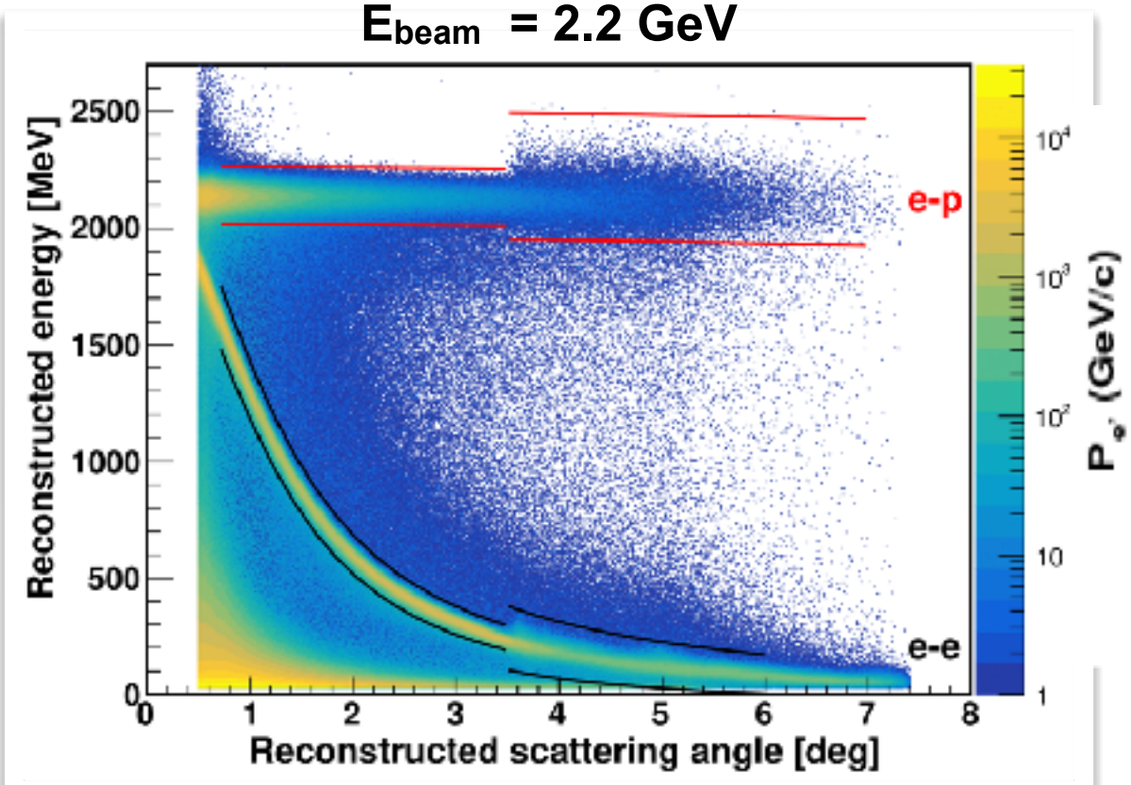
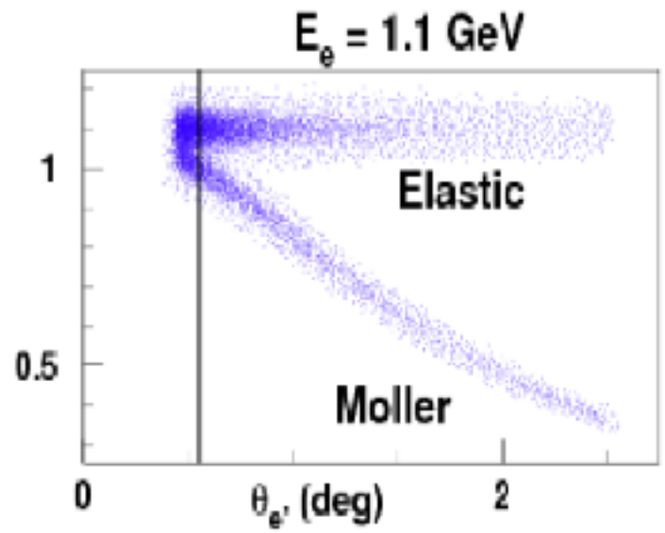
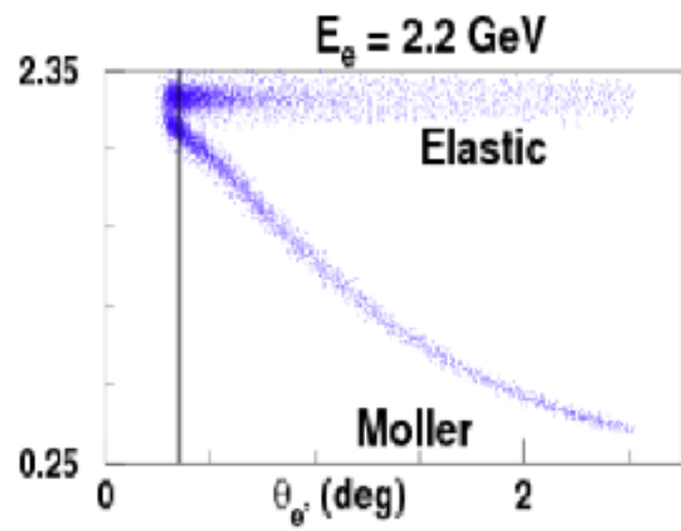
# PRad-II Scintillator Tagger Status Update

