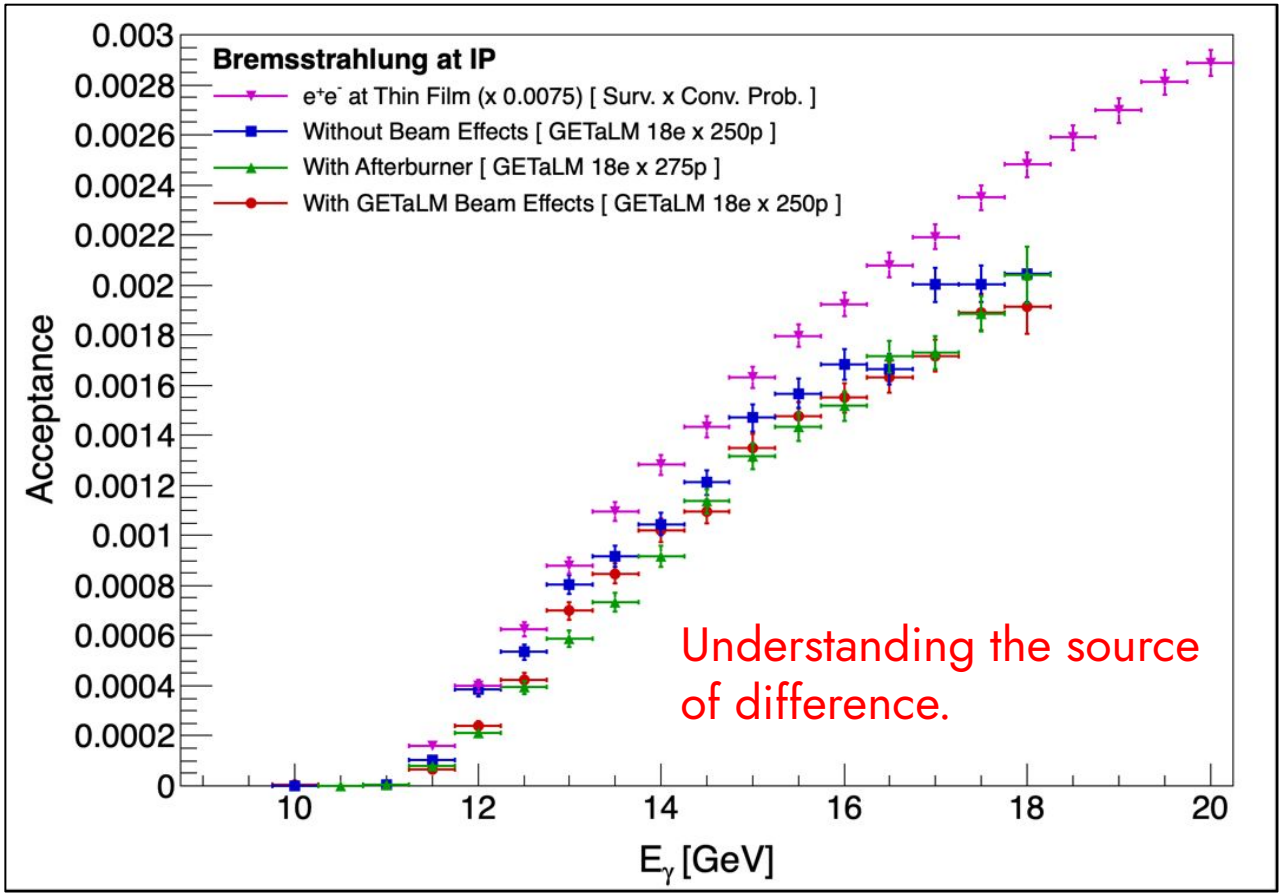
# 05-07-26 Update

GETaLM to generate bremsstrahlung events at IP

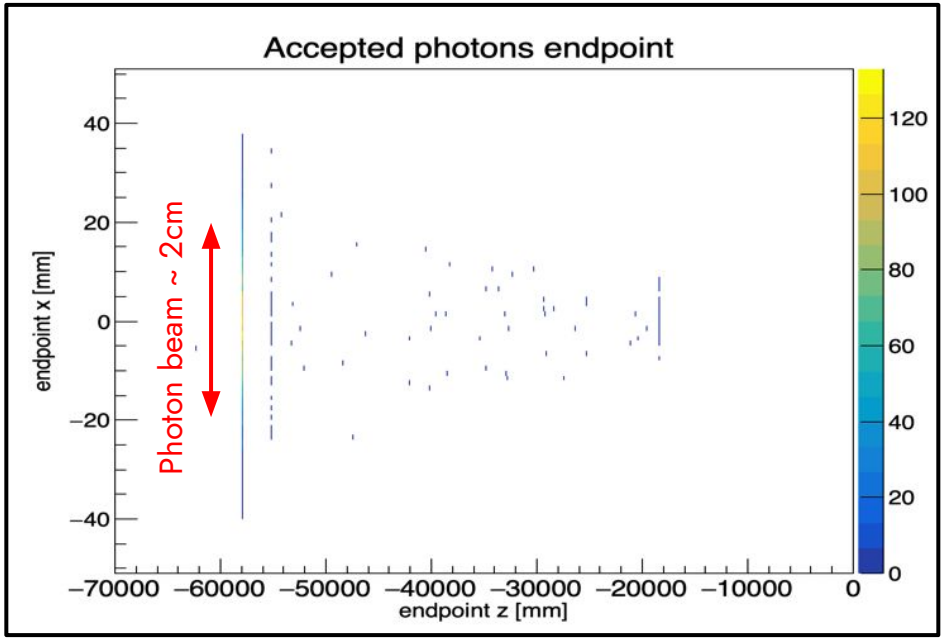
a. 18 e x 275 p GeV
b. E_gamma included from 9 GeV to 18 GeV [Accepted