LUMINOSITY :* $\mathcal{L}$ is defined as the interaction event rate per unit of elementary cross section

$$\#\text{events rate} = \sigma_{\text{elem.}} \mathcal{L}$$

A typical value of cross section in e^+e^- annihilation is set by the point cross section (s center of mass energy)

$$1R = \frac{4\pi}{3}\frac{\alpha^2}{s} \equiv \frac{86.8[\text{fb}]}{s[\text{TeV}^2]}$$

It is reasonable to set a luminosity of 1.5×10^4 events per R per year at 1 TeV, then

$$\mathcal{L}[cm^{-2}s^{-1}] \approx 5.5{\times}10^{33}[cm^{-2}s^{-1}] \left(\frac{E_{eff}[TeV]}{1[TeV]}\right)^2$$

Notice :

Hadron collider $E_{eff} \approx \frac{E_{c-of-m}}{10}$

Lepton collider $E_{eff} = E_{c-of-m}$

*