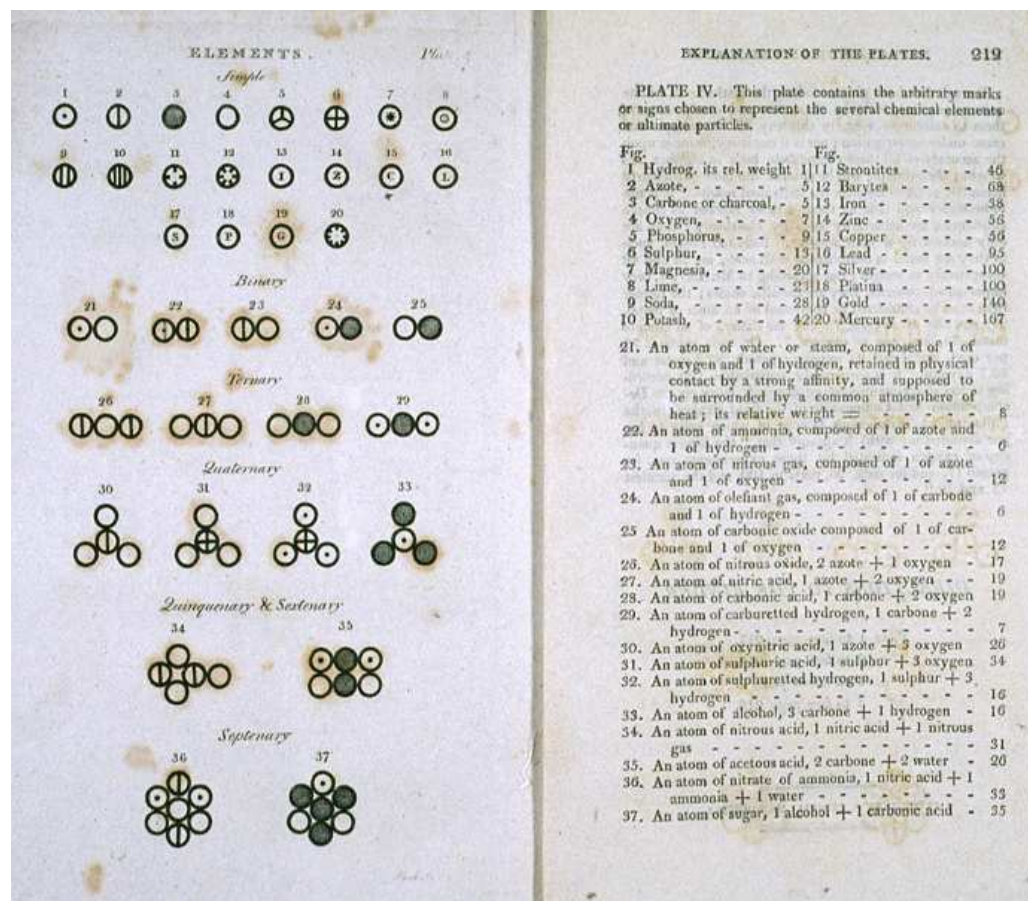
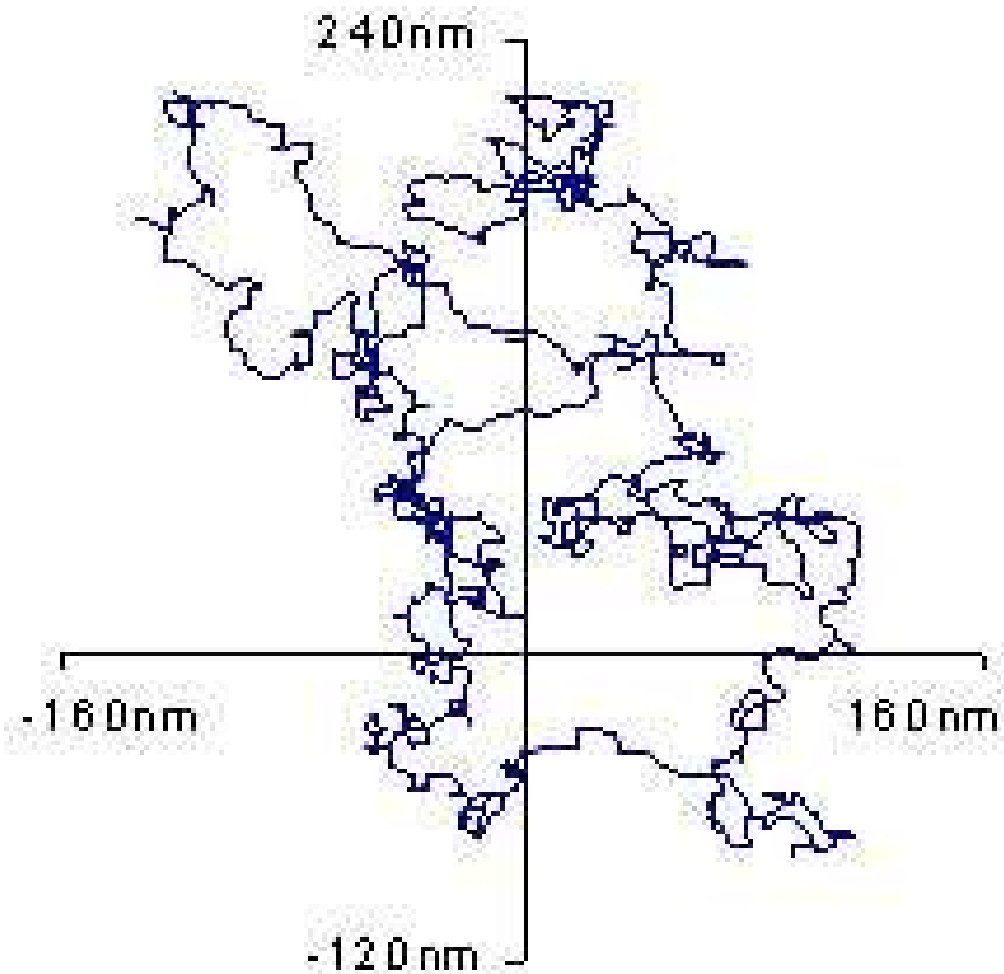


