

Towards a High Quality Physics Lab Experience for UF Online

Shawn Weatherford, Ph.D.
Lecturer of Physics

UF ONLINE
UNIVERSITY *of* FLORIDA

UFONLINE.UFL.EDU

UF Physics Offerings

Principles of Physics

PHY2020 (3)
General Ed –Physical Science

Applied Physics

PHY2004/2005 (6)
Env Management, Entomology, Food Science

Algebra-Based

PHY2053/2054 (8)
Bio, Micro, CompSci

Calculus-Based

PHY2048/2049 (6)
Bio, Micro, CompSci, Engineering



High Quality
Data
Collection

Evaluate
Student
Outcomes



Challenges for Online Students

Max
Yesterday

My computed value for resistivity using the thick nichrome wire was $114 \cdot 10^{-8}$, which is about 8.5% than the mid-point of the range reported in the table.

My computed value for resistivity using the thin nichrome wire was $108 \cdot 10^{-8}$ which is in the expected range reported in the table.

My computed value for resistivity using the brass wire was $6.94 \cdot 10^{-8}$ which is in the expected range reported in the table.

One thing that surprised me was how consistent and repeatable the voltage measurements were when compared to the results we had in the Physics 1 lab from the force sensor, for example.

Here is my plot of resistance vs length:

