Large Angle SPD Segmentation Study

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10/27/2014

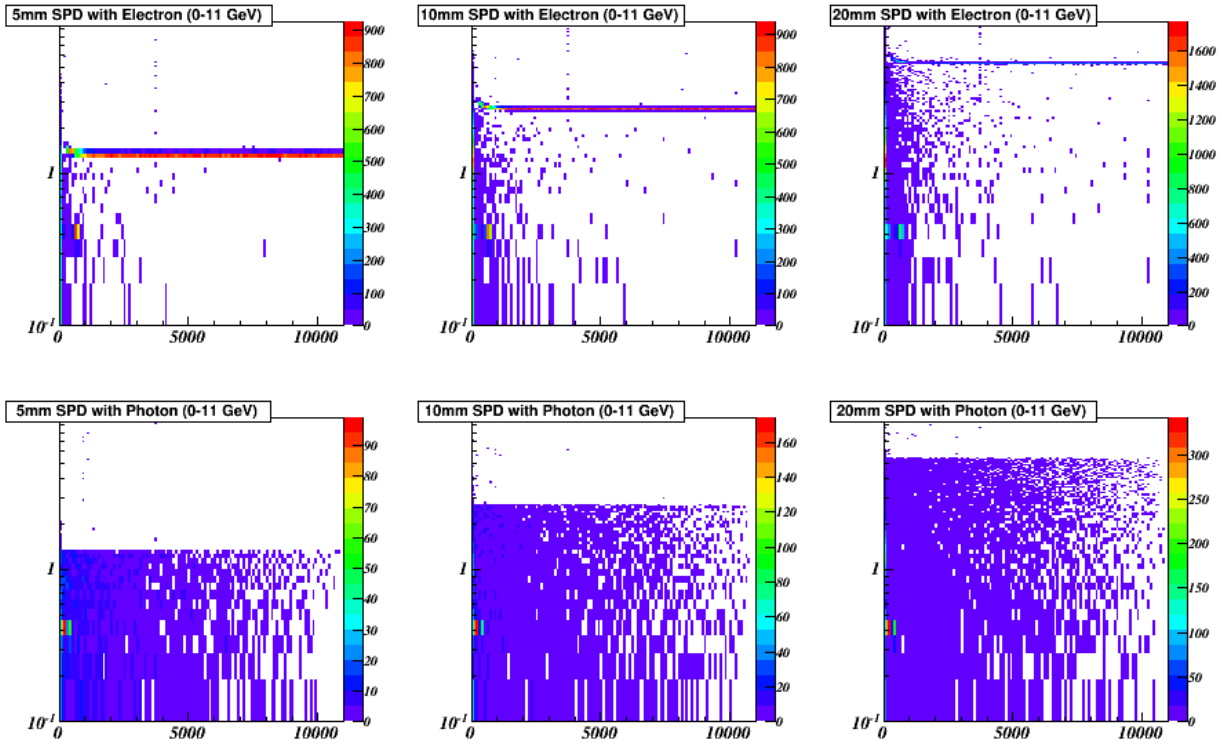
LASPD - Rates

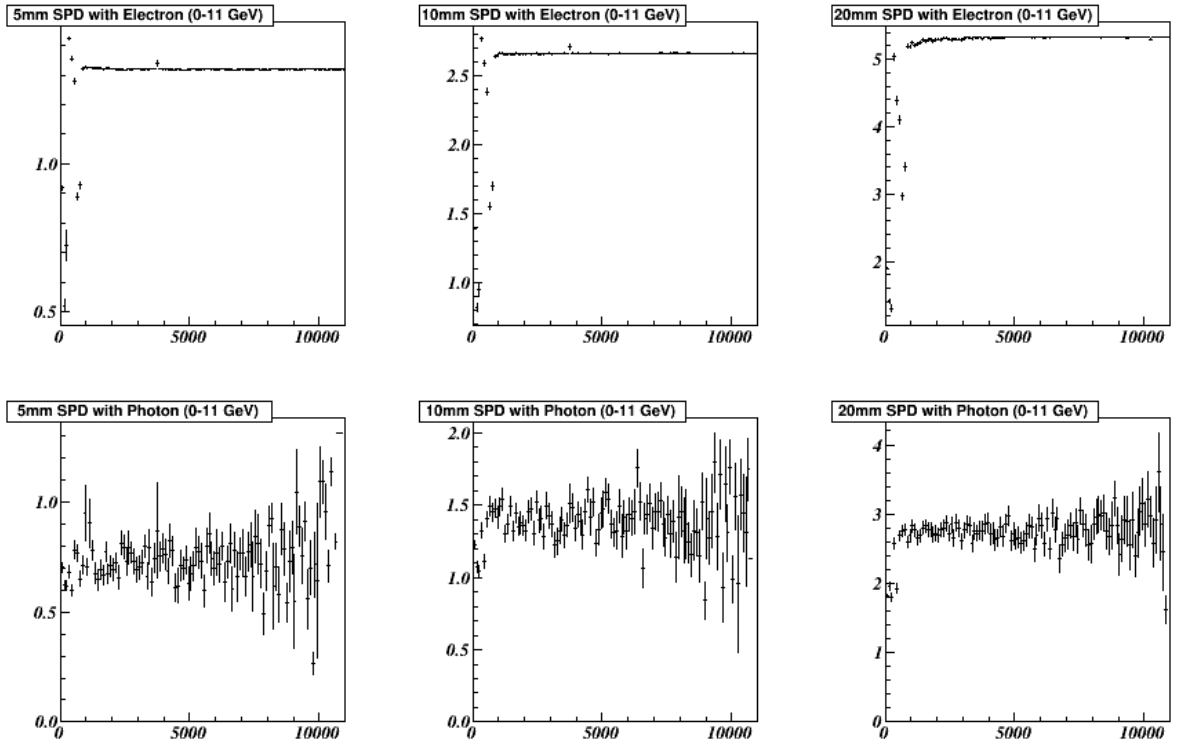
Two types of electrons that can deposit energy in the SPD:

(a) electrons before SPD:

1, So if the particle is an electron, I use its energy to search the average energy deposition in the 2cm SPD

Rate = Rate_from_Generator (or cross sections)





2, If it is a photon, I calculate the conversion rate first (see next slide)

3, running Edep for all other charged particles (assumed to be the same as electrons right now, although I know it is wrong)

LASPD - Rates

Two types of electrons that can deposit energy in the SPD:

(b) electron created by photo pair production when travelling inside the 2cm SPD:

1, Photon does not deposit energy in SPD but creates electron+position first which deposit their energies

2, For a given photon with known energy, I obtained the conversion rate from the chart,

