DVALI - 2

$L_* \longrightarrow L_{LHC}$

$c = \hbar = 1$

m

$[\hbar] = [\ell m]$

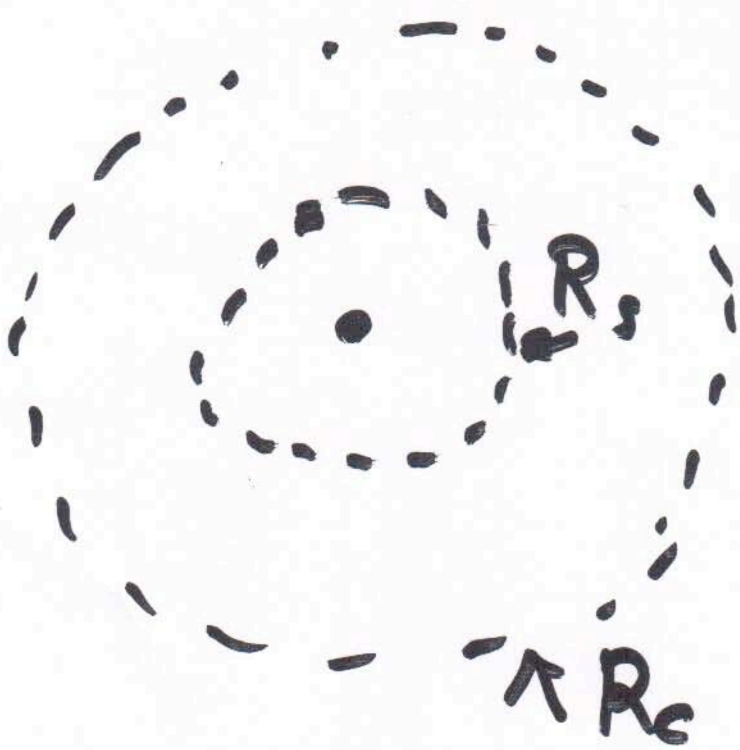
$R_c \equiv m^{-1}\hbar$ $\quad$ $\hbar \to 0 \quad R_c \to 0$

