

MIPs - Minimum Ionizing Particles (e.g. muons)

BDT - Boosted Decision Tree

DAQ - Data Acquisition

TDAQ - Trigger and Data Acquisition

WAB - Wide Angle Bremsstrahlung

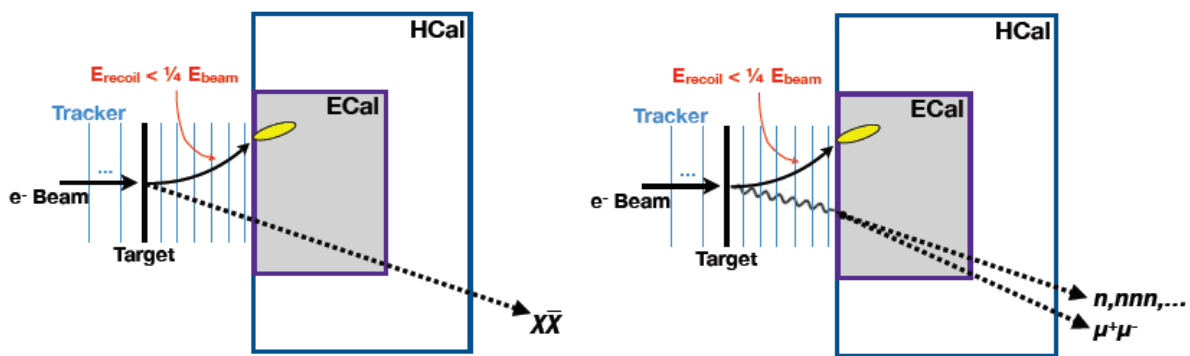
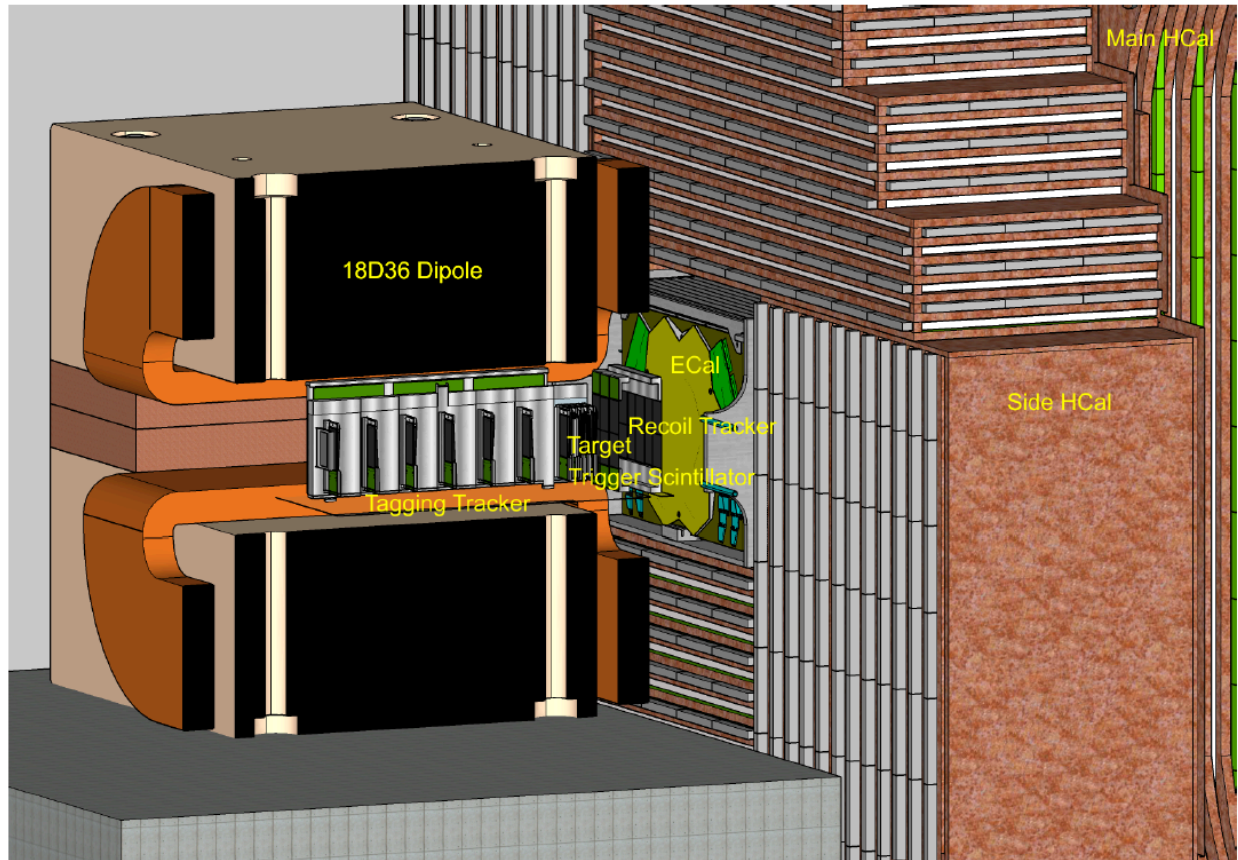
ROC - Receiver Operator Characteristic

AUC - Area Under Curve

PDF - Probability Distribution Function

CDF - Cumulative Distribution Function

LDMX Detector:



Left: Electron undergoing dark bremsstrahlung at the target to produce a soft outgoing electron with high p_T and an (invisible) DM signal; **Right:** Electron undergoing bremsstrahlung at the target to produce a soft outgoing electron with high p_T and a hard outgoing photon, which then undergoes muon conversion or photonuclear interactions in the detector.

Standard Model Background:

