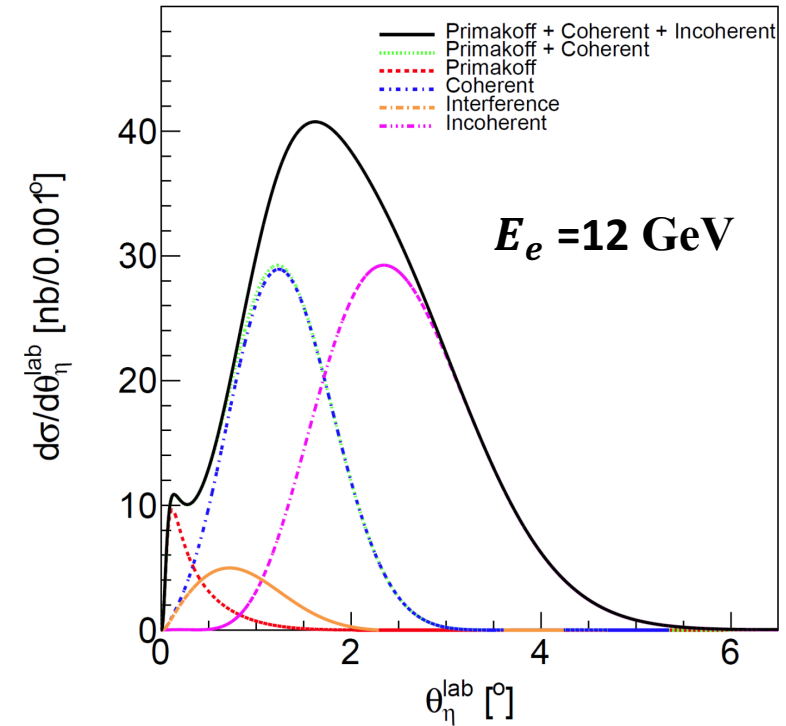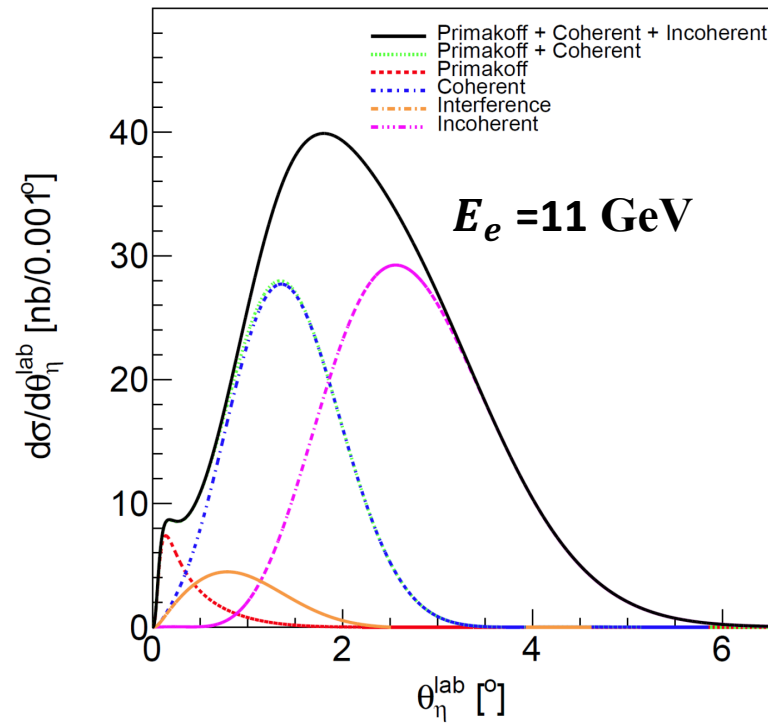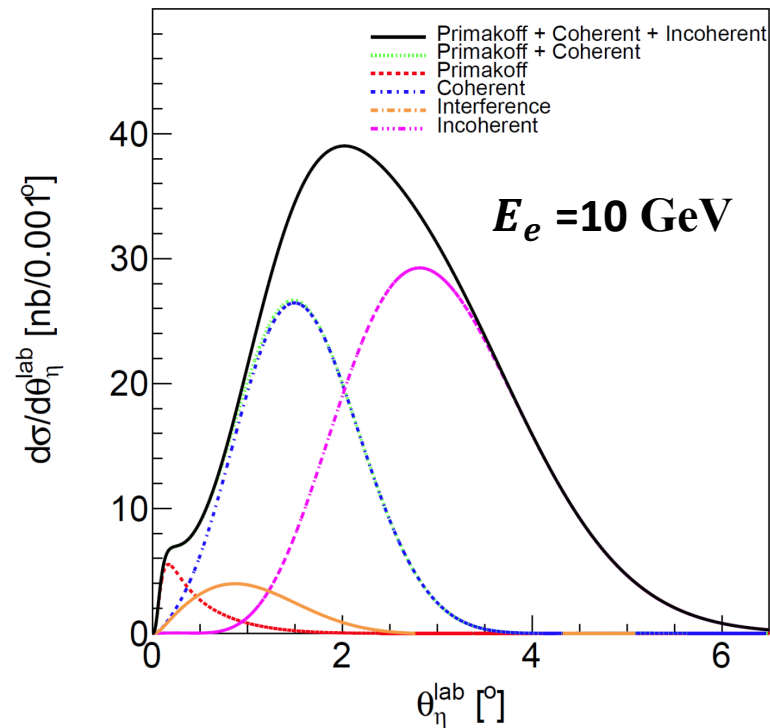