Formulas

$$\Delta t = \Delta t_0 \gamma \ , \ L = \frac{L_0}{\gamma} , \ \gamma = \frac{1}{\sqrt{1-\beta^2}} \ , \ \beta = \frac{v}{c} \ , \ f = f_0 \sqrt{\frac{1-\beta}{1+\beta}}$$

$$x' = \gamma(x - vt) , \ y' = y \ , \ z' = z , \ t' = \gamma\left(t - {vx}/{c^2}\right)$$

$$p = \gamma mv \ , \ K = mc^2(\gamma - 1) \ , \ E = \gamma mc^2 = mc^2 + K$$

$$(pc)^2 = 2Kmc^2 + K^2 , \ E^2 = (pc)^2 + \left(mc^2\right)^2$$

$$E = hf \ , \ hf = K_{\max} + \Phi \ , \ \lambda = \frac{h}{p} \ , \ p = \frac{h}{\lambda} = \hbar k , \ E = hf = \hbar\omega$$

$$\Delta x \Delta p \geq \hbar \ , \ \Delta E \Delta t \geq \hbar$$

$$\hbar = \frac{h}{2\pi} = \frac{6.64 \times 10^{-34} J \cdot s}{2\pi} \ , \ h = 6.64 \times 10^{-34} J \cdot s = 4.14 \times 10^{-15} eV \cdot s$$

$$d \sin\theta = m\lambda \ , \ y_m = \frac{m\lambda D}{d} \ \text{(for small angles)}$$