$[G_N] = \dfrac{\ell}{m}$

$R_s \equiv 2 G_N M$ $\quad$ $\hbar \to 0 \quad R_s = \text{fixed}$

$L_p^2 \equiv G_N \hbar$ $\quad$ $L_p \to 0 \quad \hbar \to 0$

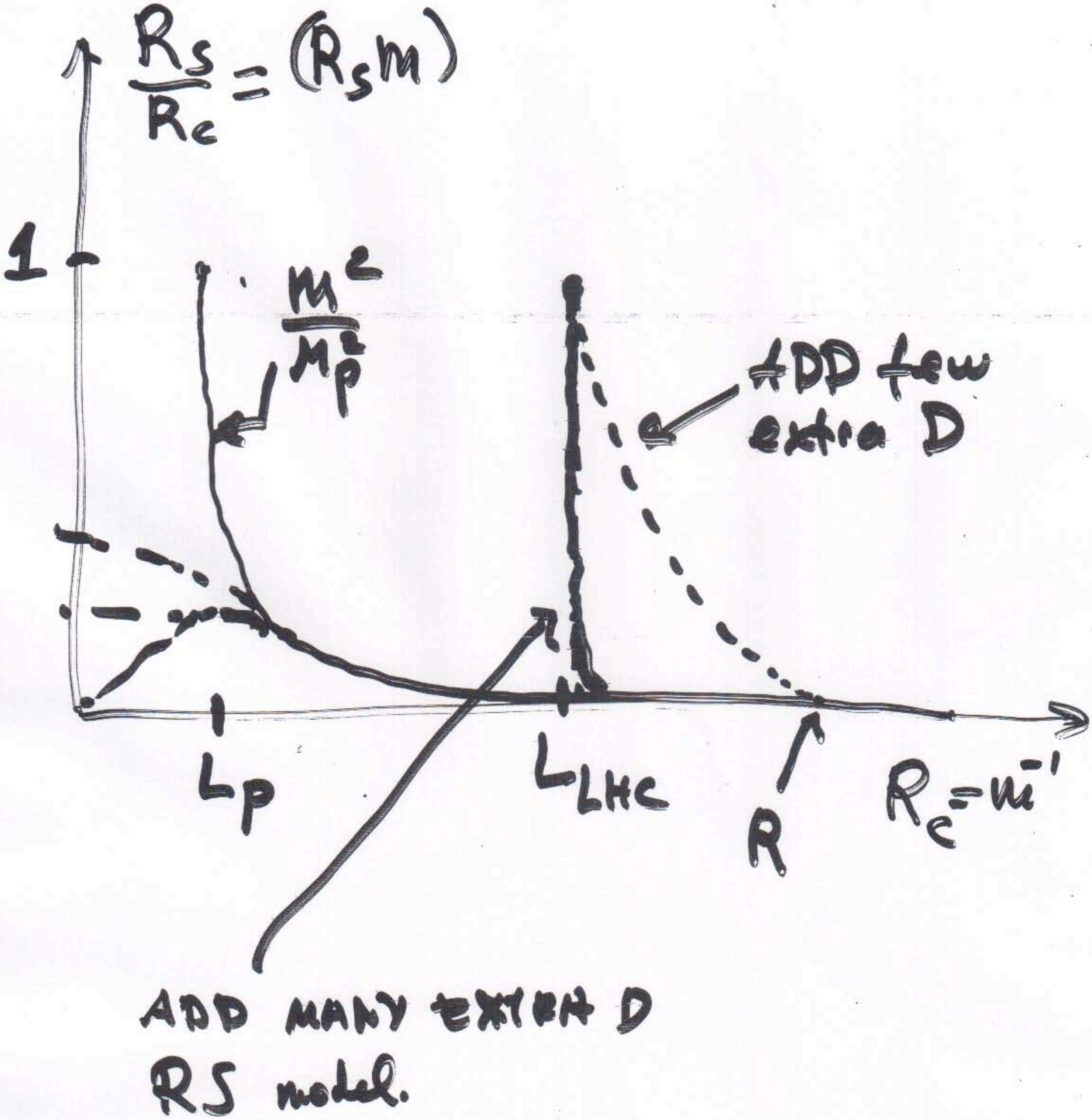
$L_p \equiv M_p^{-1}$ $\quad$ $\hbar = 1$



$m \ll M_p$

$R_s = \dfrac{M}{M_p^2}$

$R_c = m^{-1}$



$\frac{R_s}{R_c} = (R_s m)$
1
$\frac{m^2}{M_p^2}$
ADD few extra D
L_p
L_{LHC}
R
$R_c = m^{-1}$
ADD MANY EXTRA D
RS model.

$$\partial^\mu h_{\mu\nu} = \frac{1}{2}\partial_\nu h$$

$$\Box h_{\mu\nu} = \frac{1}{M_p}\left[T_{\mu\nu} - \frac{1}{2}\eta_{\mu\nu} T^\alpha_\alpha\right]$$

$$T_{\mu\nu} = \begin{pmatrix} m & & & \\ & 0 & & \\ & & 0 & \\ & & & 0 \end{pmatrix} \delta(r)$$

$$\Box h_{00} = \frac{m}{M_p}\delta(r)$$

$$V_{NEWTON} = -\frac{m}{M_p^2}\frac{1}{r} \equiv -\frac{R_S}{r}$$

$$\frac{m}{M_p^2} \rightarrow R_S$$

$$g_{\mu\nu}(x) = \eta_{\mu\nu} + \frac{h_{\mu\nu}(x)}{M_P}$$

spin-2
$m=0$

$$\frac{1}{2} h^{\mu\nu} (\mathcal{E} h)_{\mu\nu} + \frac{h_{\mu\nu}}{M_P} T^{\mu\nu}$$