e.g., 1000 photon with E = 1GeV,

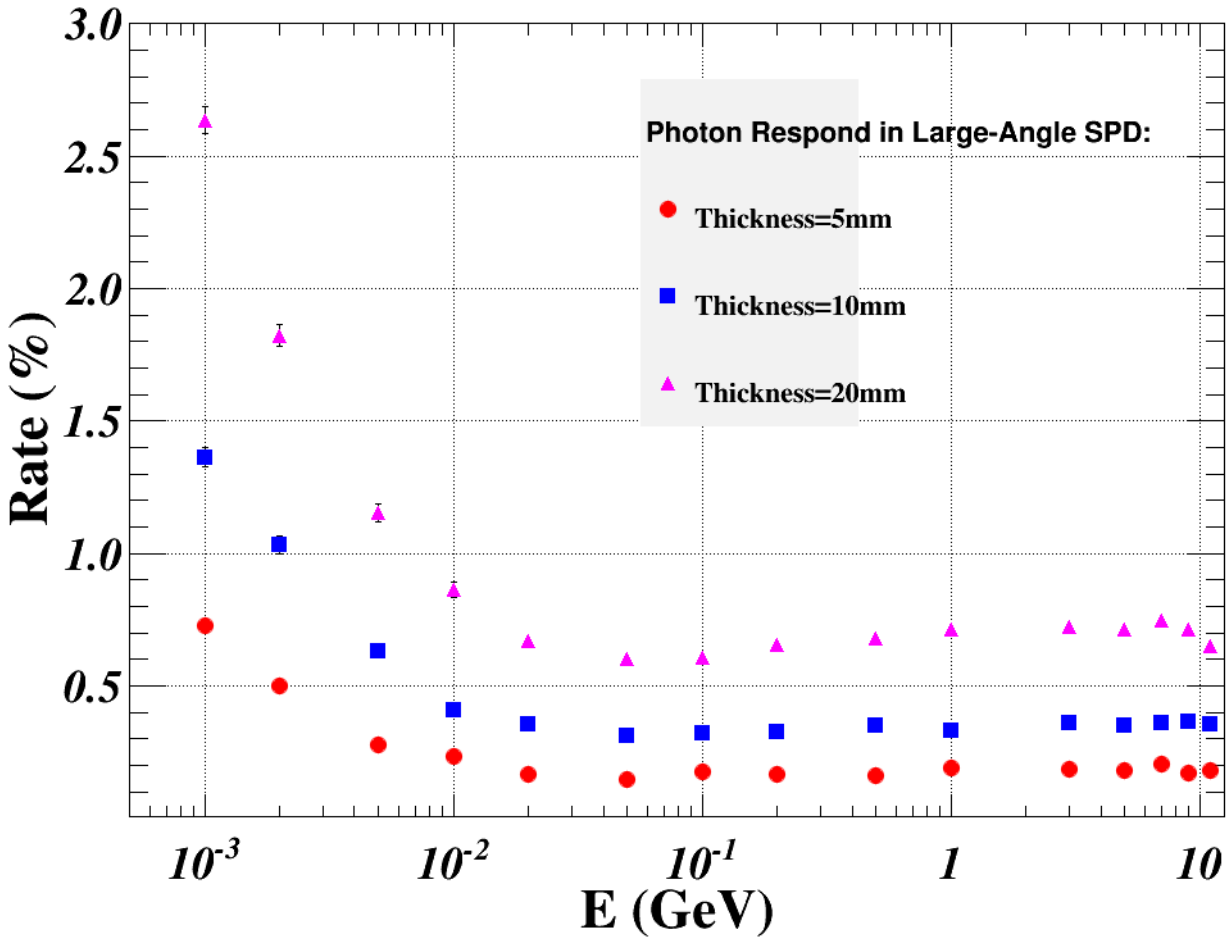
#electron+photon = 1000*0.7% x 2

= 7 x 2 = 14

3, Assuming the electron and the position have the same energy (roughly close), the energy deposited by these particles (or "by the photon") is:

Edep (E0, photon) = 2 x Edep (E0/2, electron)

