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SPEED OF ANY VISIBLE MASSIVE PARTICLE BECOMES EQUAL TO THE SPEED OF LIGHT

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ABSTRACT

As we know that escape velocity helps to leave the gravitational field of any celestial bodies like Earth, but there is uncertainty about its speed by which it leaves gravitational field and enters the other's gravitational field. This script gives information about its speed by which it would be determined easily its location after certain time. This idea based on the Law of conservation of energy and Law of conservation of momentum. It also deals about a jerk felt by escaping particle at the limiting point of gravitational field of any celestial body like the Earth.

KEYWORDS: Rest Mass, Escape Velocity, The Law of Conservation of Energy, Adjustable Momentum, Zero Gravity, Jerk on Particle, Slight Larger, Kinetic Energy

INTRODUCTION

"The speed of anybody or any particle will equal to the speed of light

When it projected by an escape velocity from the earth surface".

Explanation:

Let m_0 Be the rest mass of a particle which is projected by escape velocity from the earth's surface. If the escape velocity is v_e Then energy on the surface be

$\frac{1}{2}m_0{v_e}^2= E_1$(say)

$E_2=\frac{1}{2}m_0({v_e}^2\text{-}2gh)=\ \frac{1}{2}m_0{v_e}^2\text{-}\ m_0gh$

$$\Delta E = E_1\text{-}\ E_2=m_0gh \tag{1}$$

Now, applying the law of conservation of energy, we get

$$\frac{1}{2}m_0{v_e}^2+m_0c^2=Mc^2+\frac{1}{2}m_0V^2+\Delta E' \tag{2}$$

Here $\Delta E'=\Delta E-\frac{1}{2}m_0V^2$

Since$m_0V=Mv_e$ (being relatively adjustable momentum)

$\frac{1}{2}m_0V=\frac{1}{2}Mv_e$

$\frac{1}{2}m_0V^2=\frac{1}{2}Mv_eV$

Then from (2), we have w

$$\frac{1}{2}m_0{v_e}^2 + m_0c^2 = Mc^2 + \frac{1}{2}Mv_eV + \Delta E' \quad (3)$$

Now $m_0 > M$ and $v_e > V$

Sincev_e is slight larger than V,then we can take $v_e \approx V$

So we get

$$\frac{1}{2}m_0{v_e}^2 + m_0c^2 = Mc^2 + \frac{1}{2}M{v_e}^2 + \Delta E'$$

$$m_0(\frac{{v_e}^2}{2} + c^2) = M(\frac{{v_e}^2}{2} + c^2) + \Delta E'$$

$$m_0 = M + \frac{\Delta E'}{(\frac{{v_e}^2}{2} + c^2)}$$

$$\Delta m = \frac{\Delta E'}{(\frac{{v_e}^2}{2} + c^2)} \quad (4)$$

Now$\Delta m = \frac{\Delta E'}{(\frac{{v_e}^2}{2} + c^2)}$

$$\Delta m = \frac{\Delta E - \frac{1}{2}m_0V^2}{(\frac{{v_e}^2}{2} + c^2)}$$

$$\Delta m = \frac{m_0(gh - \frac{{v_e}^2}{2})}{(\frac{{v_e}^2}{2} + c^2)} \quad (5)$$

Similarly,$\Delta m' = \frac{m_0(g'h' - \frac{{v_e}'^2}{2})}{(\frac{{v_e}'^2}{2} + c^2)}$ (6)

Since kinetic energy of particle on arriving the just limiting point of gravitational field of earth is same as kinetic energy on leaving the just limiting point of gravitational field of earth, while a jerk (j) occur on leaving limiting point of gravitational field of earth due to being zero gravity.

Let M' and v_e' are mass and velocity of that particle after leaving the gravitational field of earth, Hence

$$\frac{1}{2}M{v_e}^2 = \frac{1}{2}M'{v_e}'^2$$

$${v_e}'^2 = \frac{M}{M'}{v_e}^2$$

$$= \frac{m_0 - \Delta m}{m_0 - \Delta m'}{v_e}^2$$

$$= \frac{m_0 - \frac{m_0(gh - \frac{{v_e}^2}{2})}{(\frac{{v_e}^2}{2} + c^2)}}{m_0 - \frac{m_0(g'h' - \frac{{v_e}'^2}{2})}{(\frac{{v_e}'^2}{2} + c^2)}}{v_e}^2$$