**Dipangkar Dutta, Nov 11, 2024**

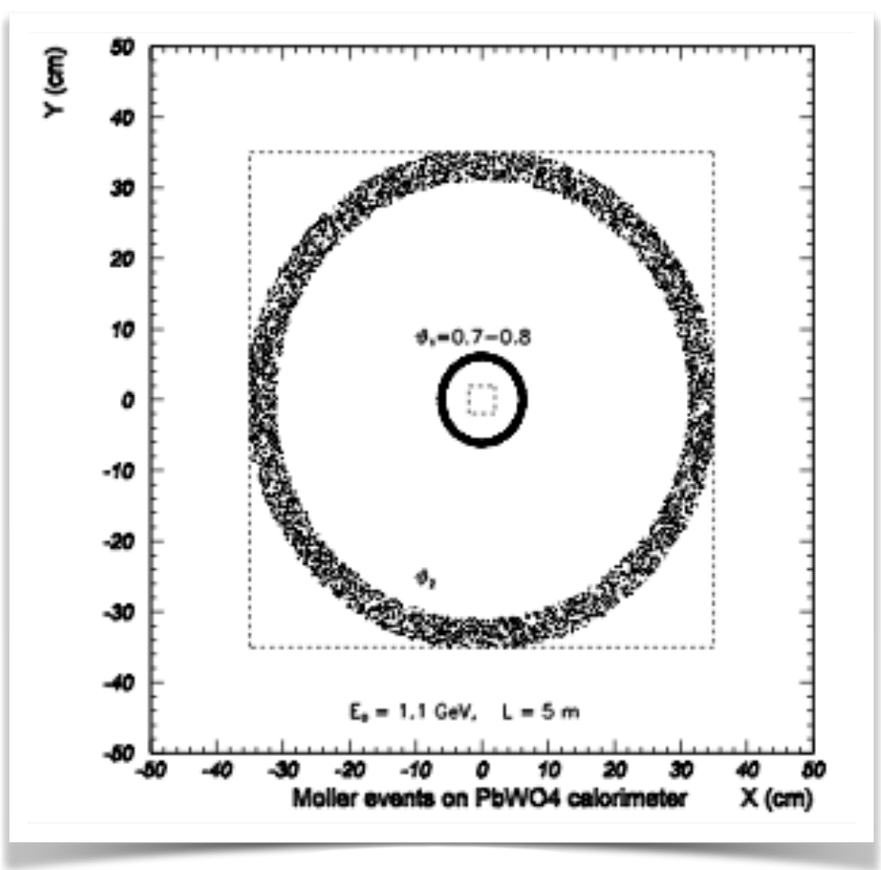
# Why do we need a Scintillator Tagger?