Rate = Conversion_Rate * Rate_from_Generator



LASPD - Rates

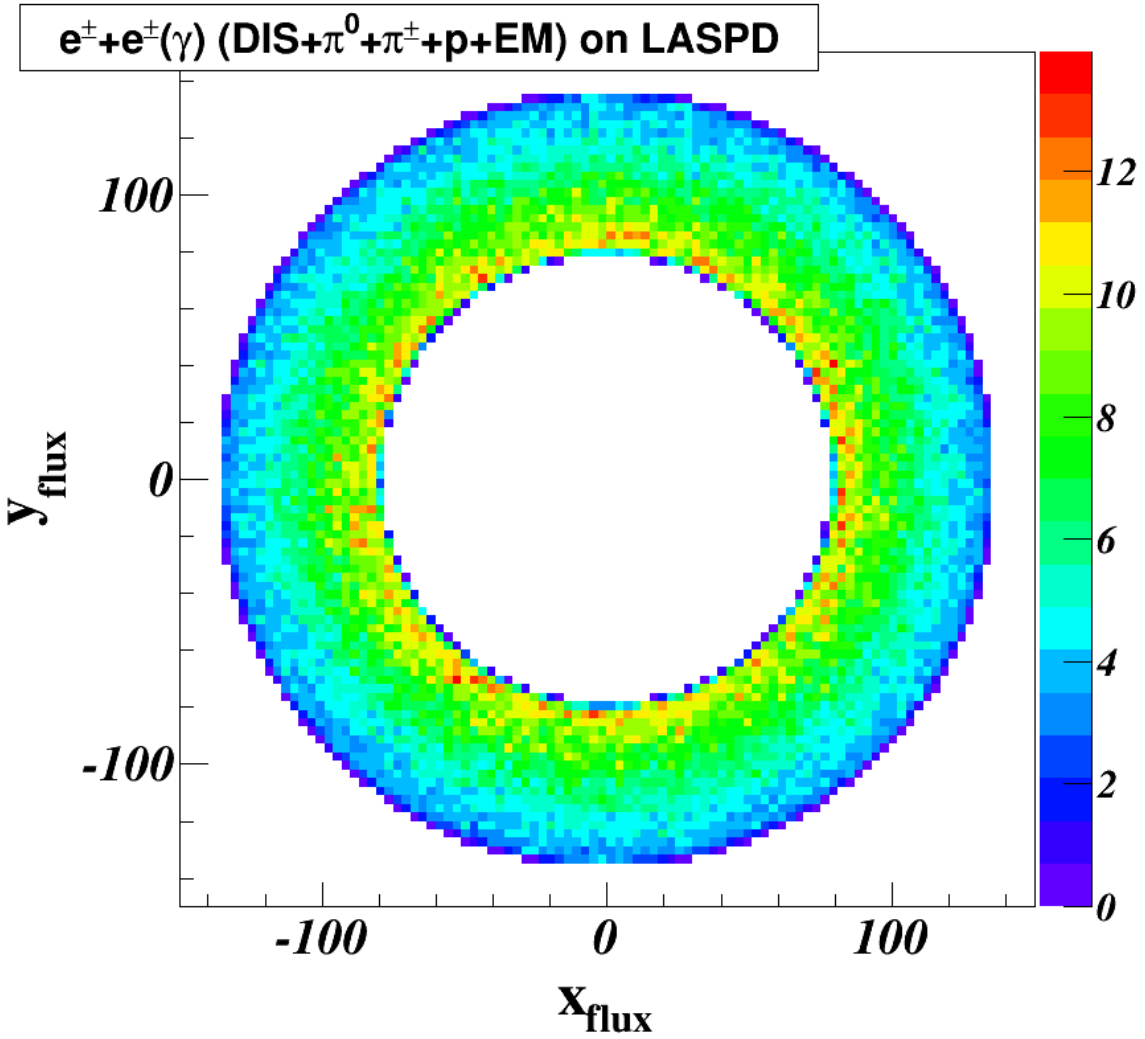
Raw electron rate from different sources (no cuts and count every flux particle as one event)

