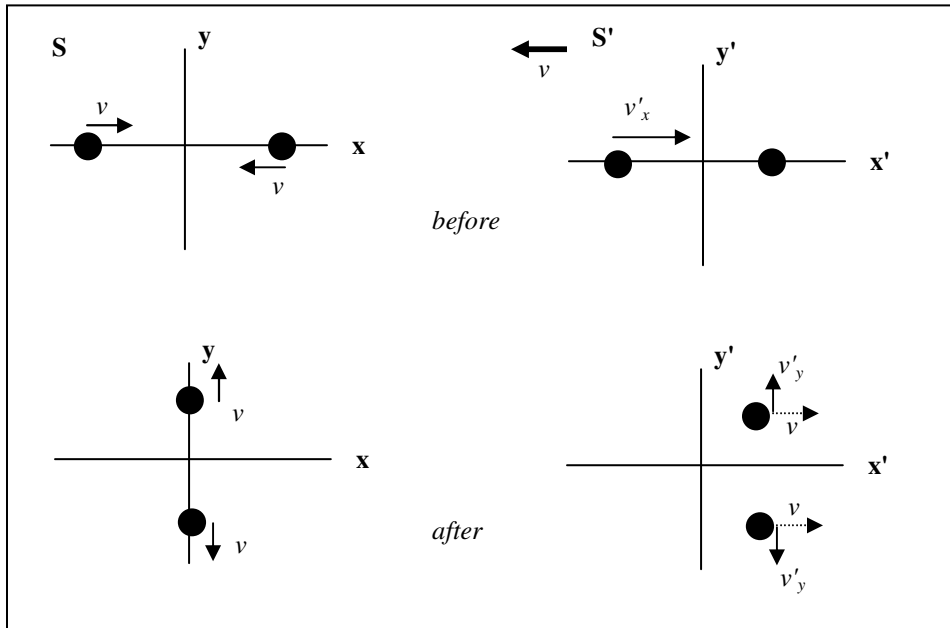


1. Recall the collision we set up class while discussing momentum. Let us now analyze the momentum using the relativistic momentum formula.



- What are the total relativistic momentum components p_x and p_y before and after the collision in frame S? Is momentum conserved in S?
- What is v'_x for the Lorentz transformed velocity of the moving particle in S' before the collision? What is the total initial momentum p'_x before the collision in S'?
- What is v'_y for the Lorentz transformed y-component of the velocity of either particle after the collision? Use this to find the total speed of either particle v' after the collision.
- Show that momentum is conserved in the collision in frame S'. Note: When you compute the relativistic momentum components in S' after the collision, the factor γ has v' in it, which comes from part (c).

2. Given $p = \gamma mu$ and $E = \gamma mc^2$, show that $E^2 = (pc)^2 + (mc^2)^2$.