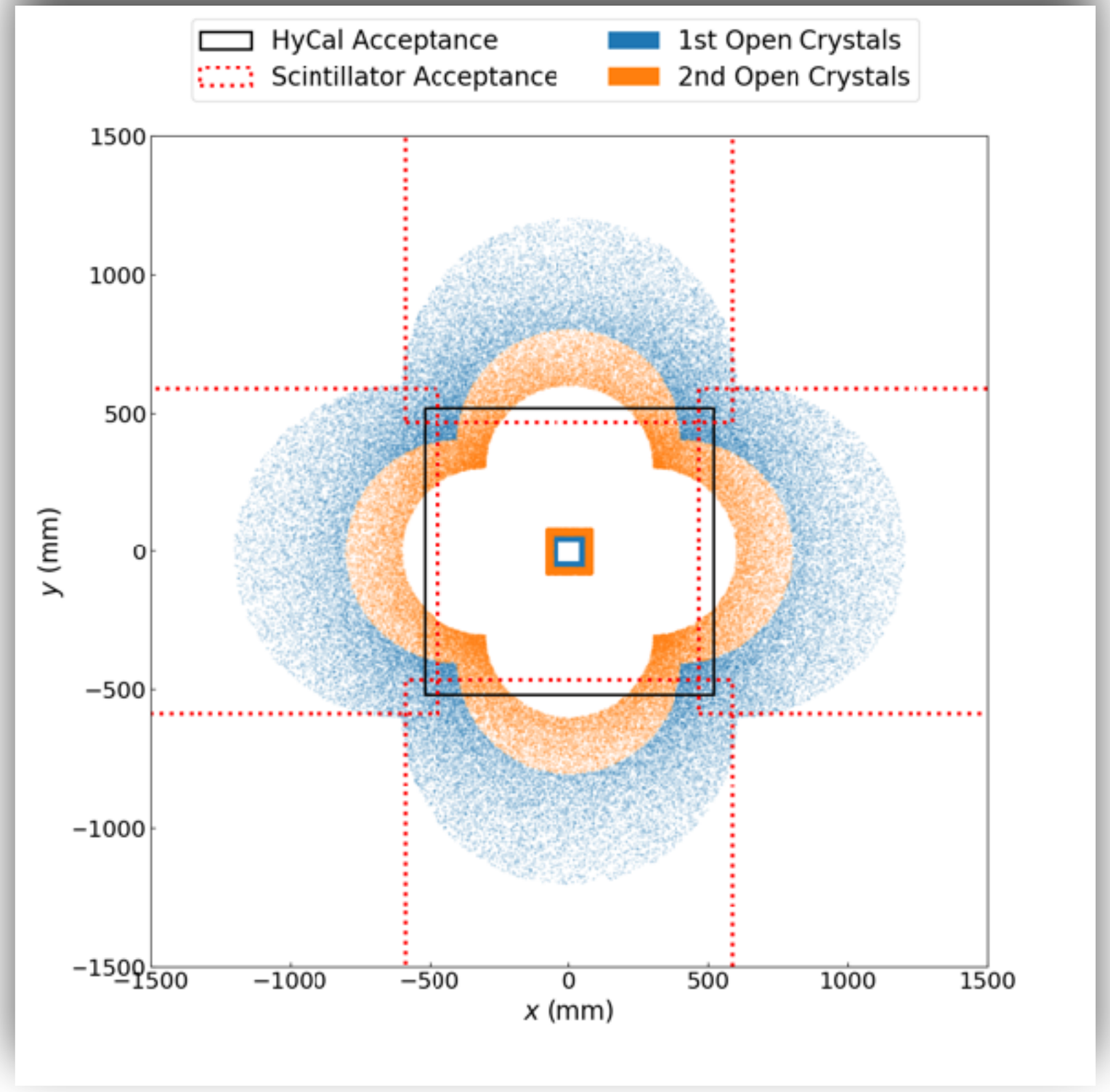




**double arm Møller events**



# Why do we need a Scintillator Tagger?




**double arm Møller events**

# Scin. Tagger allows us