北京理工大学 BEIJING INSTITUTE OF TECHNOLOGY

作业纸

课程名称：大物

班级：08012204 教学班级：B012216 姓名：俞乐辉 学号：1120223093 第 1 页

1-13 (1) $L = 30m \times \sqrt{1-\frac{u^2}{c^2}}$ $\therefore u = 0.8c$.

$L = 75ns \cdot u$

(2). $\Delta t = \frac{75ns}{\sqrt{1-\frac{u^2}{c^2}}} = 0.125ns$

1-14. $L = 36\sqrt{1-\frac{u^2}{c^2}} = 27m$.

$\Delta t' = 20min\sqrt{1-\frac{u^2}{c^2}} = 15\ min$.

1-17. $v_x' = \frac{v_x - u}{1-\frac{uv_x}{c^2}} = 0.946c$.

$\Delta t = \sqrt{1-\frac{u^2}{c^2}} = 6s$.

1-18. $p = \frac{\sqrt{E^2 - E_0^2}}{c} = 1.94\ MeV/c$

$v = c\sqrt{1-\frac{E_0^2}{E^2}} = 0.907c$.

$m = \frac{E}{c^2} = 2.9 MeV/c^2$

1-19. $v = c\sqrt{1-\frac{E_0^2}{E^2}}$. $\Delta t = \frac{t_0}{\sqrt{1-\frac{v^2}{c^2}}} = \frac{E}{E_0} t_0$.

$v\Delta t = c\sqrt{1-\frac{E_0^2}{E^2}}\, t_0 \frac{E}{E_0} = 1.799 \times 10^4 km$

联系方式：

1-22. (1). $p=\frac{m_0 v}{\sqrt{1-\frac{v^2}{c^2}}}=0.58 m_0 c$.

$E=\frac{m_0 c^2}{\sqrt{1-\frac{v^2}{c^2}}}=1.15 m_0 c^2$

(2). $v'=\frac{v-u}{1-\frac{uv}{c^2}}=0.8c$.

$p=\frac{m_0 v^2}{\sqrt{1-\frac{v^2}{c^2}}}=1.33 m_0 c$

$E=\frac{m_0 c^2}{\sqrt{1-\frac{v^2}{c^2}}}=1.67 m_0 c^2$

1-23. $\begin{cases} \frac{h\nu}{c}=mv. \\ m_0 c^2=h\nu+mc^2 \end{cases}$

$\Rightarrow m_0=m_0\sqrt{1-\frac{2h\nu}{m_0 c^2}}$