Experiment 6 Instruction

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Mar 23, 2022
KAP-B11

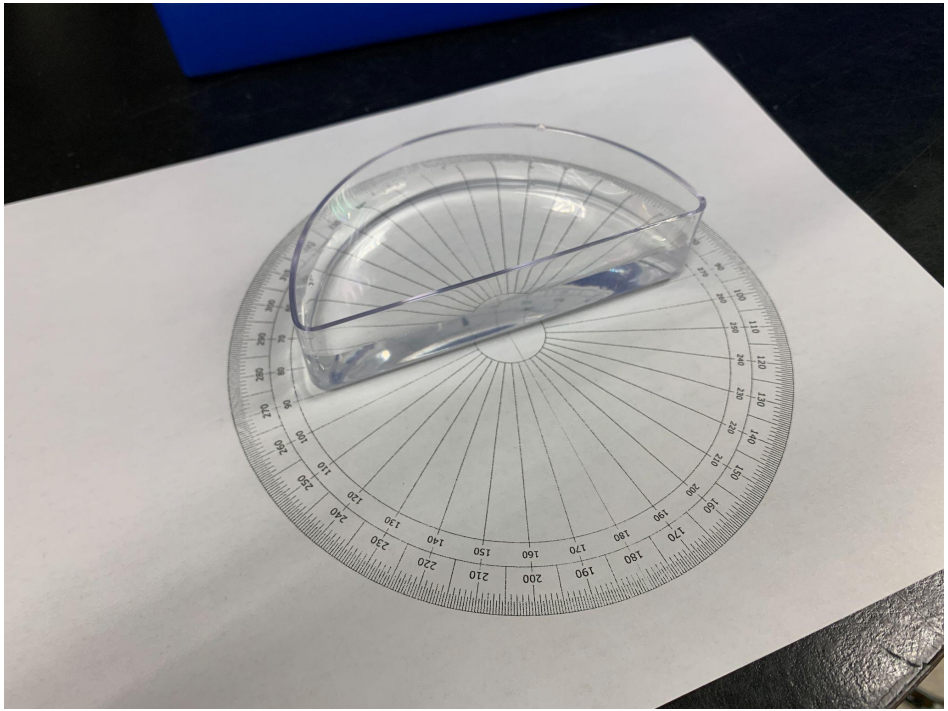
Introduction & Tips

- **About:** In this lab, you need to study optics
- **Tips:**
  - Read the lab manual and this instruction together to figure out how to do the lab
  - You are required to take photos, don't forget that
  - Be careful about the laser pointer and don't hurt you and your classmates eyes

Hope it helps

Preparation

- **Set up:** Fill your plastic refraction cup with water and place it on the paper protractor



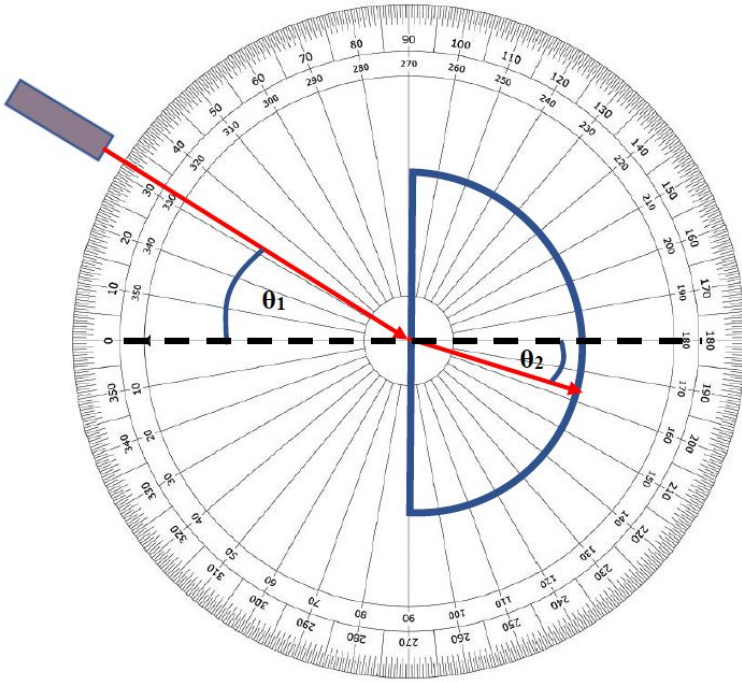
Set up like this

Task A - Part A, B and C in the Manual

- **Refraction and Snell's Law:** Make sure the incident beam hits the center of the semi-circle

- Use your setup to measure 9-10 different angles of refraction θ_2 with different angle of incidence θ_1