# Impact of Lower Beam Energy on PrimEx-D
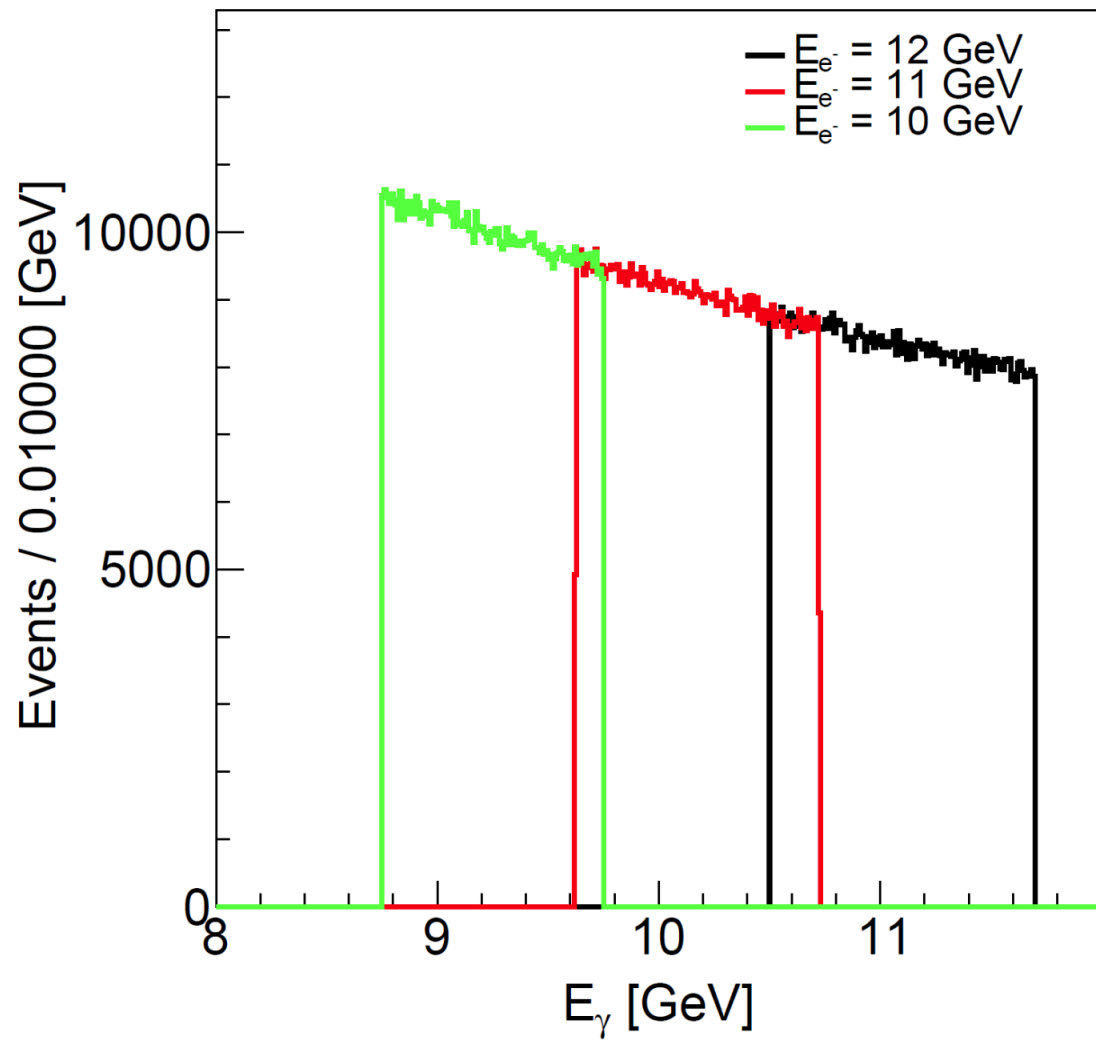
Igal and Liping

