# Estimations on Rod Targets

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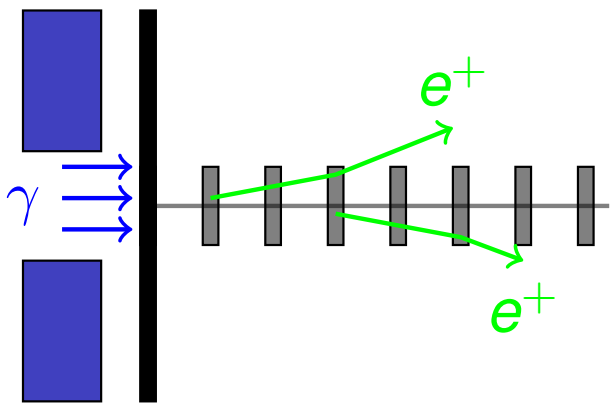
# Example of Rod Target




- the length of rod 80 cm (arbitrary, reasonable)
- the radius of rod 15 mm (1.3 GeV, 40 m, $1/\gamma$)
- material – tungsten (r.l. 3.3 mm $\Rightarrow$ 6.4 g cm$^{-2}$)
- thickness 2 rad. length (arbitrary, reasonable)

# Parameters of target performance

## Per one incident gamma

| $E_{max}$ (MeV) | $\kappa$ | $\lambda$ | yield | heat load | $\epsilon$ (m rad) | rms $x'$ rad |
|---|---|---|---|---|---|---|
| 20 | 1/3 | 0.67 | 0.42 | 0.064 | 0.025 | 0.49 |
| 30 | 1/3 | 0.44 | 0.43 | 0.056 | 0.019 | 0.38 |
| 58 | 1/2 | 0.22 | 0.57 | 0.059 | 0.012 | 0.24 |

## Power load (capturing efficiency 28 %)

| $E_{max}$ (MeV) | gammas ($\times 10^{15}$/s) | heat load (J/s) | heat load (J/g s) | $\Delta$ temp (K/s) |
|---|---|---|---|---|
| 20 | 3.33 | 344 | 3.8 | 27.6 |
| 30 | 3.26 | 435 | 4.8 | 34.8 |
| 58 | 2.45 | 668 | 7.5 | 53.5 |
| 10 | 62.5 | 10.5k | 50k | spn |

# Summary

- Minimal necessary gammas $5 \times 10^{11}$ per positron bunch at IP (25 gammas per positron) eases Compton ring/ERL beam dynamics and/or the laser system.
- Low power load in the target may allow a stationary target.