Ranged is > 10 GeV for this B]
c. Beam effects with after burner
d. Single photon per event.
e. 10 Million event

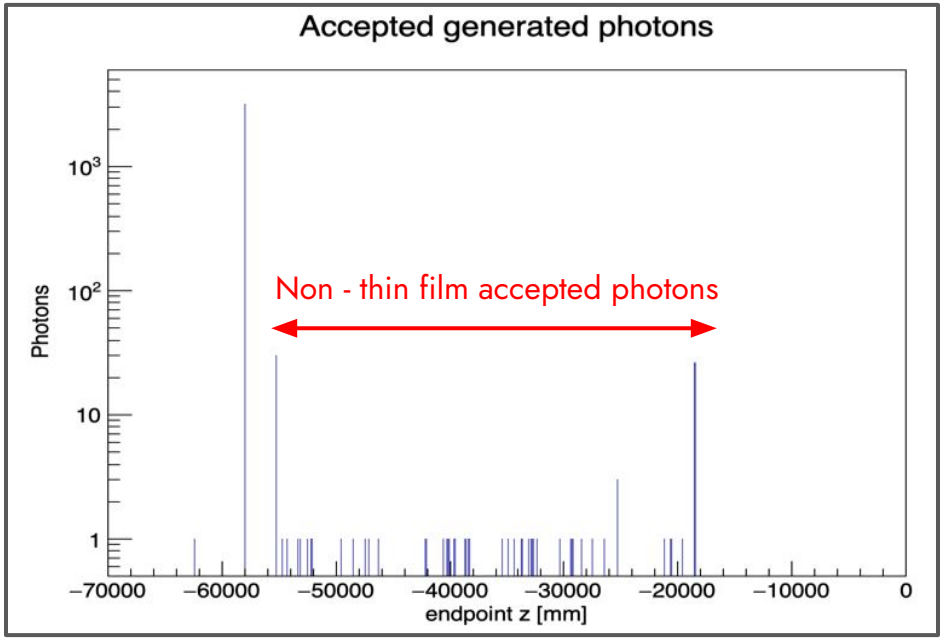
# Acceptance [ with new Andre's B design ] Comparision



