Linear Momentum

PHYS 211L – H02

Tuesday 10:05am – 12:05pm

Abstract

In this lab, we suffered.

Introduction

Once upon a time some random asshole figured out how to made future students have extra bullshit to do, so he took it upon himself to make that a reality. Bastard.

Procedure

In this lab, we used the following materials: balance, air track with blower, 2 gliders with bumpers, 4 glider masses, additional small masses, 2 photogates, 2 small plastic fences, computer with DataStudio, photogate port, and a USB link.

First, you told us to bend over. And then you fucked us.

Results/Analysis/Physics

Measurements taken prior to Experiment

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mass of Incident Glider (kg) | Mass of Target Glider (kg) | Mass of Large Cylinder (kg) | Mass of Small Cylinder (kg) | Distance between bands on Picket Fence (m) |
| 0.223 | 0.223 | 0.218 | 0.05 | 0.01 |

Carts have Equal Mass

|  |  |  |
| --- | --- | --- |
| Trial | Incident Velocity (m/s) | Target Velocity (m/s) |
| 1 | 0.16 | 0.14 |
| 2 | 0.37 | 0.35 |
| 3 | 0.42 | 0.40 |
| 4 | 0.44 | 0.42 |
| 5 | 0.14 | 0.12 |

Incident Mass Greater than Target Mass

|  |  |  |
| --- | --- | --- |
| Trial | Incident Velocity (m/s) | Target Velocity (m/s) |
| 1 | 0.44 | 0.54 |
| 2 | 0.46 | 0.55 |
| 3 | 0.44 | 0.54 |
| 4 | 0.62 | 0.75 |
| 5 | 0.75 | 0.88 |

Target Mass Greater than Incident Mass

|  |  |  |
| --- | --- | --- |
| Trial | Incident Velocity (m/s) | Target Velocity (m/s) |
| 1 | 0.64 | 0.40 |
| 2 | 0.56 | 0.35 |
| 3 | 0.58 | 0.37 |
| 4 | 0.44 | 0.26 |
| 5 | 0.49 | 0.29 |

Error Analysis: Case 1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Collision | Incident Glider’s Momentum before Collision  (kg \* m/s) | Incident Glider’s Momentum after Collision  (kg \* m/s) | Target Glider’s Momentum after Collision  (kg \* m/s) | Percent Uncertainty in Momentum for Incident Glider | Percent Uncertainty in Momentum for Target Glider |
| 1 | 0.03568 | 0.00446 | 0.03122 | 1.939 | 1.939 |
| 2 | 0.08251 | 0.00446 | 0.07805 | 1.939 | 1.939 |
| 3 | 0.09366 | 0.00446 | 0.08920 | 1.939 | 1.939 |
| 4 | 0.09812 | 0.00446 | 0.09366 | 1.939 | 1.939 |
| 5 | 0.03122 | 0.00446 | 0.02676 | 1.939 | 1.939 |
| 6 | 0.18612 | 0.06570 | 0.12042 | 1.939 | 1.939 |
| 7 | 0.19458 | 0.07193 | 0.12265 | 1.939 | 1.939 |
| 8 | 0.18612 | 0.06570 | 0.12042 | 1.939 | 1.939 |
| 9 | 0.26226 | 0.09501 | 0.16725 | 1.939 | 1.939 |
| 10 | 0.31725 | 0.12101 | 0.19624 | 1.939 | 1.939 |
| 11 | 0.14272 | -0.02648 | 0.16920 | 1.939 | 1.939 |
| 12 | 0.12488 | -0.02317 | 0.14805 | 1.939 | 1.939 |
| 13 | 0.12934 | -0.02717 | 0.15651 | 1.939 | 1.939 |
| 14 | 0.09812 | -0.01186 | 0.10998 | 1.939 | 1.939 |
| 15 | 0.10927 | -0.01340 | 0.12267 | 1.939 | 1.939 |

Conclusion

In conclusion, \*dies\*