Plot Area of R_L vs. L

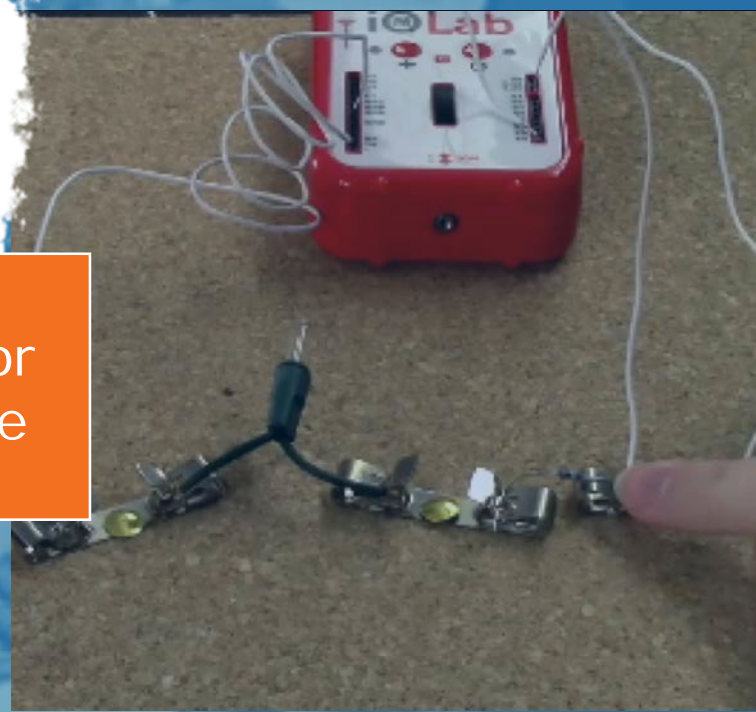
Resistance

Length

$y = 0.0351x + 0.0318$

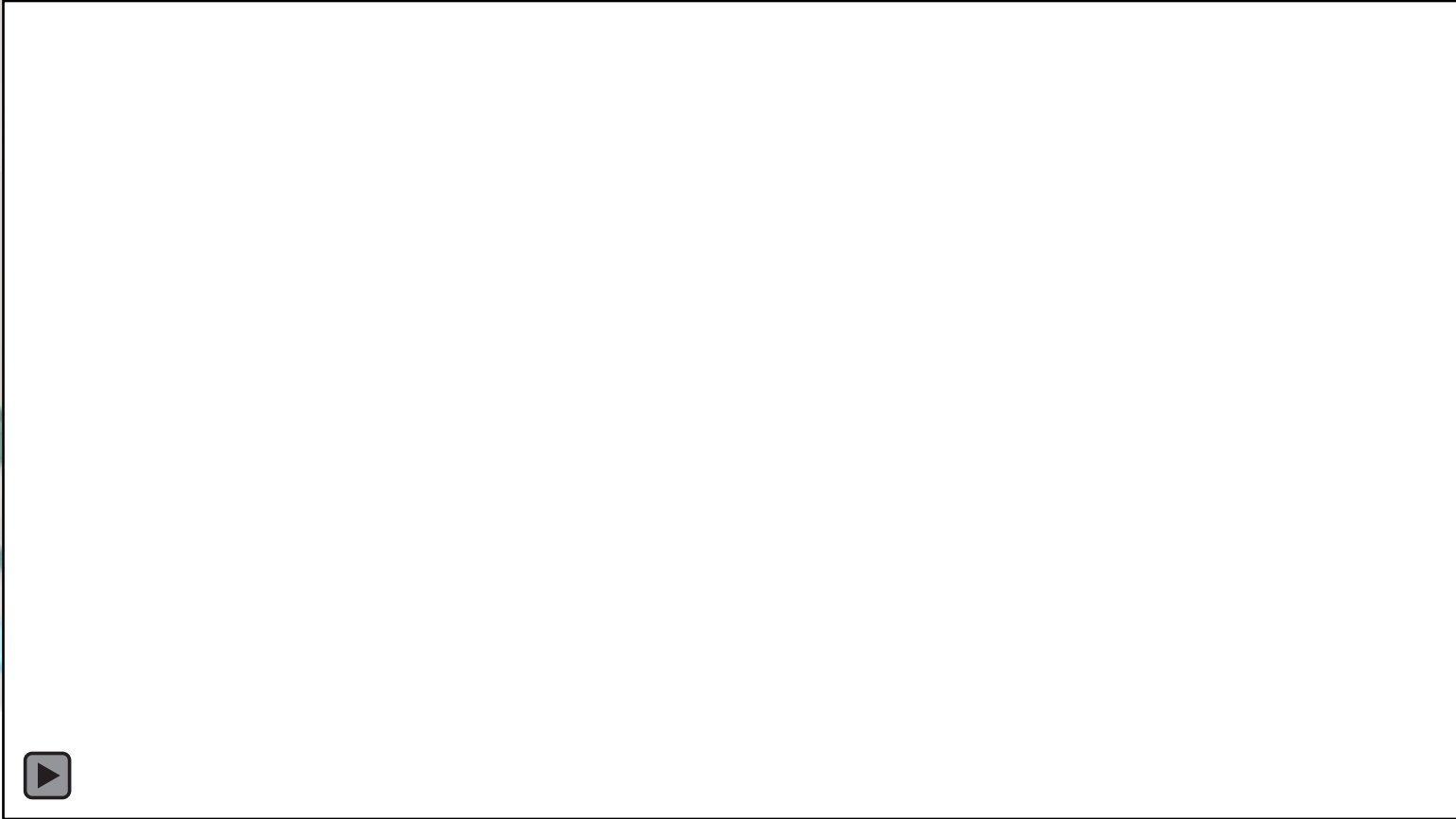
Fostering
Student
Interactions

Instructor
Guidance



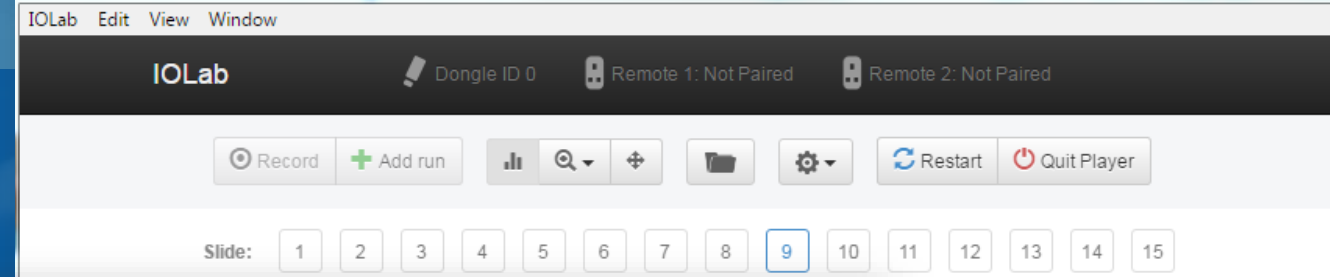
IOLab Demo and Materials Kit





Instructor Guidance

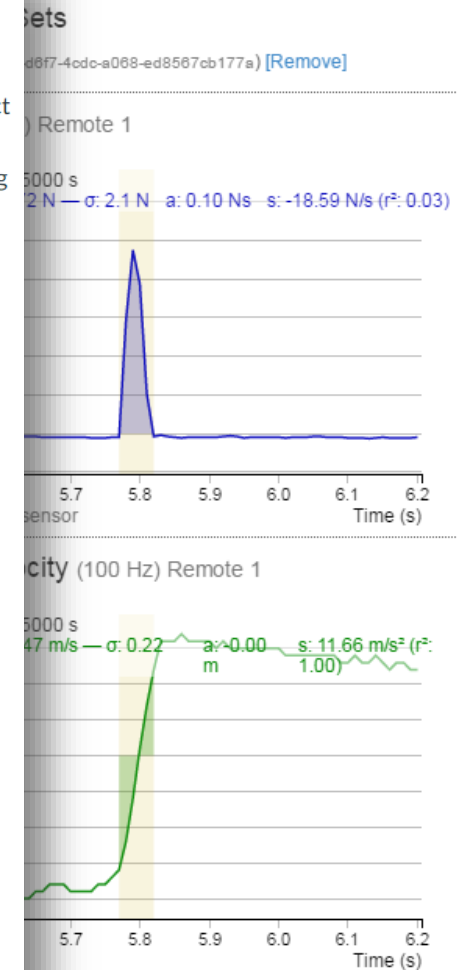
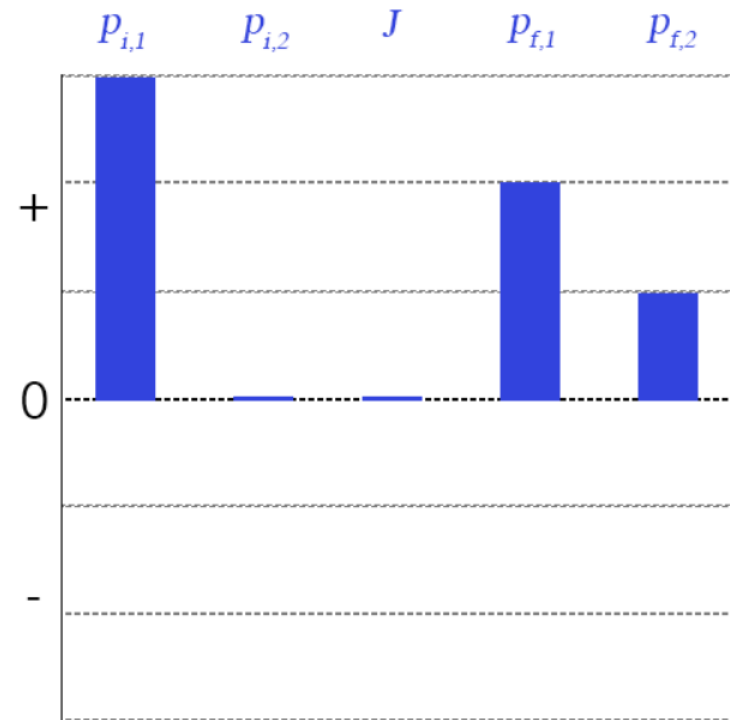
Student Outcomes



Week 12: Impulse Momentum group discussion - Group Alpha

Shawn Weatherford
From r

The bar-chart diagram below shows the measurements of the initial momenta of two objects, Object 1 and Object 2, the total impulse J , and the final momenta of Object 1 and Object 2. Use this information to construct a short creative narrative consistent with the information presented in the chart. Feel free to name the objects something other than 1 and 2.



Authentic Scientific Practice Fosters Student Interactions

"One thing that surprised me was how consistent and repeatable the voltage measurements were, especially when compared to the results we had in the Physics 1 lab from the force sensor, for example."

"I dunno what I'm doing wrong, but all my resistivities except the thick nichrome one are waaaaaaay off from what they're supposed to be. I got 0.0227 for the brass one, which is most certainly wrong."

My Tips to anyone who hasn't started this lab:

1. Start now to give yourself ample time to do it. It took me a while.
2. You can create your chart using Excel's graphing tool