# Pair production point of accepted photons

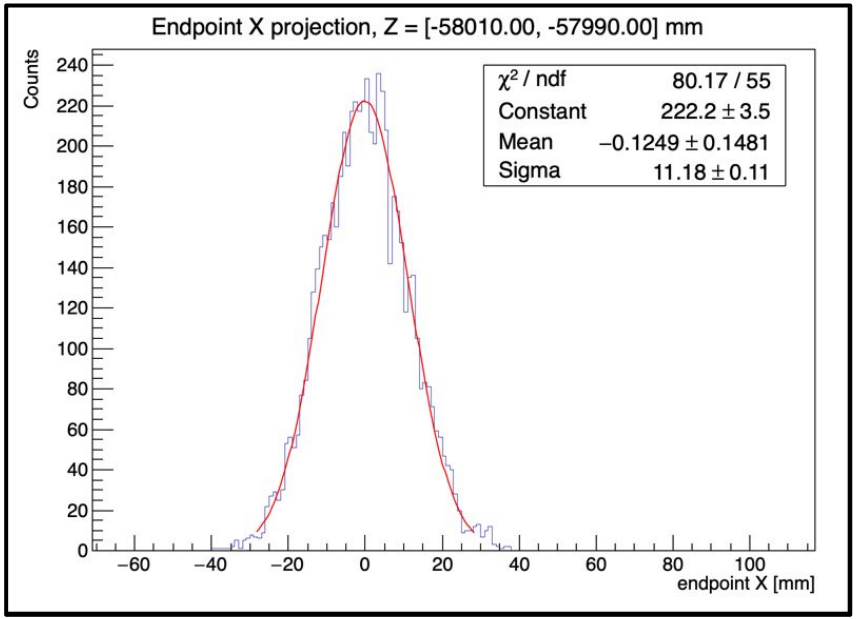
2 possible reasons for the difference.

