

6.7

For constant v ($\Rightarrow$ constant γ):

$$\alpha^2 = \gamma^4 a^2 = \gamma^4 \cdot \left(\frac{v^2}{r}\right)^2$$

For such large γ we can set $v=c$ in the second term.

$$\begin{aligned}\alpha &= \gamma^2 \frac{c^2}{r} = (2 \times 10^5)^2 \times \frac{(3 \times 10^8 \frac{\text{m}}{\text{s}})^2}{4.3 \times 10^3 \text{ m}} = \\ &= 8.4 \times 10^{23} \text{ m/s}^2\end{aligned}$$