to reach lowest $Q^2$ range ($10^{-5}$ GeV$^2$)

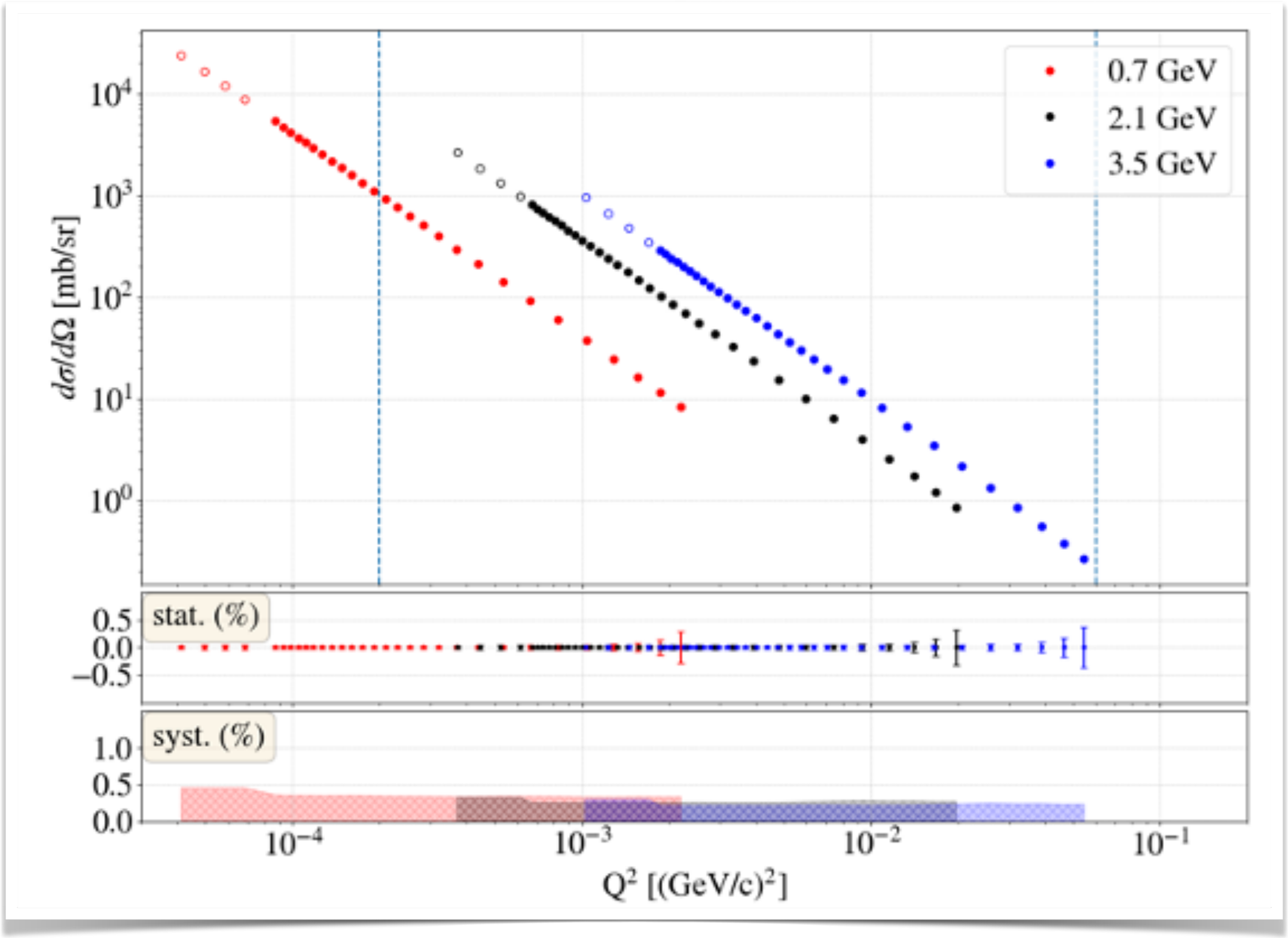
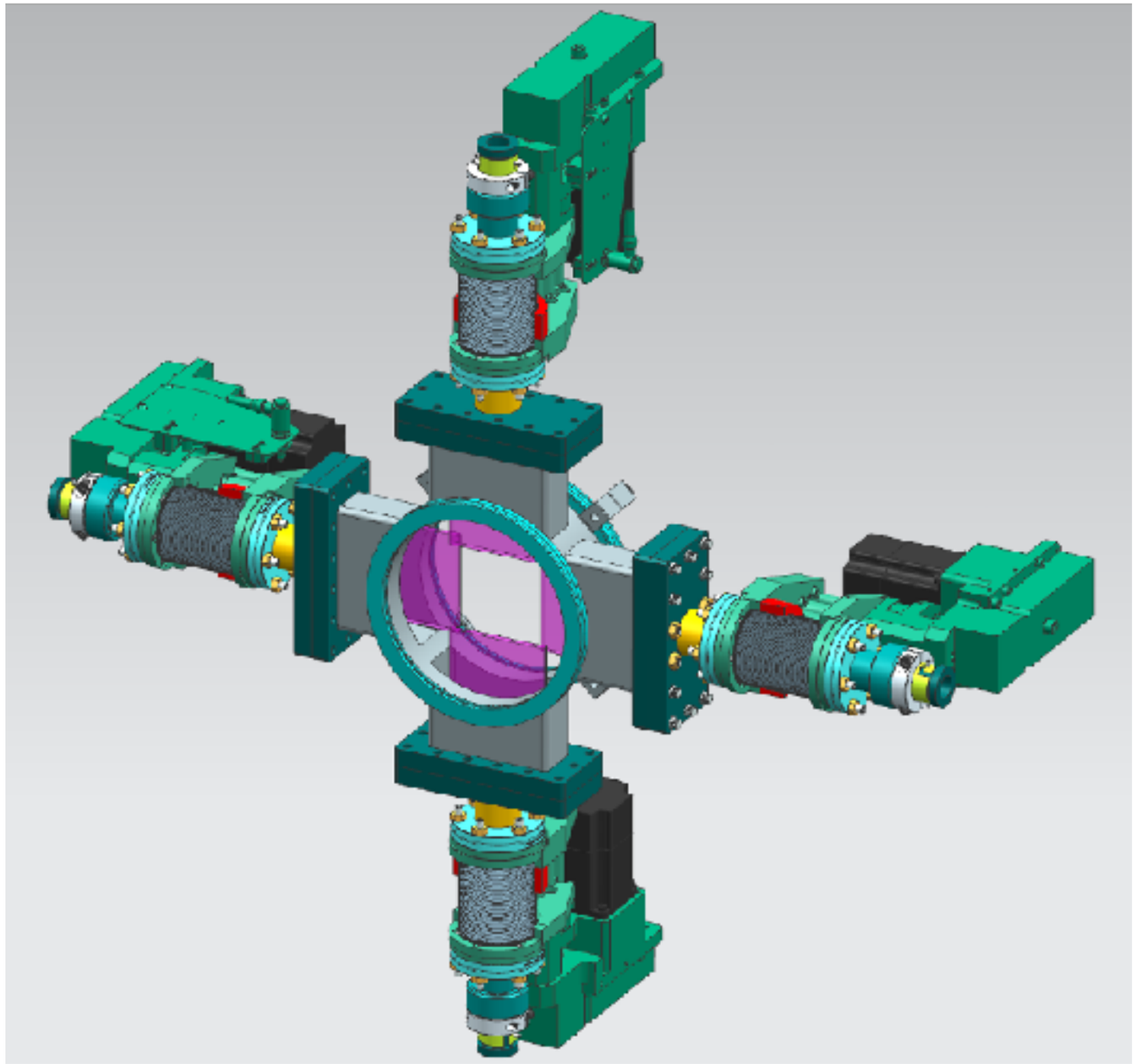
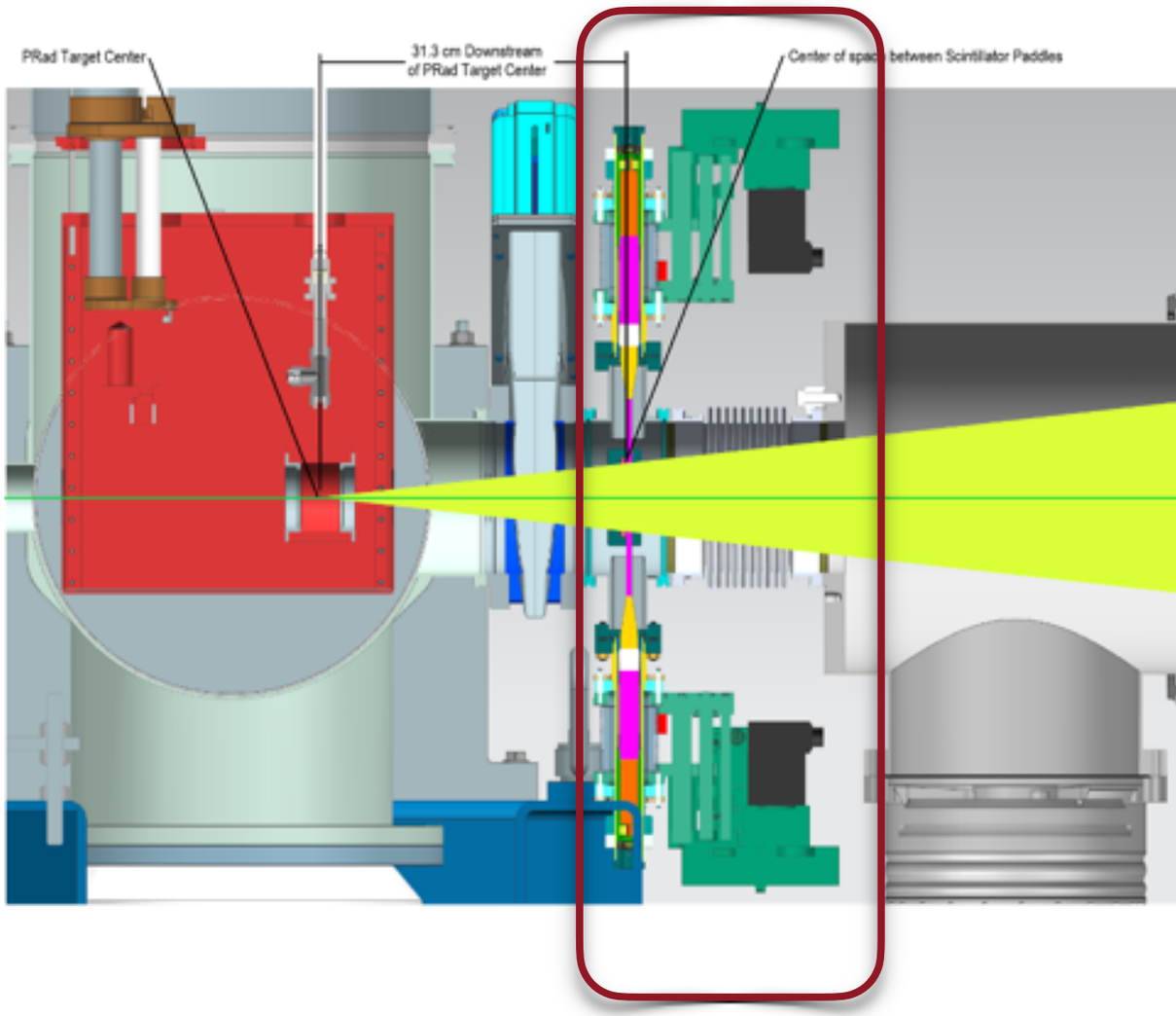



