

PH2102 Problem Set

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Q 1) In a given inertial frame, two particles are shot out simultaneously from a given point, with equal speeds v , which are perpendicular to each other. What is the speed of one particle with respect to the other?

Q 2) A rod of proper length 10 cm moves length-wise along the x axis at a speed of $0.5c$. How long does it take a particle, moving in the opposite direction with the same speed, to cross the rod?

Also calculate the times taken in the rod's rest frame and the particles rest frame.

Q 3) Derive the transformation law for the components of acceleration for two observers connected by a special Lorentz transformation.