$$=\frac{(\frac{v_e{}^2}{2}+c^2-gh+\frac{v_e{}^2}{2})/(\frac{v_e{}^2}{2}+c^2)}{(\frac{v_e{}'^2}{2}+c^2-g'h'+\frac{v_e{}'^2}{2})/(\frac{v_e{}'^2}{2}+c^2)}v_e{}^2$$

$$=\frac{(v_e{}^2+c^2-gh)}{(\frac{v_e{}^2}{2}+c^2)}\frac{(\frac{v_e{}'^2}{2}+c^2)}{(v_e{}'^2+c^2-g'h')}v_e{}^2$$

$$=\frac{(v_e{}^2+c^2-gh)(v_e{}'^2+2c^2)}{(v_e{}^2+2c^2)(v_e{}'^2+c^2-g'h')}\ v_e{}^2$$

$\Rightarrow v_e{}'^2(v_e{}^2v_e{}'^2+v_e{}^2c^2\text{-}\ g'h'v_e{}^2+\ 2c^2\ v_e{}'^2+2c^4-2g'h'c^2\ )=\ v_e{}^2(v_e{}^2v_e{}'^2+2c^2\ v_e{}^2+c^2\ v_e{}'^2+2c^4-ghv_e{}'^2-2ghc^2)$

$\Rightarrow\ v_e{}'^4v_e{}^2+v_e{}^2v_e{}'^2c^2-g'h'\,v_e{}^2v_e{}'^2+2c^2\ v_e{}'^4+2c^4v_e{}'^2-2g'h'c^2\ v_e{}'^2=v_e{}^4v_e{}'^2+2c^2v_e{}^4+c^2v_e{}^2v_e{}'^2+2c^4v_e{}^2-ghv_e{}^2v_e{}'^2-2ghc^2\ v_e{}^2$

$\Rightarrow\ v_e{}^2v_e{}'^2(v_e{}'^2-v_e{}^2\ )+v_e{}^2v_e{}'^2(gh-g'h')+2c^2(v_e{}'^4-v_e{}^4)+2c^4(v_e{}'^2-v_e{}^2)+2c^2(ghv_e{}^2-g'h'v_e{}'^2)=0$

$\Rightarrow v_e{}^2v_e{}'^2\left(v_e{}'^2-v_e{}^2\right)+2c^2(v_e{}'^4-v_e{}^4)+2c^4(v_e{}'^2-v_e{}^2)=0$

(Because g'=0 and by $g'=\frac{g}{(1+\frac{h}{R_e})^2}$, we have h= ∞, $h'=\infty$)

$\Rightarrow v_e{}^2v_e{}'^2+2c^2(v_e{}'^2+v_e{}^2)+2c^4=0$

$\Rightarrow\ \ v_e{}^2v_e{}'^2=-2c^2(v_e{}'^2+v_e{}^2)-2c^4$

$=-2c^2\left[v_e{}'^2+v_e{}^2+c^2\right]$

$\Rightarrow\ \ v_e{}^2v_e{}'^2+2c^2\ v_e{}'^2=-2c^2(v_e{}^2+c^2)$ (7)

$\Rightarrow\ \ v_e{}'^2(v_e{}^2+2c^2)\ =-2c^2(v_e{}^2+c^2)$

From equation (7), we have

$v_e{}^2v_e{}'^2+c^2\ v_e{}'^2+c^2\ v_e{}'^2=-2c^2(v_e{}^2+c^2)$

$\Rightarrow v_e{}'^2(v_e{}^2+c^2)+c^2\ v_e{}'^2=-2c^2(v_e{}^2+c^2)$

$\Rightarrow v_e{}'^2+\frac{c^2\ v_e{}'^2}{v_e{}^2+c^2}=-2c^2$

$\Rightarrow v_e{}'^2[1+\frac{c^2}{v_e{}^2+c^2}]=\qquad -2c^2$

$\Rightarrow v_e{}'^2\left(1+\frac{c^2}{c^2}\right)=-2c^2$

(Since $v_e<<c$)

$\Rightarrow 2v_e{}'^2=-2c^2$

$\Rightarrow v_e{}'^2=-c^2$

$\Rightarrow v_e{}'^4=c^4$

$$\Rightarrow v_e{}' = c$$

$$\boldsymbol{v_e{}' = c}$$

CONCLUSIONS

It gives information about visible, massive particle which attains a speed equal to the speed of light while we know that there is no visible massive particle having speeded same as light. This idea will help in study of escaped particles of earth or other celestial bodies and also it proves the strongly particle nature of light.

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