Figure courtesy of W. Xiong

# Based on Youri Sharabian's concept a Scintillator Tagger setup has been designed by Chris Guthrie





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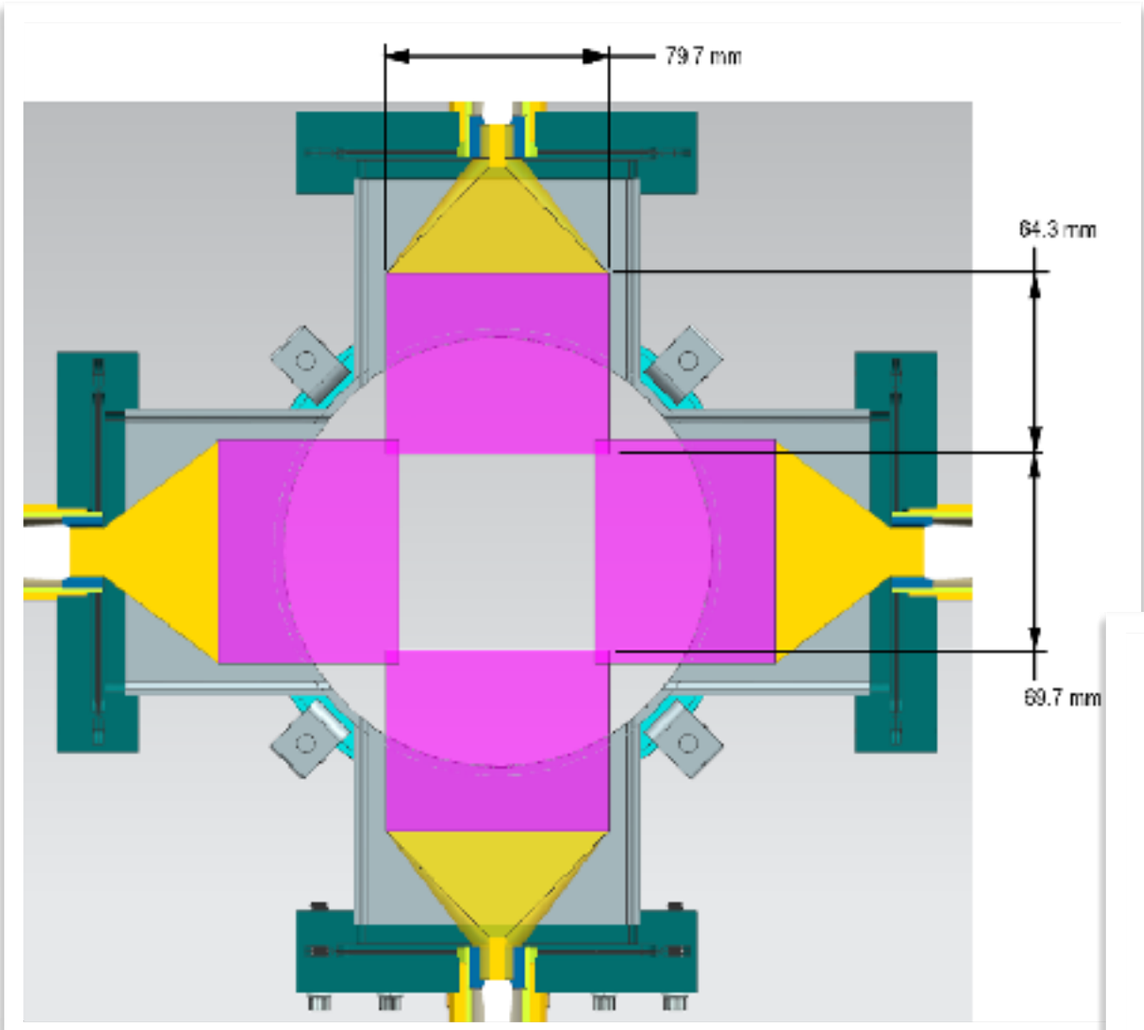


