Linear Momentum

Theory

- Linear momentum of an object of mass \( m \) moving with velocity \( \vec{v} \) is \( \vec{p} = m \vec{v} \)
- The total linear momentum for a system of objects is conserved in a collision (Since momentum is a vector, the vector sum of the momentum of each object before a collision should equal the vector sum of the momentum of each object after the collision)
- Mechanical energy is not conserved in a collision

Tips

- Avoid touching the metal parts of the spheres due to danger from the high voltage spark timers
- Keep track of which spark trails came from which spheres and in which direction they were traveling
Linear Momentum Data

raw data

marked-up data

vector diagram

\[ \vec{p}_i \rightarrow \vec{p}_{b,i} \rightarrow \vec{p}_{s,i} \]

\[ \vec{p}_{b,f} \rightarrow \vec{p}_f \rightarrow \vec{p}_{s,f} \]