Daily Physics Problem 7-18-2022

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1 Today's Problem

A beam of Helium-3 atoms (m = 3.016u) is incident on a target of nitrogen-14 atoms(m = 14.003 u) at rest. During the collision,a proton from the helium-3 nucleus passes to the nitrogen nucleus, so that following the collision there are tow atoms: an atom of "heavy hydrogen"(deuterium, m = 2.014 u) and an atom of oxygen-15 (m = 15.003 u). The incident helium atoms are moving at a velocity of $6.346 \times 10^6 \frac{m}{s}$. After the collision, the deuterium atoms are observed to be moving forward (in the same direction as the initial helium atoms) with a velocity of $1.531 \times 10^7 \frac{m}{s}$. What is the final velocity of the oxygen-15 atoms?