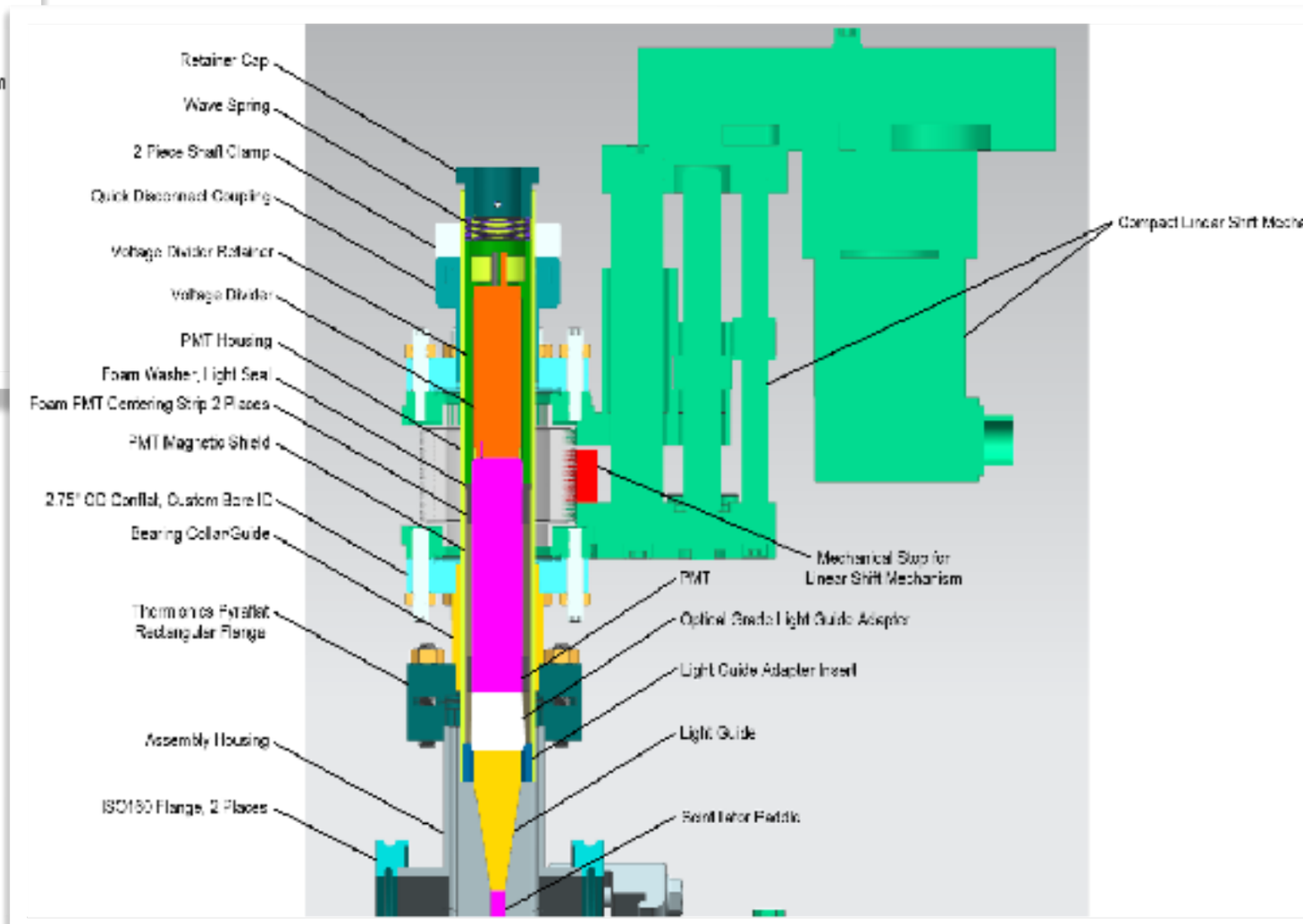

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