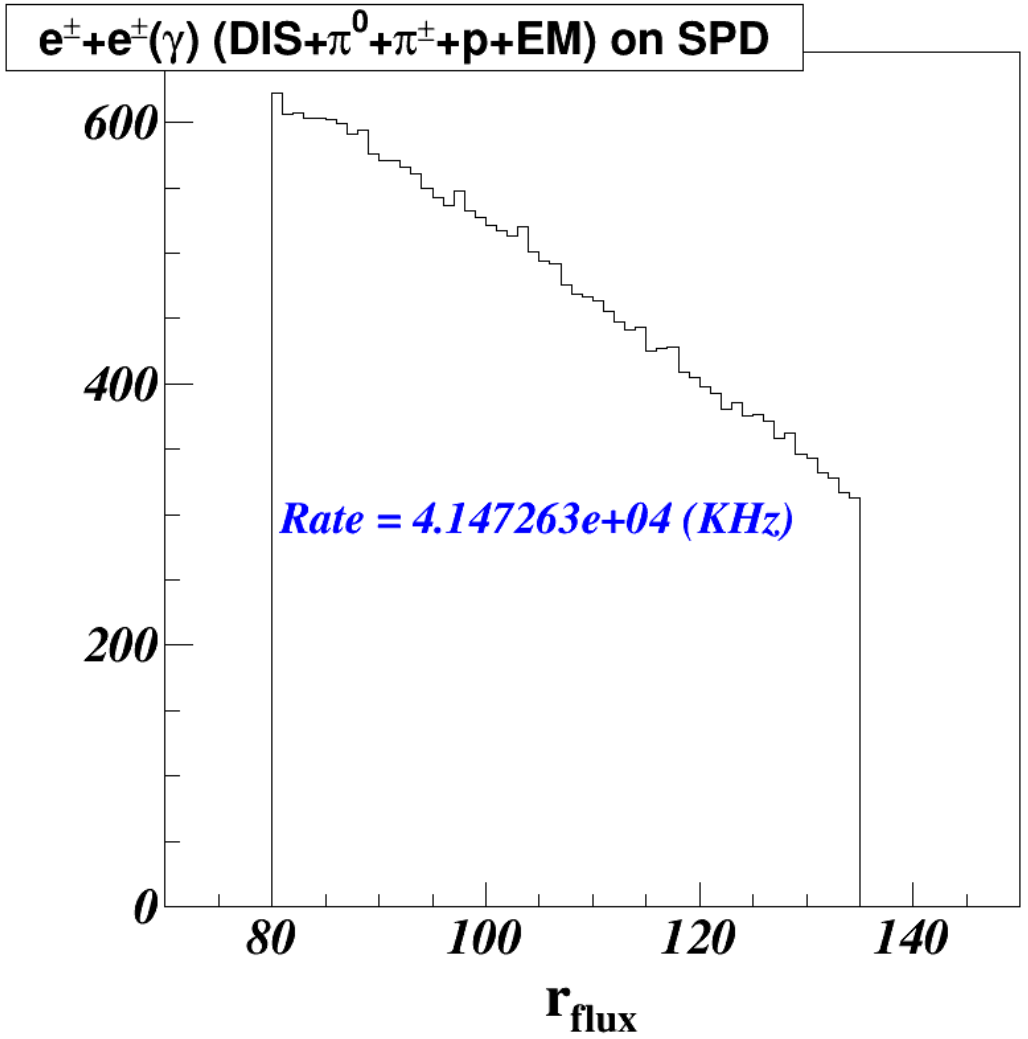
(KHz)	eDIS	π0 (T/up/down)	π+ (T/up/down)	π- (T/up/down)	Proton (T/up/down)	EM
e+/- & pi+/- & p+	46.08	6.75e3	4.79e3	3.63e3	9.12e3	0
e+/- (γ)	0	23.10e3	3.29e3	3.40e3	0.75e3	0
all	46.08	29.85MHz	8.08MHz	7.03MHz	9.87MHz	0

Quick check with LAEC cut (e+/- only)						
all	**19.31**	**1.84 KHz**	**0.02 KHz**	**0.02 Hz**	**0**	**0**

So most of background electrons+positions carry very low energies,
BUT they may can still trigger the LASPD due to the pile-up effect