  θ_1 and θ_2 are smaller than $90°$



Here is θ_1 and θ_2

Task A - Part A, B and C in the Manual

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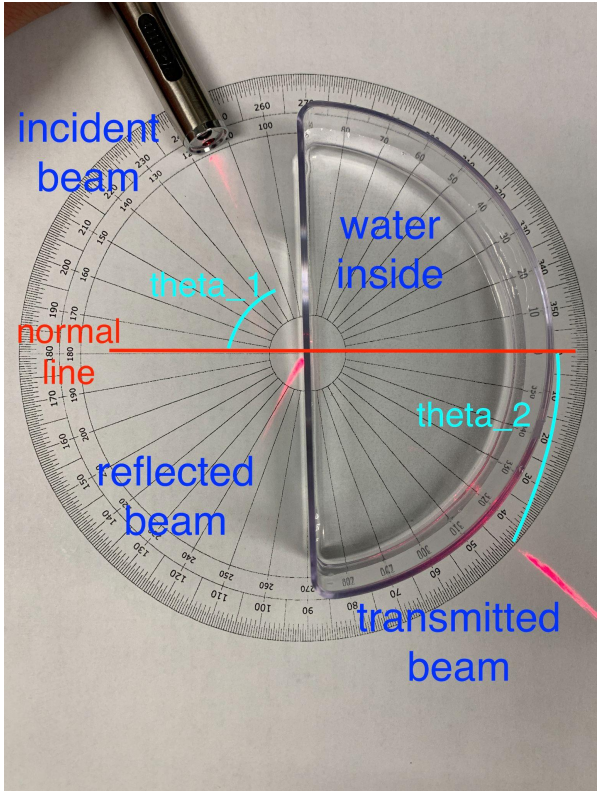
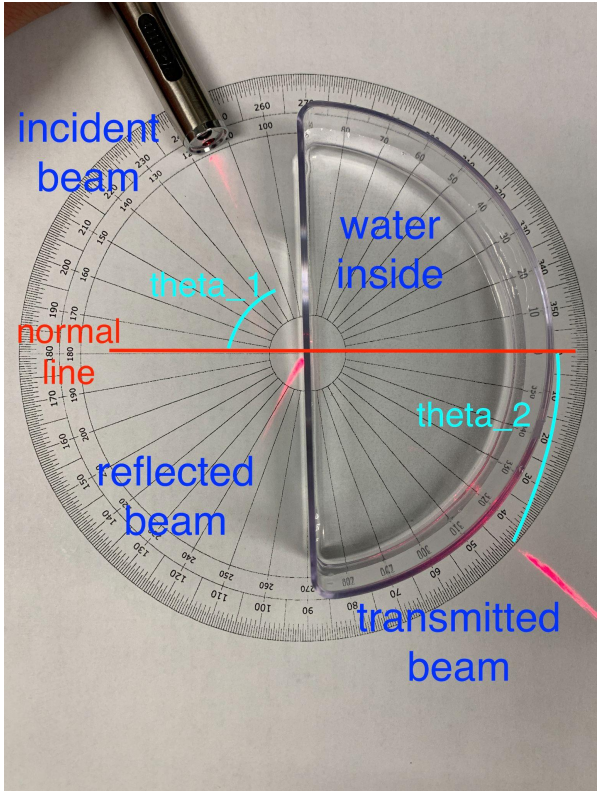


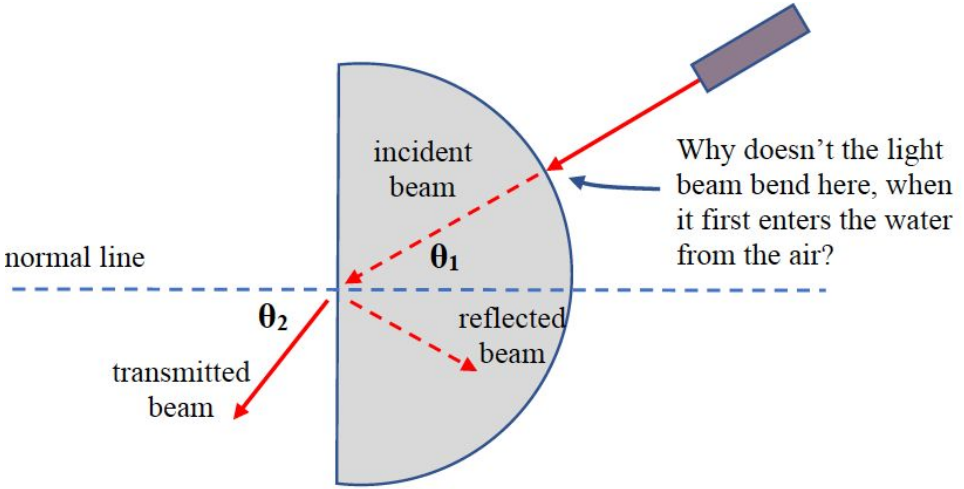
Task A - Part A, B and C in the Manual

- **Data Analysis:**
- Plot $\theta_2 - \theta_1$, use θ_1 as x—axis value and θ_2 as y—axis value
- Calculate $\sin\theta_1$ and $\sin\theta_2$, and use your Excel to plot $\sin\theta_2 - \sin\theta_1$, use $\sin\theta_1$ as x—axis value and $\sin\theta_2$ as y—axis value and **calculate the slope of the line with your Excel**. The slope is n_1/n_2