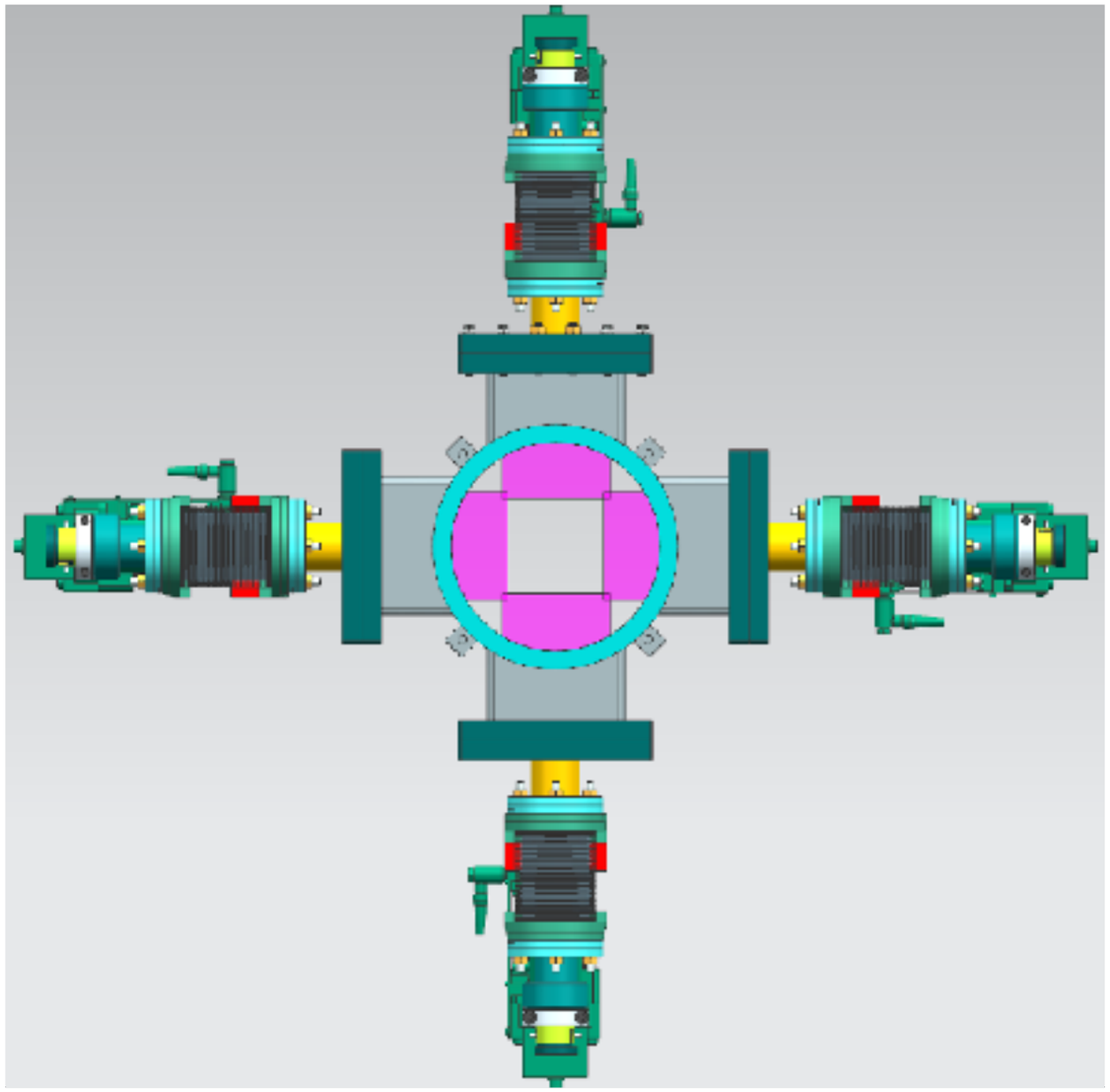
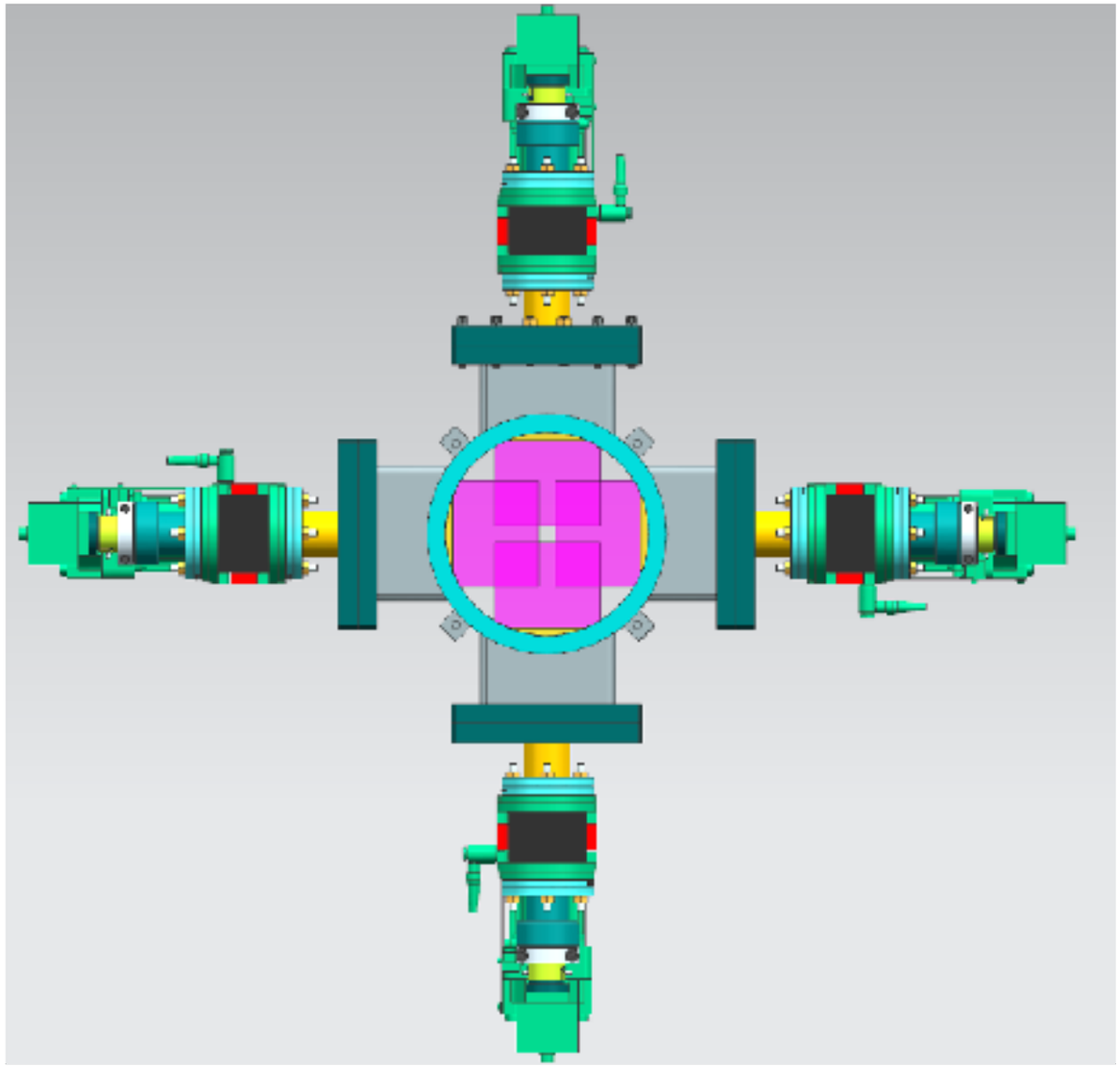
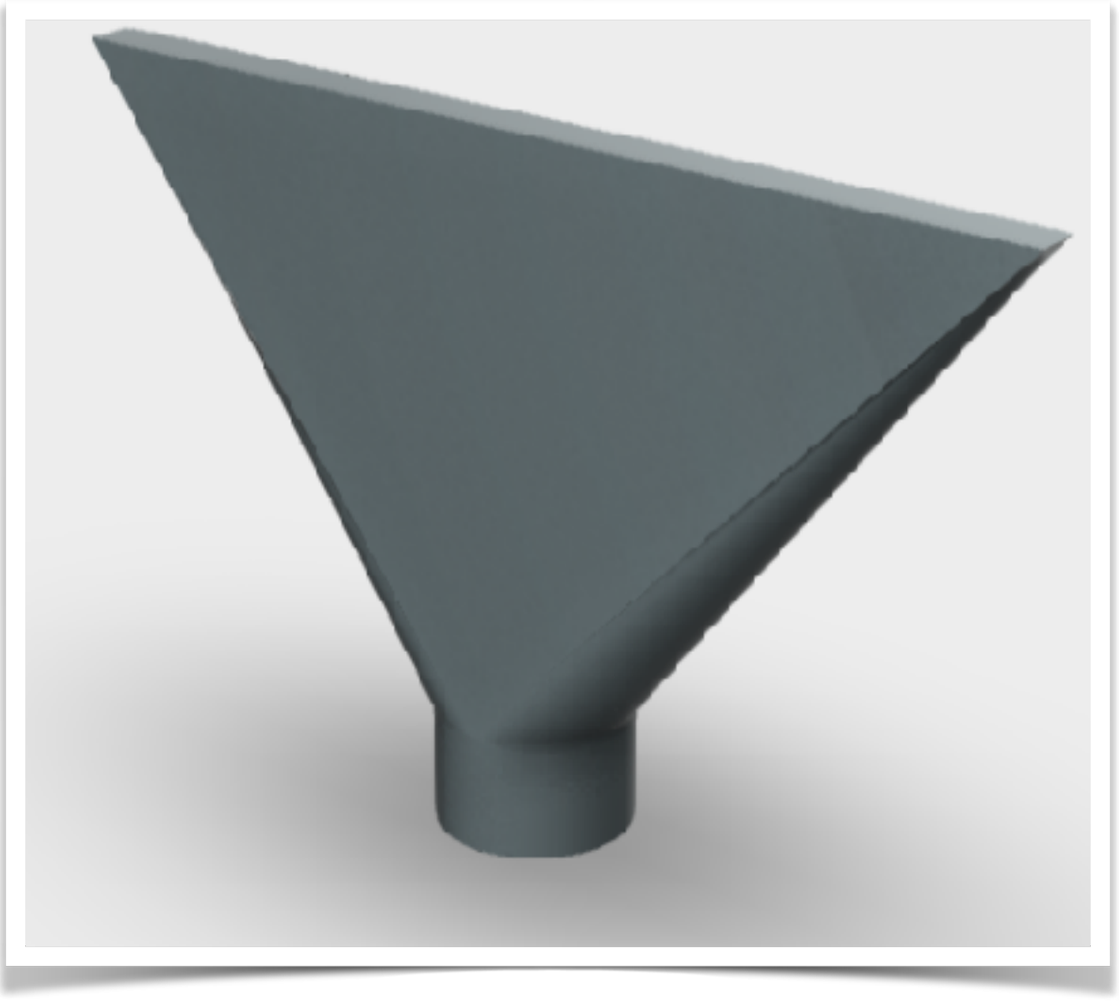


