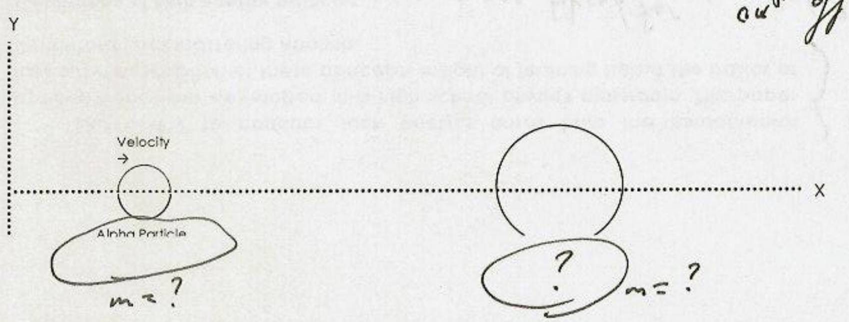
Now we will analyze the collision of these particles with the surface of the target. The collision is considered to be perfectly elastic, which means that both momentum and energy are conserved during the collision. With the concepts of conservation of energy and momentum, the change in energy for the alpha particle can be related to the mass of the particle it collided with. This mass is related to a specific element on the periodic table. In this manner we can measure the energy of the alpha particles after the collision and determine what elements are present near the surface of the target. We will consider two dimensions, x and y. The coordinates are labeled below.



Consider that the alpha particle's velocity is all in the X direction, with no Y component to the velocity. The atom near the surface does not have any initial velocity.

1. Using the velocity and mass you calculated in the first section for the alpha particle, calculate the momentum in the X direction for the particle.

What is the total momentum in the x direction for the system of alpha particle and surface atom?

3. What is the total momentum in the y direction for the system of alpha particle and surface atom?

4. Using the velocity and mass you calculated in the first section, calculate the kinetic energy of the alpha particle.

5. What is the energy of the system of alpha particle and surface atom?