



In Class Exercises (ICE) - 11/17/00

One of the President Reagan's more controversial programs was the Strategic Defense Initiative (popularly called "Star Wars"). One of the projects in SDI was the development of satellite-based particle beam weapons intended to shoot down Soviet nuclear missiles.

One particle beam system produced, accelerated and fired muons. Muons are subatomic particles that decay with explosive results. A schematic diagram of the particle beam system is shown in Figure 1 below.

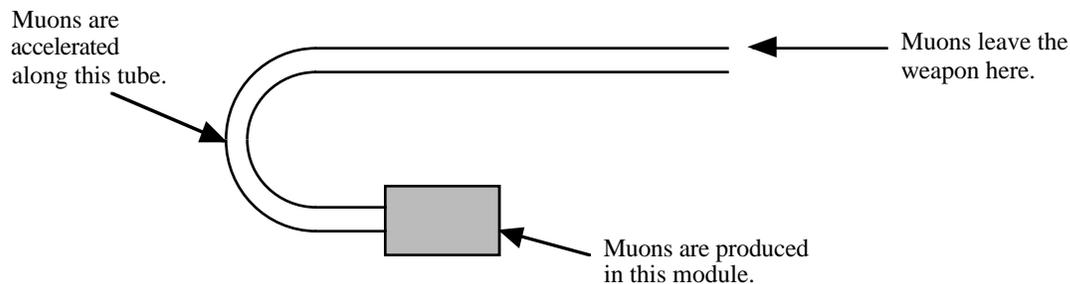


Figure 1: Schematic diagram of muon particle beam weapon.

When the weapon was fired, a group of muons were produced at time $t=0$ and then accelerated until they left the weapon at $t=6$. The velocity of the muons was given by:

$$v(t) = t^2 + t - 6.$$

• *When is the velocity of the muons at a maximum? Is this consistent with your expectations? When is the velocity of the muons at a minimum?*

• *Speed is the magnitude of velocity. When is the speed of the muons maximized and when is the speed of the muons minimized?*