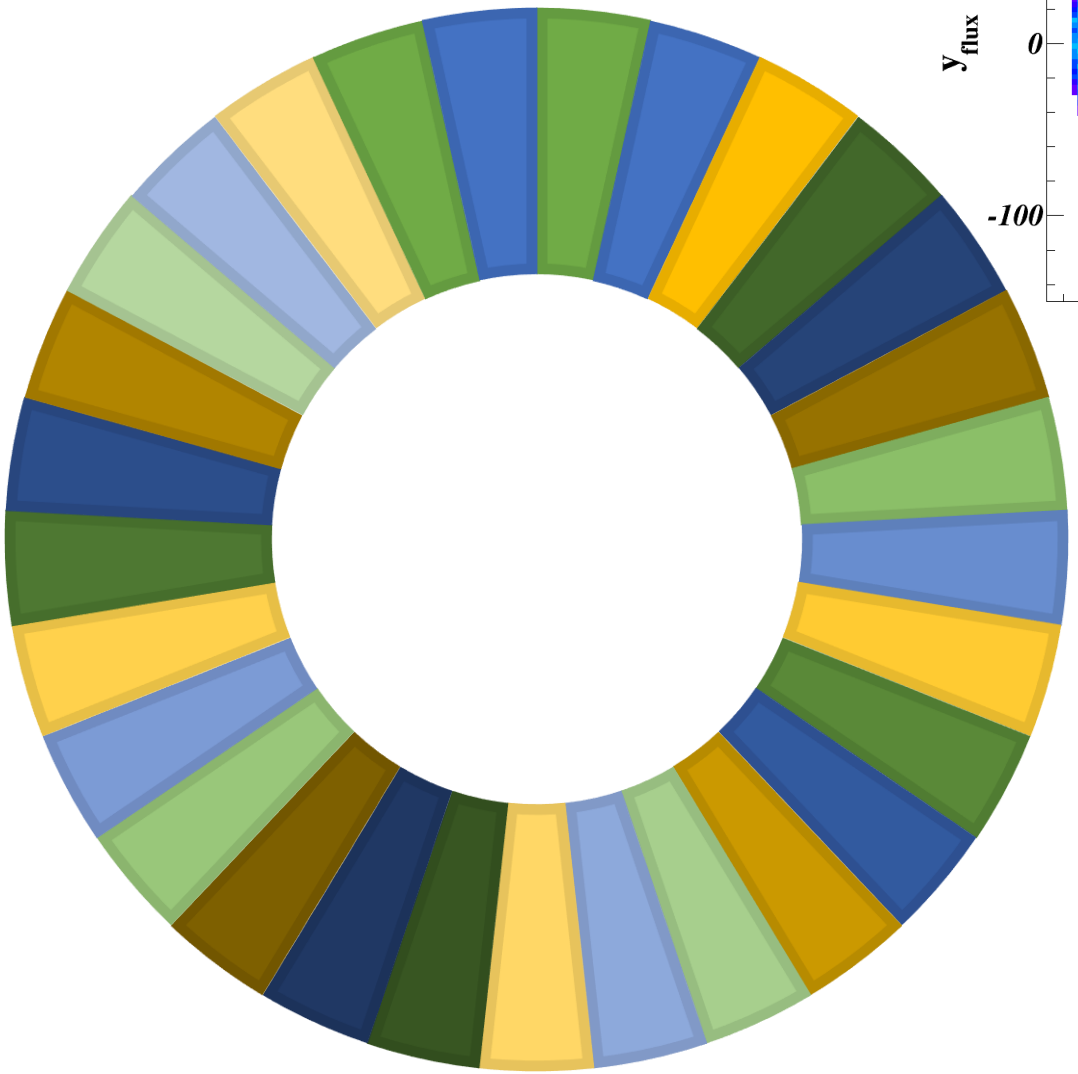
LASPD - Rates

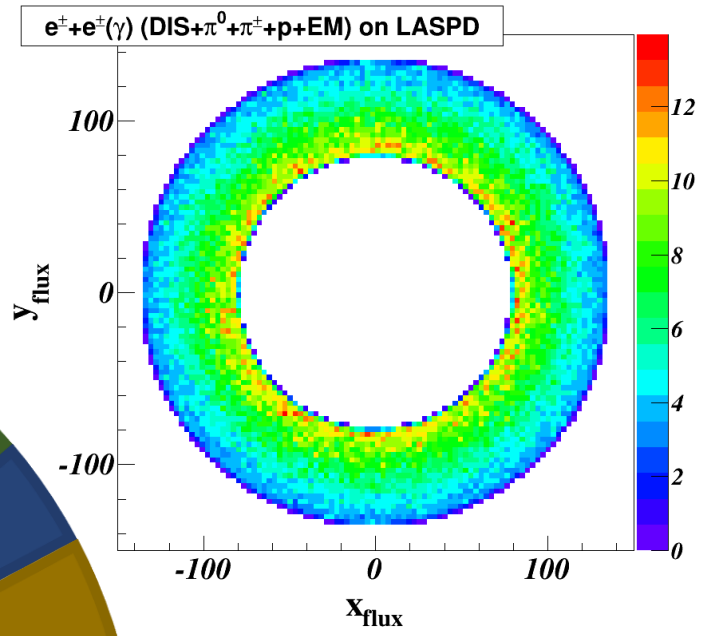


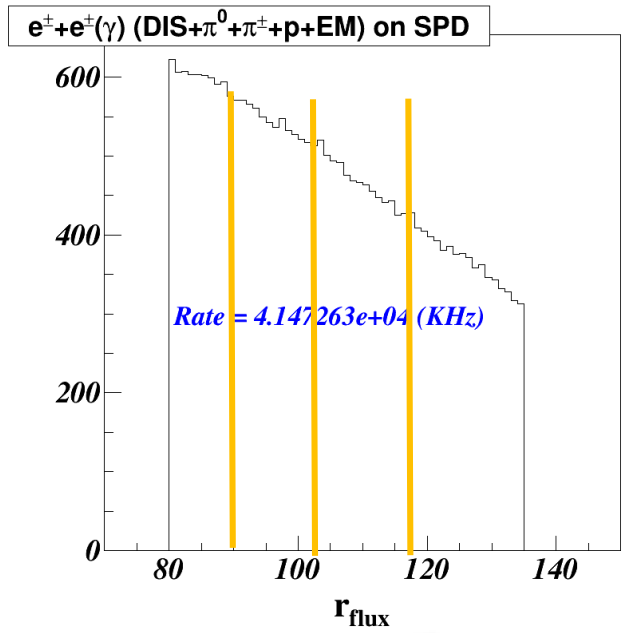