Dalton's Atomic Theory

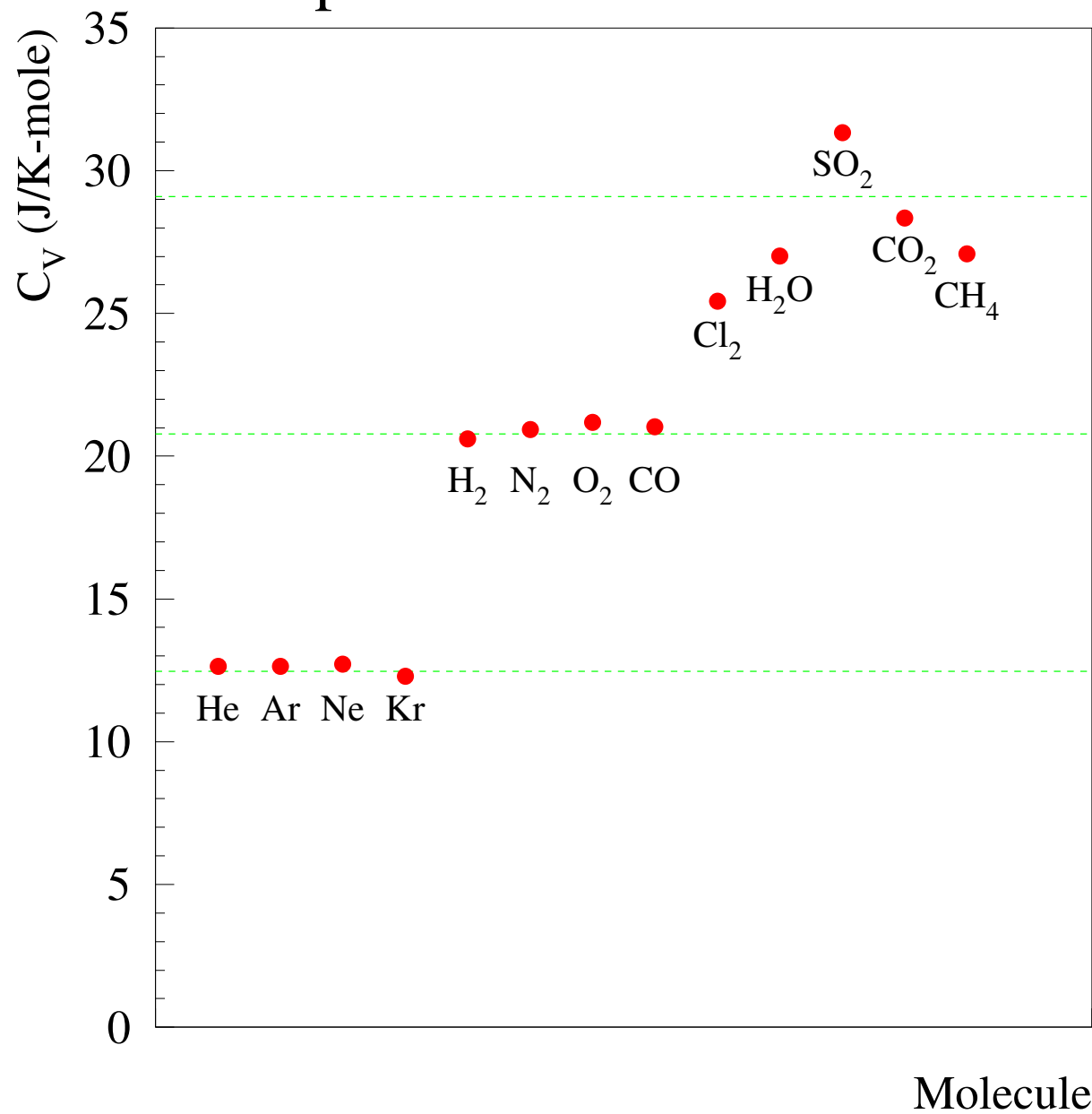
1. All matter consists of tiny particles.
2. Atoms are indestructible and unchangeable.
3. Elements are characterized by the mass of their atoms.
4. When elements react, their atoms combine in simple, whole-number ratios.