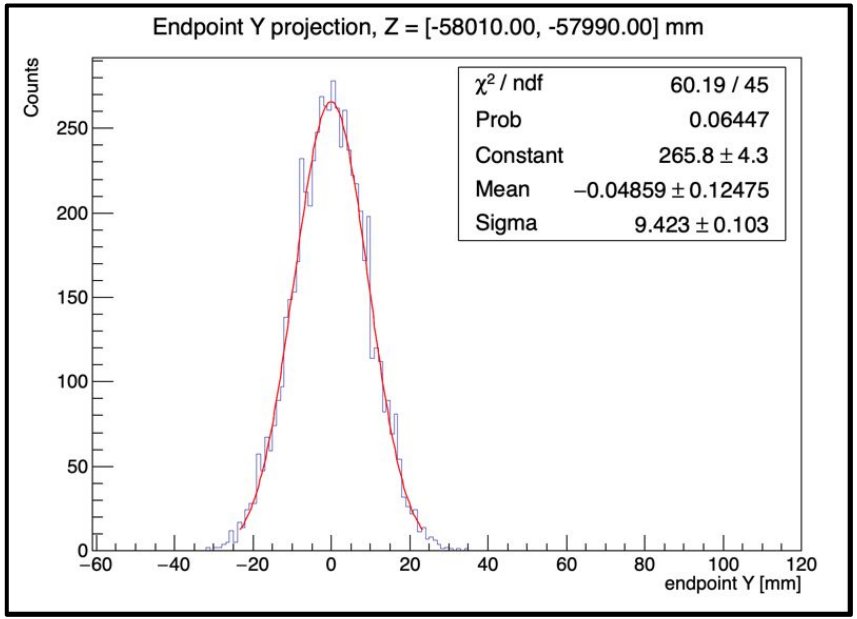



1. % accepted photons only from thin film - 6332/6450 = 98.17%

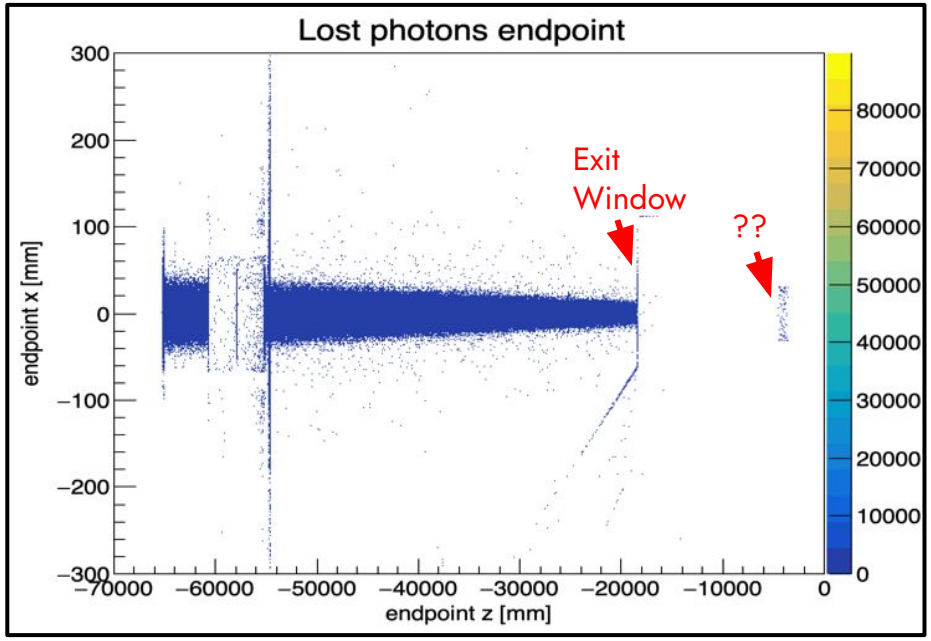
# BH photon beam endpoint spread at Thin Foil

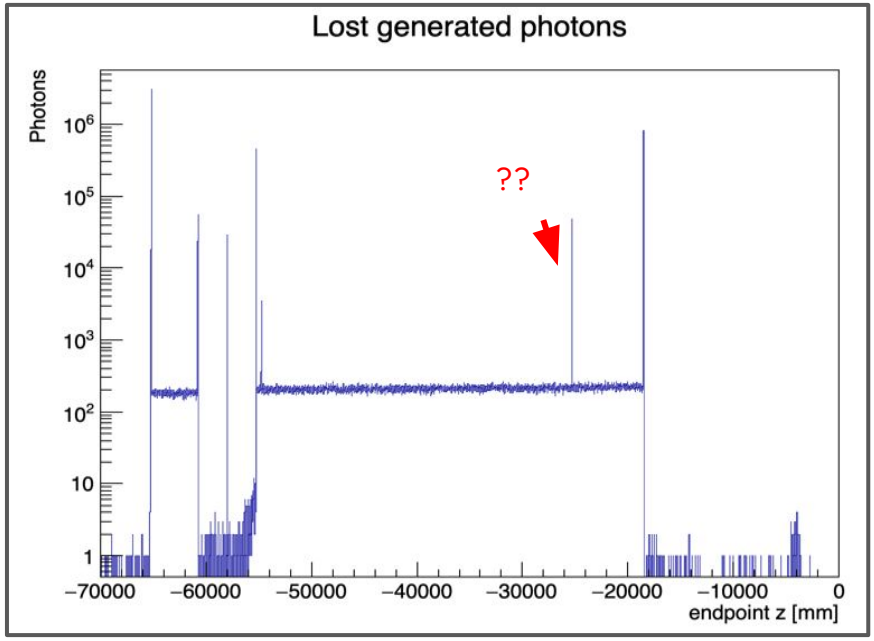



1. Unsymmetric in x and y direction.
   a. Makes sense - further away from y = 0 are not accepted due to magnetic field direction.
2. The photon beam reaching the thin film is a rectangle of ~ sigma_x = 1.12 cm and sigma_y = 0.94 cm.

