

Name:

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Physics 9B Lab Report #7

I. Critiquing the Simulator

1. Assuming the simulator is functioning in three dimensions, determine which of the following five gases are being represented by the light and the heavy particles:

H_2 , He, N_2 , O_2 , Ne

2. Discuss what happens when the change is made from the particles not colliding to colliding.

- a. How does this change affect the distribution of the speeds of the particles?

- b. How does the change to allowing collisions affect the average and rms speeds of the particles?

c. Does turning off collisions return the gas to its previous state? Why or why not?

d. Which of the three states (before turning on collisions / having collisions turned on / after turning collisions off) most closely represents what we have been using as a model for an ideal gas? Explain.

3. Explain how the two-dimensional model differs from the three-dimensional model when it comes to identifying the particles.

4. More simulator testing...

a. When the collisions are turned off, what happens to the modified van der Waals equations?

b. Does the simulator reflect the change in the relationship that we would expect to occur when the collisions are turned off? If not, what happens?

- c. Can the constant β in the modified van der Waals equation possibly just be negligible? Explain.

II. Ideal Gases

5. Using different values for P , N , T , and x for two different states, determine whether the simulator confirms the ideal gas law within the uncertainty.

6. Compute the value of the cross-sectional area of the chamber.