3. Take the time to straighten the wires, as it will make it easier when sliding the clip during the lab
4. Pay close attention to the lab setup video for proper wiring
5. Use both the lab pdf and the excel file when answering the questions within the excel file"

"I thought this was a pretty fun lab. Unfortunately I didn't have any type of board nearby and couldn't get to a store in time to buy one, but I did use my guitar case as the board and it seems to have worked well."

Persistent Challenges and Opportunities

- Framing student expectations to align with the lab experience
- Leveraging additional functionality of IOLab
- Enhancing the integration between software platforms
- Differentiating lab experiences across three flavors of physics courses.



Focus Moving Forward

- Analysis of pilot semesters: student engagement, student difficulties, gaps in instructional support
- Utilizing checkpoints as markers for peer and instructor feedback through week
- Strengthen alignment between lab and lectures (this matters more in online labs than campus labs).
- Bring uniform lesson player design and layout across all labs.

Student Feedback – Spring 2017

“A little bit of a learning curve, but it isn't too hard after a while.”

“I think that overall we were provided with sufficient materials to be able to complete physics labs in our own homes. However, there were a couple labs (centripetal acceleration and standing waves) that were difficult to complete at home/alone.”

“Great experience! I enjoyed using the IOLab, and this was my first online lab course with UF.”