

Answer on Question #72120-Physics-Classical Mechanics

A stationary uranium nucleus disintegrates emitting an alpha particle of mass 6.65×10^{-27} kg and another nucleus X of mass 3.89×10^{-25} kg (they're in opposite direction to one another)

Calculate the ratio velocity alpha particle / velocity nucleus X

Solution

$$m_{\alpha} = 6.65 \cdot 10^{-27} \text{ kg}$$

$$m_x = 3.89 \cdot 10^{-25} \text{ kg}$$

From the conservation of momentum:

$$m_{\alpha}v_{\alpha} = m_xv_x$$

The ratio velocity alpha particle / velocity nucleus X is

$$\frac{v_{\alpha}}{v_x} = \frac{m_x}{m_{\alpha}} = \frac{3.89 \cdot 10^{-25}}{6.65 \cdot 10^{-27}} = 58.5$$

Answer: 58.5.

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