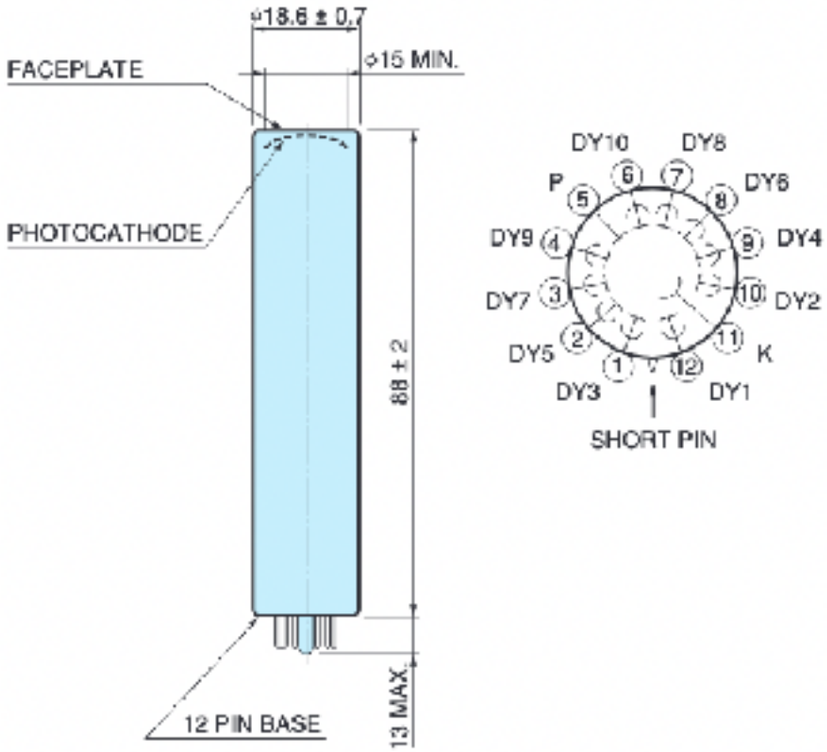


# Scintillators and light guides have been procured from Elgen Tech.

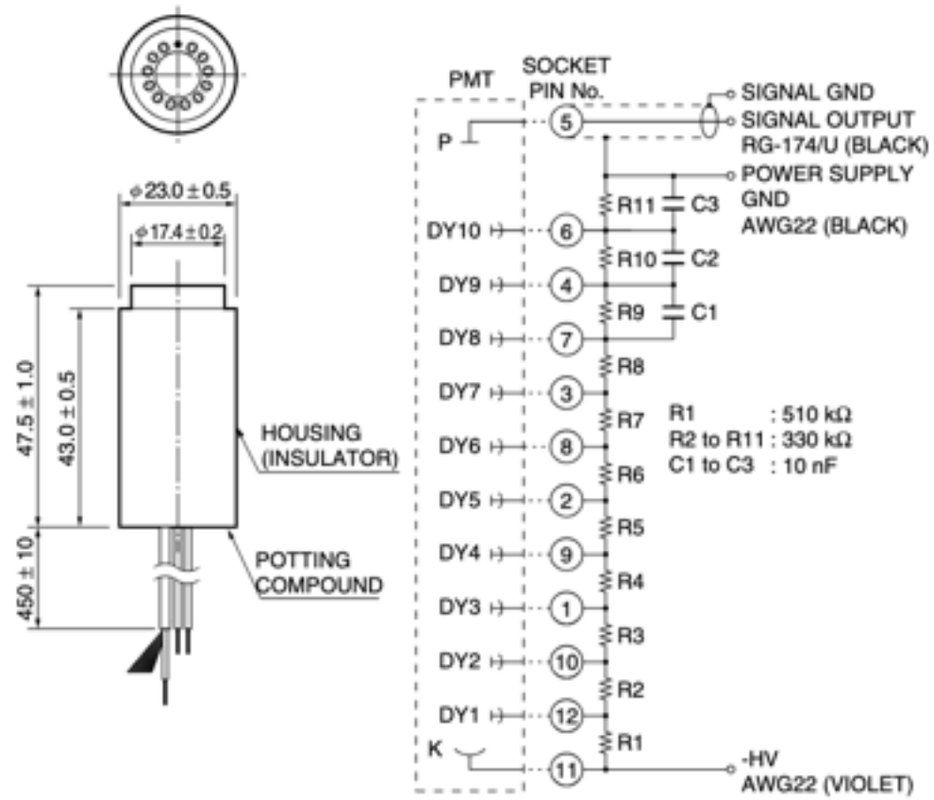


# PMTs & Bases have been procured from Hamamatsu

## R4125




## ●D-type Socket Assembly E974-13 (Sold separately)




| Tube diameter | Type No. | ❶ Out-line No. | Spectral response ❷ | | Cathode characteristics | | | | Anode characteristics | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Spectral response range (nm) | Curve code | ❸ Q.E. at peak Typ. (%) | ❹ Lumi-nous Typ. (μA/lm) | ❺ Blue sensitivity index Typ. | ❻ Radiant Typ. (mA/W) | ❼ Anode to cathode supply voltage (V) | ❽ Lumi-nous Typ. (A/lm) | ❻ Radiant Typ. (A/W) | ❾ Gain Typ. | Dark current ❿ Typ. (nA) | Dark current ❿ Max. (nA) | Time response ⓫ Rise time Typ. (ns) | Time response ⓫ Transit time Typ. (ns) | Time response ⓫ T.T.S. Typ. (FWHM) (ns) |
| 19 mm (3/4") | R1166 | 4 | 300 to 650 | Ⓐ-Ⓓ | 26 | 110 | 10.5 | 85 | 1000 ⑯ | 110 | $8.5 \times 10^4$ | $1.0 \times 10^6$ | 1 | 5 | 2.5 | 27 | 2.8 |
| | R1450 | 5 | 300 to 650 | Ⓐ-Ⓓ | 27 | 115 | 11.0 | 88 | 1500 ㉑ | 200 | $1.5 \times 10^5$ | $1.7 \times 10^6$ | 3 | 50 | 1.8 | 19 | 0.76 |
| | R3478 | 6 | 300 to 650 | Ⓐ-Ⓓ | 27 | 115 | 11.0 | 88 | 1700 ⑦ | 200 | $1.5 \times 10^5$ | $1.7 \times 10^6$ | 10 | 300 | 1.3 | 14 | 0.36 |
| | R3991A-04 | 7 | 300 to 650 | Ⓔ | 12 | 30 | 4.5 | 38 | 1500 ㉒ | 10 | $1.3 \times 10^4$ | $3.3 \times 10^5$ | 0.1 | 10 | 1.0 | 10 | — |
| | R4125 | 5 | 300 to 650 | Ⓐ-Ⓓ | 27 | 115 | 11.0 | 88 | 1500 ⑰ | 100 | $7.7 \times 10^4$ | $8.7 \times 10^5$ | 10 | 50 | 2.5 | 16 | 0.85 |

## Current Status:

**One 3 mm scintillator module  is being assembled for light output testing**

**UV gluing and testing should be completed this week.**

**Yuan Li is simulating the backgrounds generated by the scin. tagger assembly.**

**Parts for the rest of the assembly will be ordered soon**

Thanks to Youri Sharabian for all the help with this detector