$$(\mathcal{E} h)_{\mu\nu} = \frac{1}{M_p} T_{\mu\nu}$$

$$\Box h_{\mu\nu} - \eta_{\mu\nu} \Box h - \partial_\mu \partial^\alpha h_{\alpha\nu} - \partial_\nu \partial^\alpha h_{\alpha\mu}$$
$$+ \partial_\mu \partial_\nu h + \eta_{\mu\nu} \partial^\alpha \partial^\beta h$$

$$h \equiv h^\alpha_\alpha$$

$$h_{\mu\nu} \to h_{\mu\nu} + \partial_{\{\mu} \xi_{\nu\}}$$

$\underline{T^{\mu\nu} T'_{\mu\nu}}$

Spin - 2 $\left(\begin{array}{l} m=0 \\ m \neq 0. \end{array} \right.$

Spin - 0

$$h_{\mu\nu} T^{\mu\nu} + \phi \eta_{\mu\nu} T^{\mu\nu}$$

$$m=0 \longrightarrow m \neq 0$$

$$\boxed{\begin{aligned} h^{(m)}_{\mu\nu} &= h^{(0)}_{\mu\nu} + \partial_\mu A_\nu + \partial_\nu A_\mu \\ &+ \eta_{\mu\nu} \phi + \frac{\partial_\mu \partial_\nu}{m^2} \phi \end{aligned}}$$

$$\delta h^{(0)}_{\mu\nu} = \{\partial_\mu \varepsilon_\nu\} \quad \delta A_\nu = -\varepsilon_\nu$$

$$h_{\mu\nu}^{(2)} \qquad M_p^{(2)} \qquad G_N^{(2)}$$

$$\left(m_2^2 + \Box\right) h_{\mu\nu}^{(2)} = \frac{1}{M_p^{(2)}}\left[T_{\mu\nu} - \frac{1}{3}\eta_{\mu\nu} T^{\alpha}_{\alpha}\right]$$

$$\frac{h_{00}^{(2)}}{M_p^{(2)}} = -\frac{4}{3}\,\frac{m\, G_N^{(2)}}{r}\, e^{-m_2 r}$$