Nov 10, 2021

Two Consequences from Lower Beam Energies

- Smaller Primakoff cross section
- More overlap between the Primakoff and the nuclear background

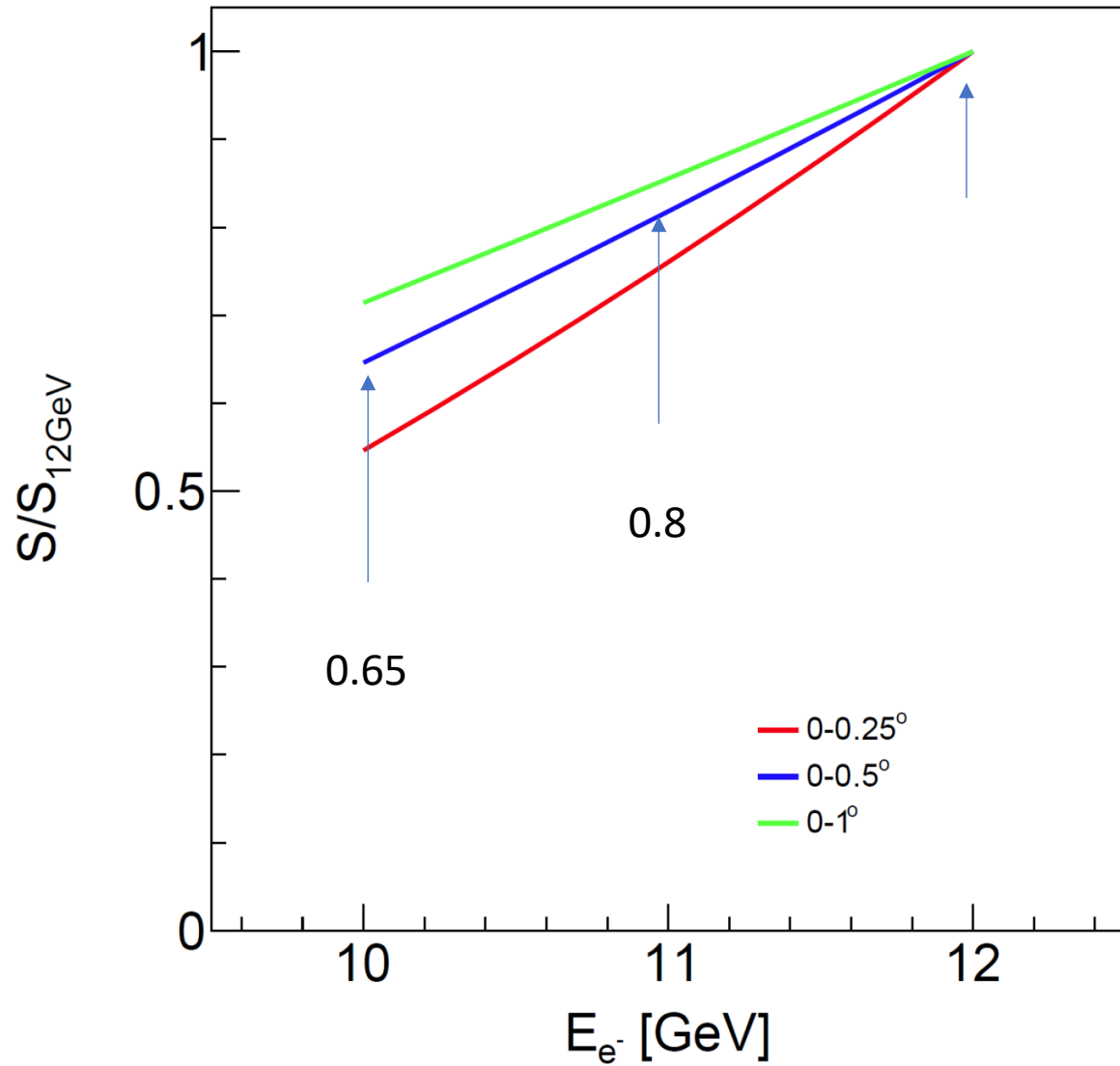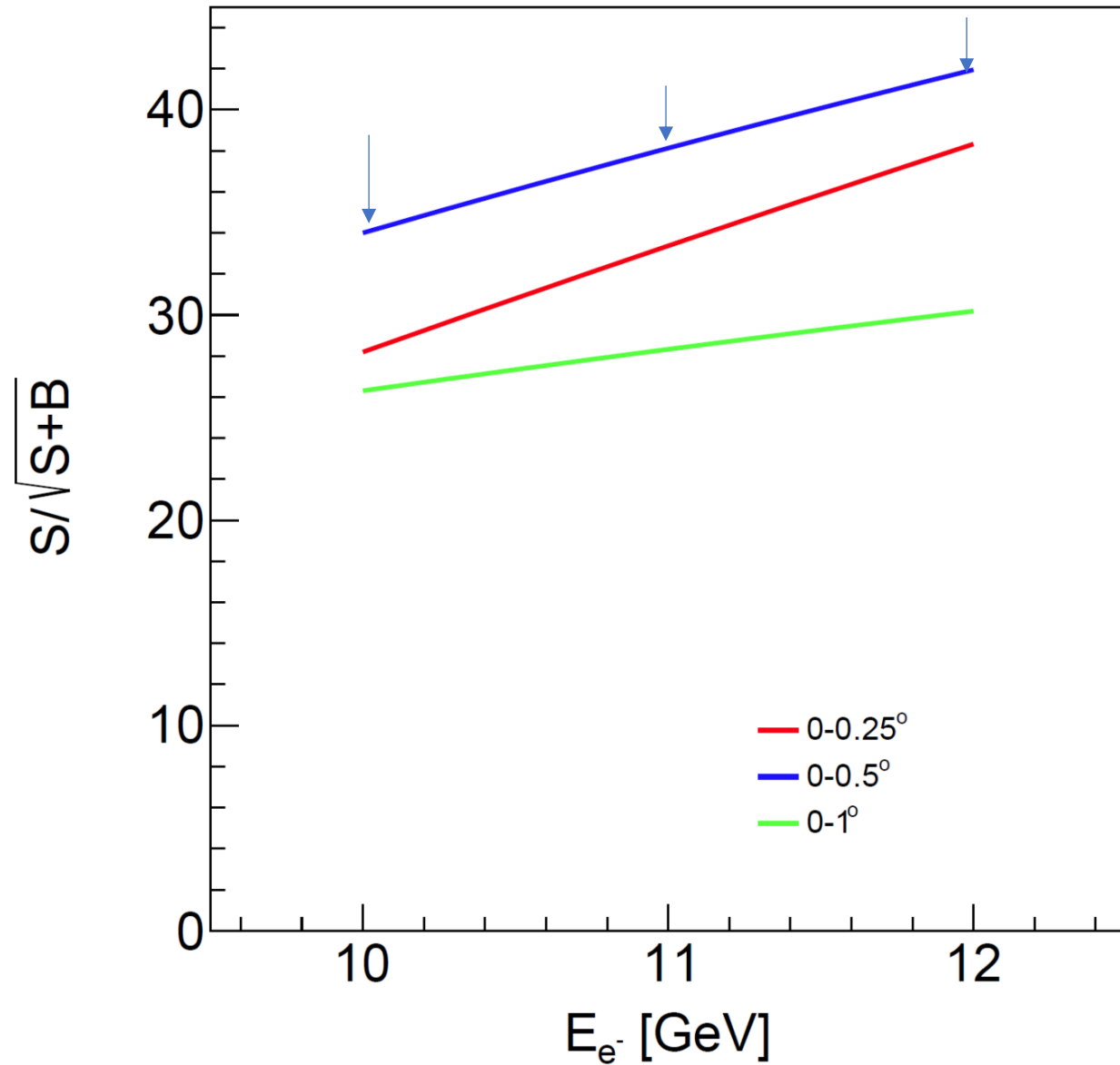| E_e (GeV)	E_γ Range (GeV)
10	8.75-9.64
11	9.625-10.61
12	10.5-11.57

If running the same electron beam current at different beam energies, the numbers of photon in above three γ energy windows will the same.

Correction Factor due to the Primakoff Yield

E_e (GeV)	Correction Factor (yield)
10	0.65
11	0.8
12	1

Legend:
- 0-0.25°
- 0-0.5°
- 0-1°

Axis labels: S/S_{12GeV} vs E_{e^-} [GeV]

Arrow annotations: 0.65, 0.8

Correction Factor due to FOM

E_e (GeV)	FOM	Correction Factor (FOM)
10	34	0.655
11	38	0.818
12	42	1

Summary

E_e (GeV)	Correction Factor (yield)	Correction Factor (FOM)	Total correction factor
10	0.65	0.655	0.43
11	0.8	0.818	0.65
12	1	1	1