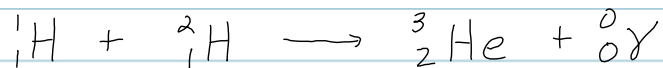


Nuclear Physics Review - Nuclear Reactions

Stars generate energy through fusion of light elements. One of the fusion reactions thought to occur in our sun involves fusion of Hydrogen and Deuterium, as shown in the reaction below:



What is the total energy released in this process?

$$E_{\text{tot}} = \Delta m c^2$$

$$\Delta m = m_{\text{reactants}} - m_{\text{products}}$$

$$\Delta m = (m_{\text{H}1} + m_{\text{H}2}) - m_{\text{He}3} \quad \rightarrow \text{Find in Appendix F.}$$

$$m_{\text{H}1} = 1.007825 \text{ u}$$

$$m_{\text{H}2} = 2.014102 \text{ u}$$

$$m_{\text{He}3} = 3.016029 \text{ u}$$

$$\Delta m = 1.007825 \text{ u} + 2.014102 \text{ u} - 3.016029 \text{ u} = 0.005898 \text{ u}$$

$$E = \Delta m c^2 = (0.005898 \text{ u}) \left(931.50 \frac{\text{MeV}}{\text{u}} \right)$$

$$\boxed{E = 5.49 \text{ MeV}}$$