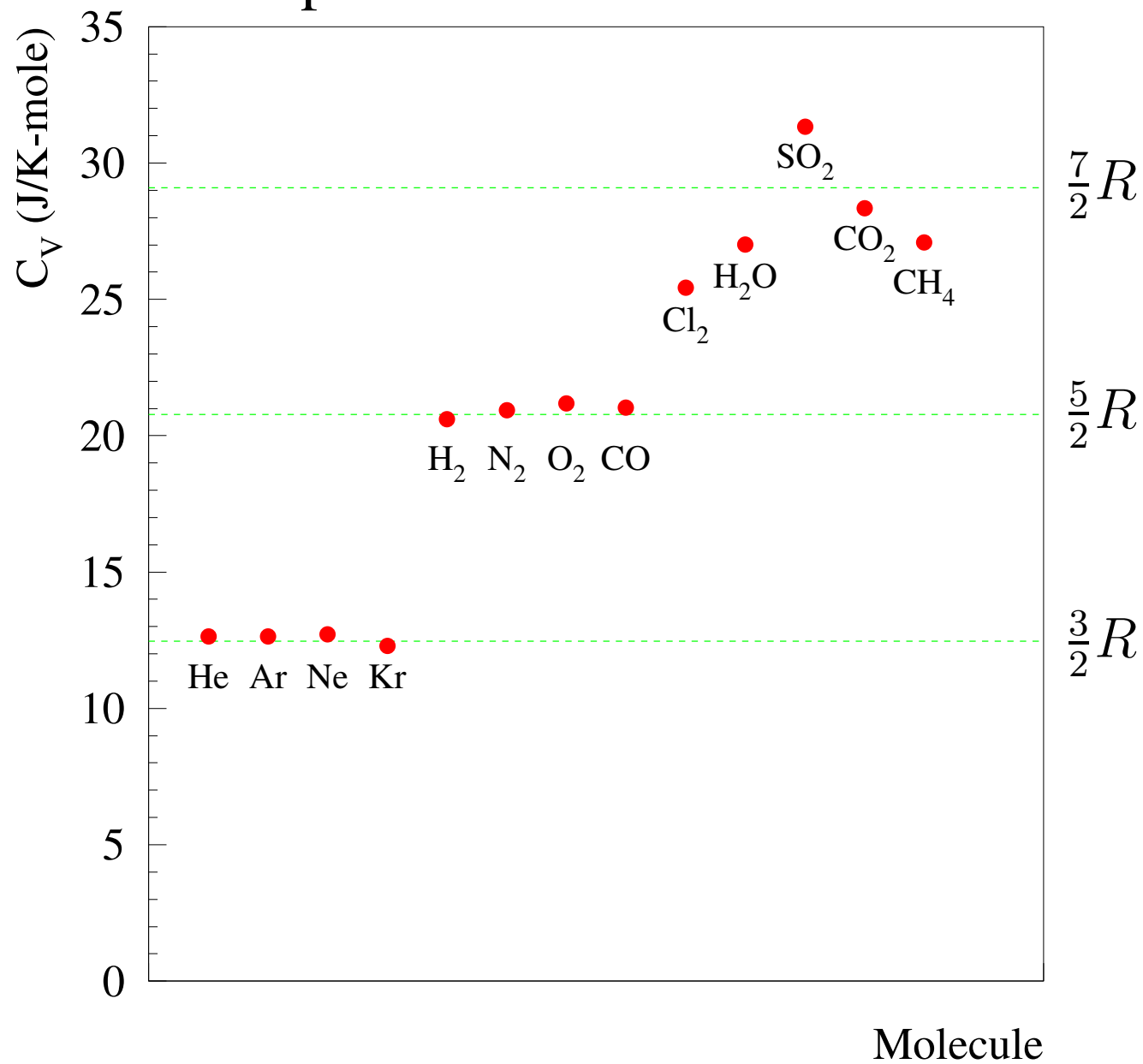
Trajectory of Brownian Motion



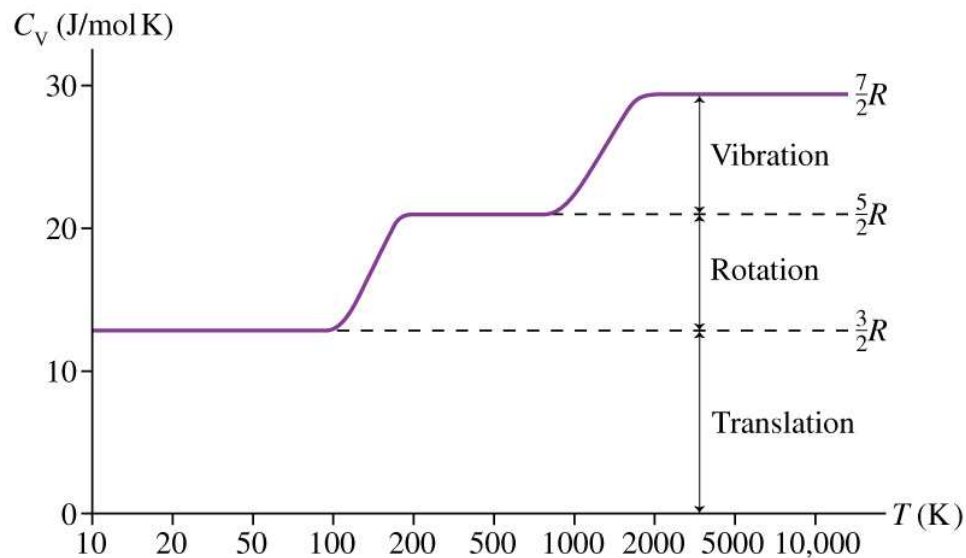
Specific Heats of Gases



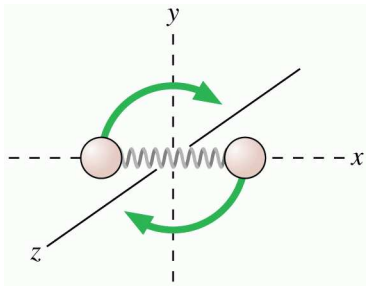
Specific Heats of Gases



Specific Heats of Gases

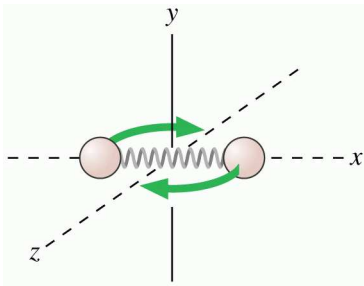


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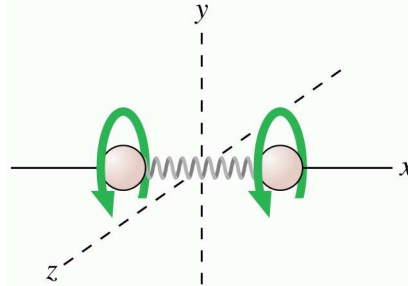
Rotation end-over-end about the z -axis

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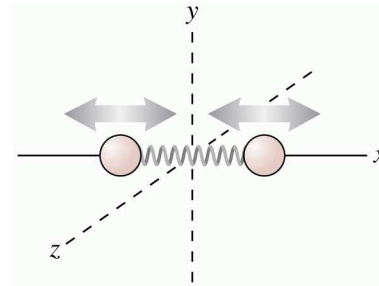
Rotation end-over-end about the y -axis