$$\boxed{V_{\mathrm{NEWTON}}(r) = \frac{m}{r}\sum_j G_N^{(j)}\, e^{-m_j r}}$$

$$r < m_j^{-1}$$

$$V(r)_{\text{NEWTON}} = -\frac{m}{r} \sum_j G_N^{(j)}$$

$$r \sim L_*$$

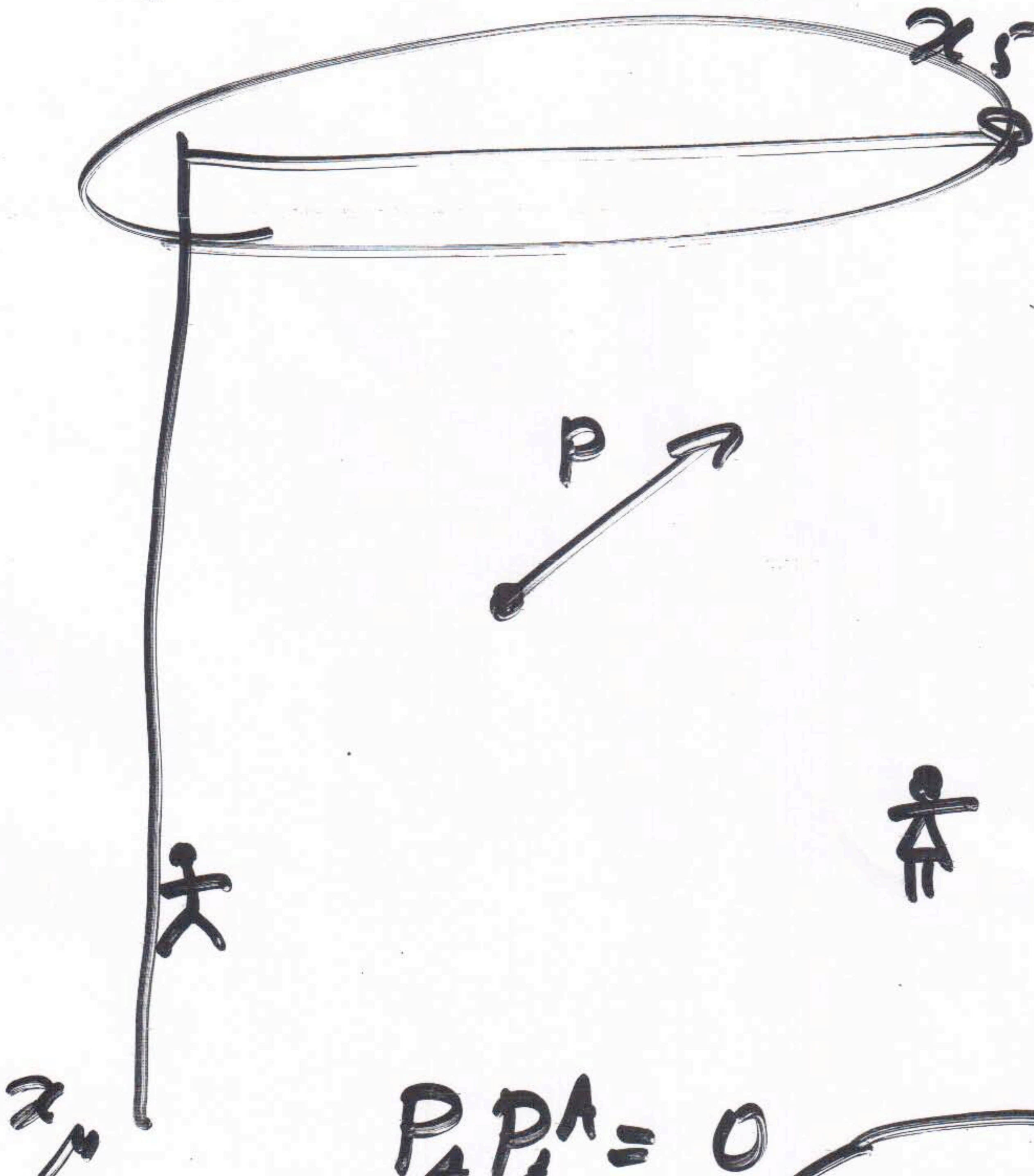
$$\sum_j G_N^{(j)} = 10^{32} G_N$$

$$G_N^{(j)} = G_N$$

$$j = 1 \ldots N = 10^{32}$$

$$h_{\mu\nu} \quad G_N' = \frac{1}{(\text{[illegible]} N)^2}$$

$x_\mu\,,\ x_5 \qquad X_A \quad \underline{A = 0,1,2,3,}$



$$P_A P^A = 0$$

$$P_5 = m = \frac{n}{R}$$

$$P_\mu P^\mu - P_5 P_5 = 0$$

$$P_\mu P^\mu - m^2 = 0$$

x_μ

h_{AB}

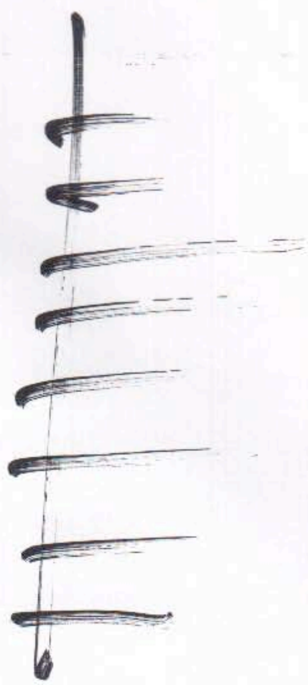
$$h_{AB} = \left(\begin{array}{c|c} h_{\mu\nu} & h_{\mu 5} \\ \hline h_{\mu 5} & h_{55} \end{array}\right)$$