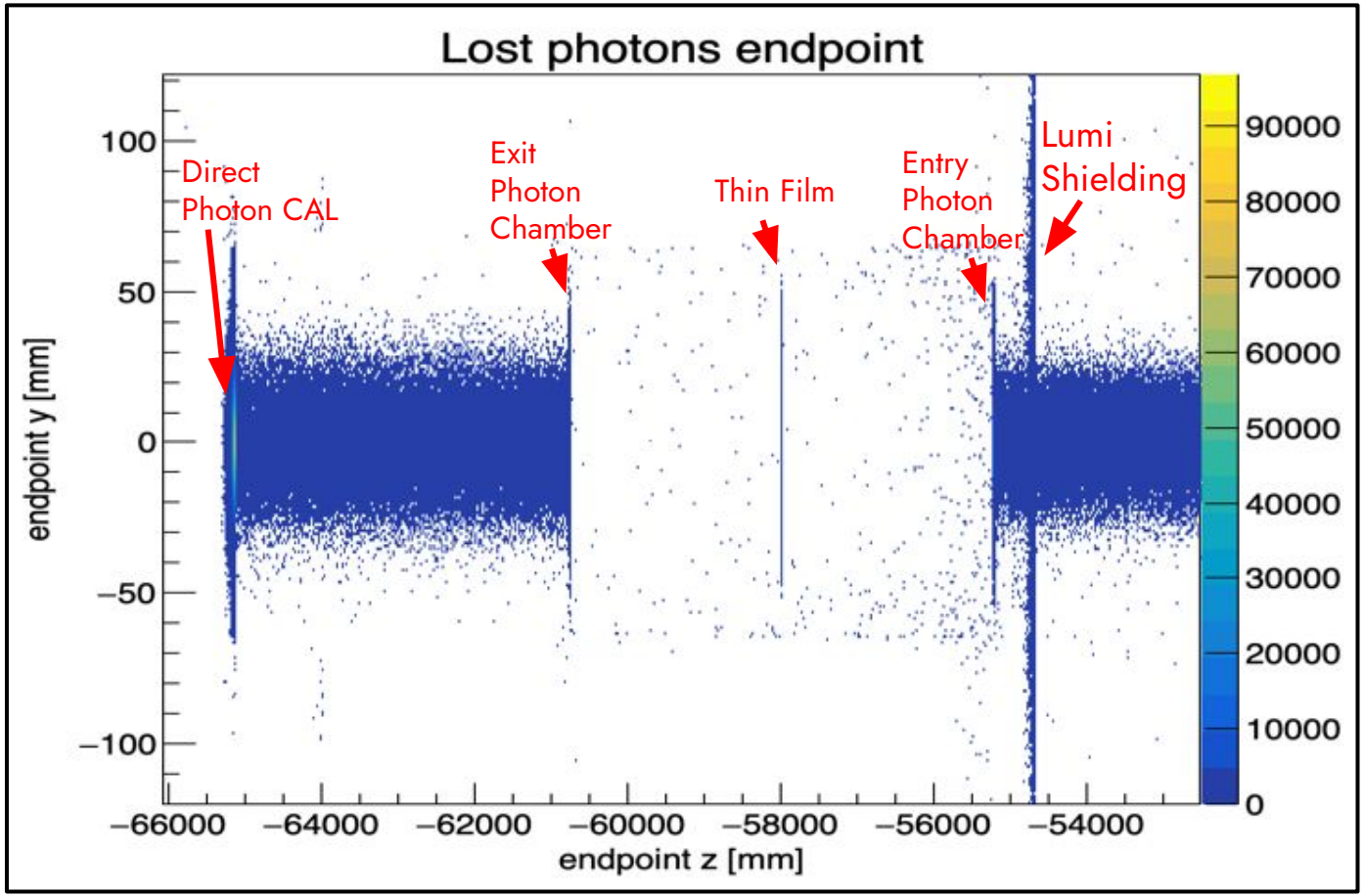
# endpoint of un-accepted ( lost ) photons