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Rotation about its own axis

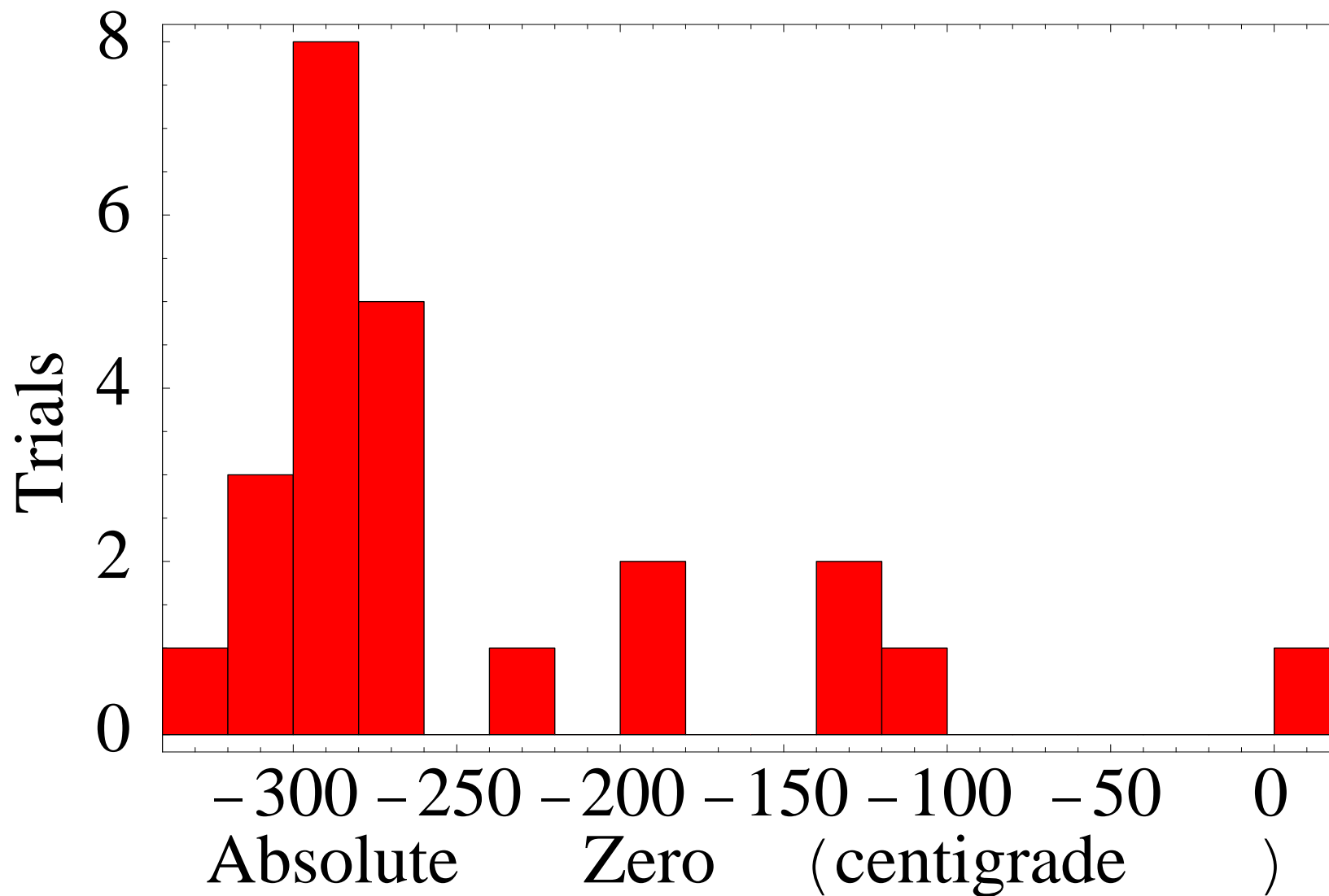
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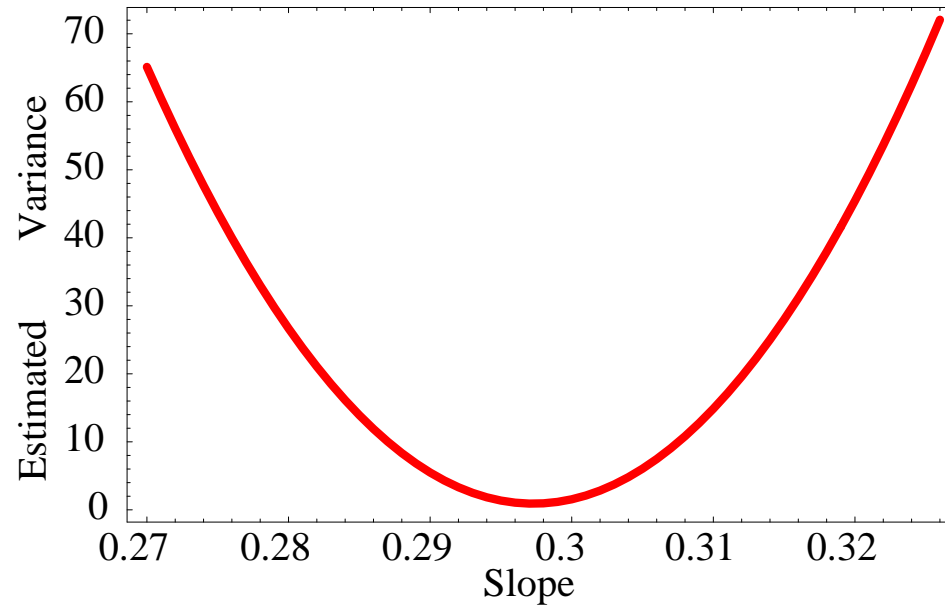
Vibration back and forth along the x -axis

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Extrapolating to Absolute Zero



Fitting the Data



In the plot above the value of the y-intercept is kept at its best fit value and the slope is varied. The estimated variance is the following.

$$\sigma^2 = \frac{\sum_{i=1}^N (y_i - (mx_i + b))^2}{N - d.o.f} \quad (1)$$

where N is the number of data points and $d.o.f$ is the number of degrees of freedom (*i.e.* free parameters) in the fit.