

Estimated eta Production Rate

- For 200nA beam and 1×10^{-4} R.L. radiator, 5 mm collimator, #photons on target ($9\text{GeV} < E_\gamma < 11.2\text{ GeV}$) is: $N_\gamma = 6.28 \times 10^6 \text{ } \gamma/\text{s}$
- For 30 cm He, $N_{\text{he}} = 5.64 \times 10^{23} \text{ He}/\text{cm}^2$
- The forward η photo-production cross section $\sigma \sim 16 \text{ nb}$, detection efficiency ~ 0.7 , $\text{BR}(\eta \rightarrow \Upsilon\Upsilon) \sim 0.4$
- The production rate for η per day is:

$$N_\eta \approx 5.64 \times 10^{23} \times 6.28 \times 10^6 \times 16 \times 10^{-33} \times 0.7 \times 0.4 \times 3600 \times 24 \approx 1370$$

- The Primakoff eta is: $1370 \times 20\% \sim 274$ per day