1. Some unknown reason for photon loss near ~5m from IP.

endpoint of un-accepted ( lost ) photons



# Accounting Lost Photons

**Before Exit Window = 9.990568 x 10^6 + ( Accepted Photons = 6450 ) = 9.997018 x 10^6**

```
=======================================================
Detector name         : Exit Window
Input ROOT file       : brems_GETaLM_10M_woBE_wabBE_wEndpoint.root
Histogram used        : PhotonLossMap/hPhotonEndX_vs_Z_lost
Detector z range [mm]: -18510  to  -18500
z-bin range           : 5149  to  5151
-------------------------------------------------------
Photons ending inside Exit Window = 816373 +/- 903.534
=======================================================
```

Lost % : 8.17 off by 2% from theory

```
=================================================
Detector name        : Air [ Exit Window to Photon Chamber]
Input ROOT file      : brems_GETaLM_10M_woBE_wabBE_wEndpoint.root
Histogram used       : PhotonLossMap/hPhotonEndX_vs_Z_lost
Detector z range [mm]: -55220  to  -18510
z-bin range          : 1479  to  5150
-------------------------------------------------
Photons ending inside Air [ Exit Window to Photon Chamber] = 843544 +/- 918.447
=================================================
```

Lost % : 9.19

```
=======================================================
Detector name         : Entry Photon Chamber
Input ROOT file       : brems_GETaLM_10M_woBE_wabBE_wEndpoint.root
Histogram used        : PhotonLossMap/hPhotonEndX_vs_Z_lost
Detector z range [mm]: -55240  to  -55220
z-bin range           : 1476  to  1479
-------------------------------------------------------
Photons ending inside Entry Photon Chamber = 682663 +/- 826.234
=======================================================
```

Lost % : 8.19 off by 0.1% from theory

# Accounting Lost Photons

```
=====================================================
Detector name        : Thin Film
Input ROOT file      : brems_GETaLM_10M_woBE_wabBE_wEndpoint.root
Histogram used       : PhotonLossMap/hPhotonEndX_vs_Z_lost
Detector z range [mm]: -58010  to  -57990
z-bin range          : 1200  to  1202
-----------------------------------------------------
Photons ending inside Thin Film = 58576 +/- 242.025
=====================================================
```

Lost % : 0.76 [unaccepted photons from thin film]

```
=====================================================
Detector name        : Photon Exit Chamber
Input ROOT file      : brems_GETaLM_10M_woBE_wabBE_wEndpoint.root
Histogram used       : PhotonLossMap/hPhotonEndX_vs_Z_lost
Detector z range [mm]: -60780  to  -60760
z-bin range          : 923  to  925
-----------------------------------------------------
Photons ending inside Photon Exit Chamber = 78192 +/- 279.628
=====================================================
```

Lost % : 1.03 off by 0.1% from theory

```
=====================================================
Detector name        : Photon Exit Chamber
Input ROOT file      : brems_GETaLM_10M_woBE_wabBE_wEndpoint.root
Histogram used       : PhotonLossMap/hPhotonEndX_vs_Z_lost
Detector z range [mm]: -70000  to  -60780
z-bin range          : 1  to  922
-----------------------------------------------------
Photons ending inside Photon Exit Chamber = 7.51122e+06 +/- 2740.66
=====================================================
```

**After Exit Photon Chamber - 7.511220x 10^6 to direct photon calorimeter.**