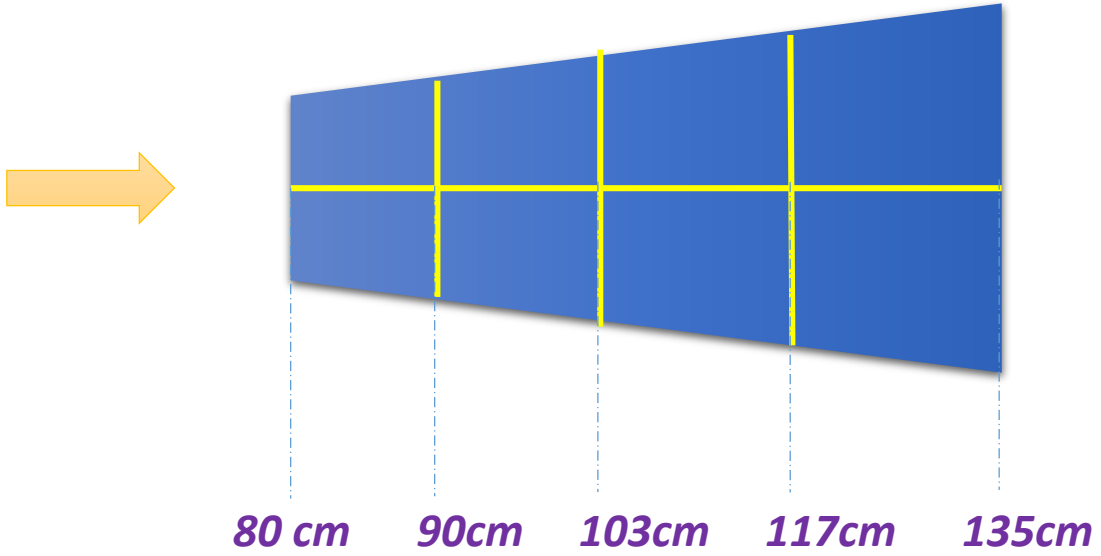
The sum of all charged particles that are inside the LASPD

LASPD SEGMENTATION









LASPD Energy Deposition and Pile-Up

In Progress …