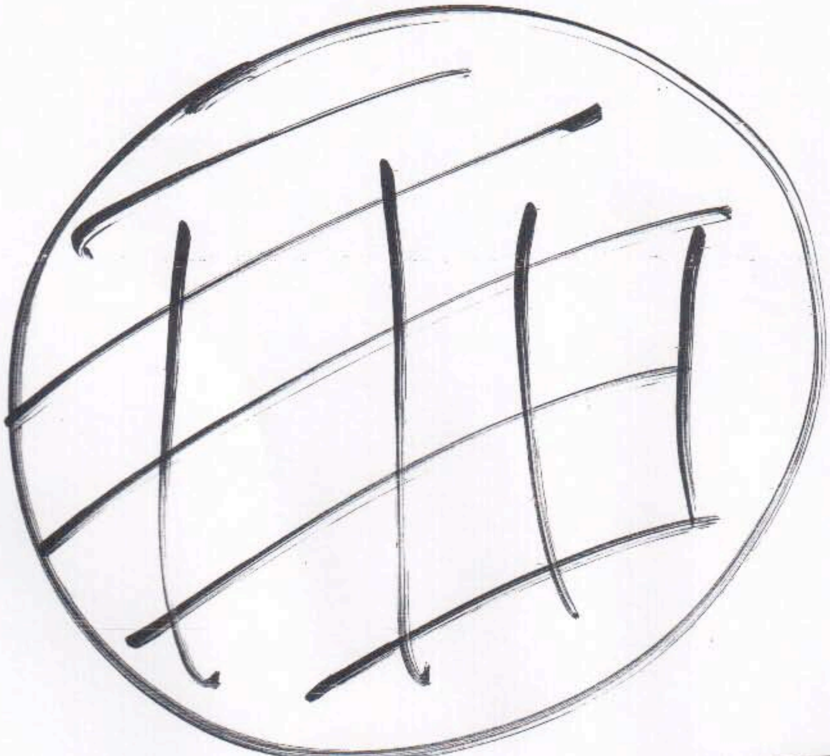
x_5

$$m^2 = \frac{n^2}{R^2}$$

$m_{\cdot j}$

$G^{(j)}_{N..}$



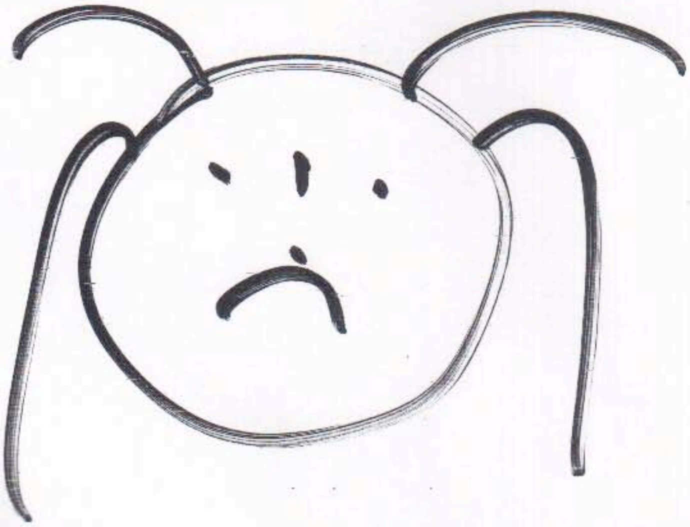


R_s $\quad T = R_s^{-1}$

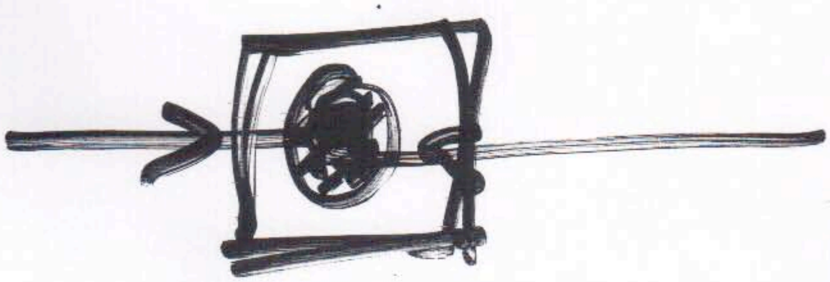
$$\xi = T^{-2}\frac{dT}{dt} \ll 1$$

$$T \sim L_*^{-1}$$

$\sqrt{s} \gg L_*^{-1}$



$(L_*$



$\tau = L_*$