Task A - Part D and E in the Manual

- **Totally reflection:** Measure the angle of totally reflection
  - Set up the lab as shown
  - Measure the minimum θ_1 that make you cannot see the transmitted beam
  - Don't forget to answer questions in the manual



Set up in this way

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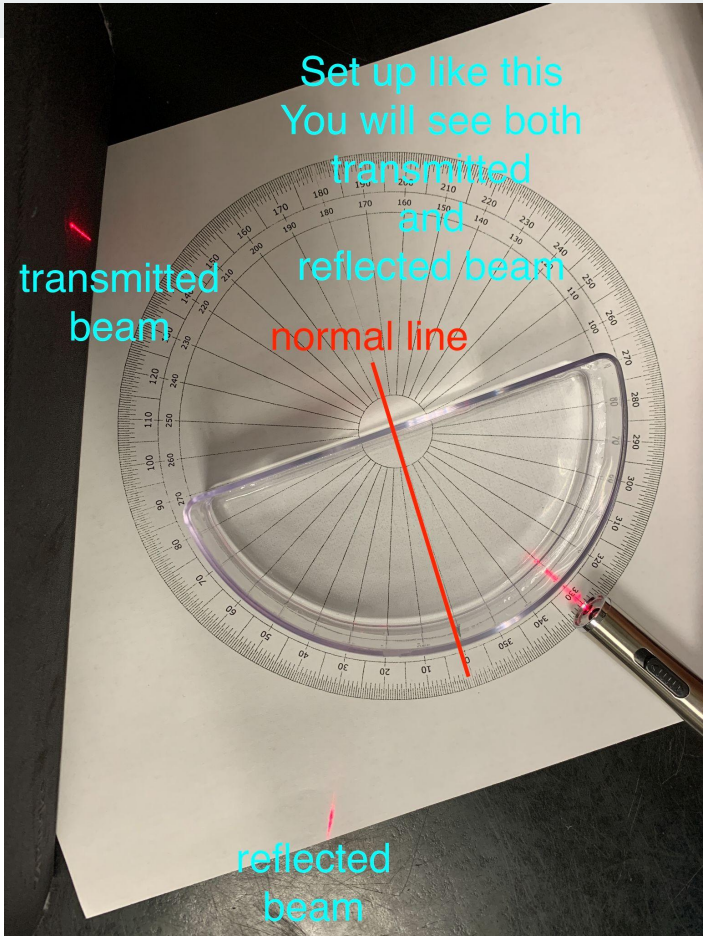

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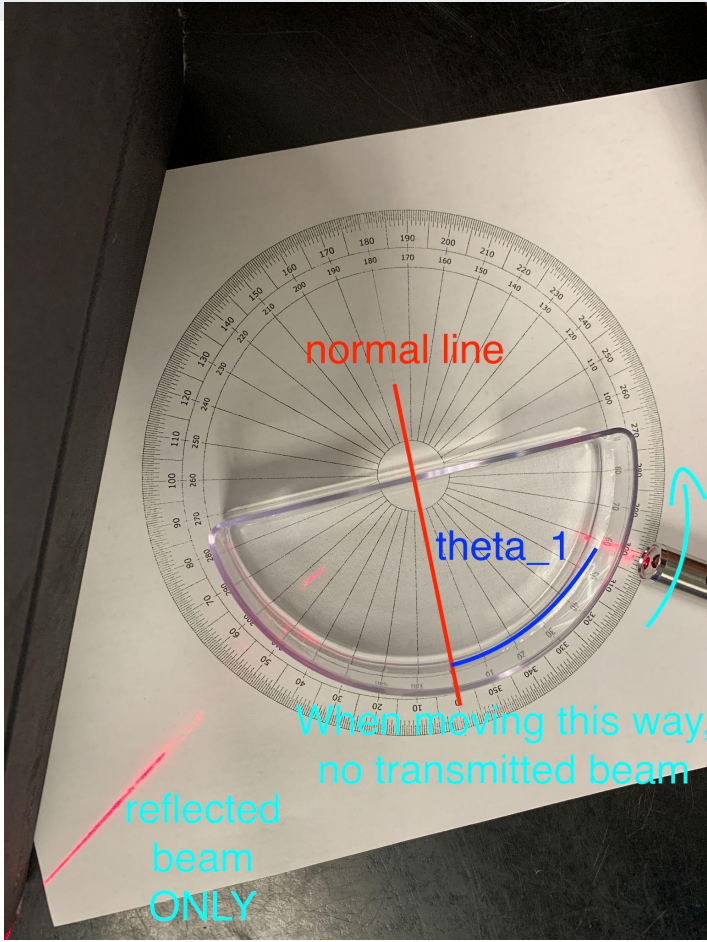

Task A - Part F in the Manual

- **Multiple internal reflection:**
  - Move the incident beam as shown, and find out the position that make the beam exits at the other end of flat surface
  - Make sure the incident beam is perpendicular to the face of the refraction cup