Answer on Question #63669, Physics / Atomic and Nuclear Physics

Can 1 kg of stone be converted in to energy according To Einstein mass energy relation?

Solution:

Relationship between mass m and energy E:

$\mathrm{E} = \mathrm{mc}^2$ (1),

where c is the speed of light in a vacuum (about 3×10^8 m/s)

Stone moves with speed v:

$\mathrm{v} = \beta\mathrm{c}$ (2),

where $0 < \beta < 1$,

c is the speed of light in a vacuum.

Of (2) $\Rightarrow$ $\beta = \frac{\mathrm{v}}{\mathrm{c}}$ (3)

Relativistic mass m of stone:

$\mathrm{m} = \frac{\mathrm{m_0}}{\sqrt{1-\beta^2}}$ (4),

where m_0 is the rest mass of stone (m_0=1 kg)

(4) in (1): $\mathrm{E} = \frac{\mathrm{m_0}}{\sqrt{1-\beta^2}}\mathrm{c}^2$ (5)

Formula (1) is valid.

Answer:

Yes