

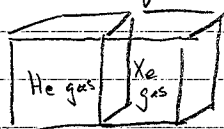
1.1 Thermal Equilibrium

Temperature: simple if you don't think about it but completely non intuitive

Temperature measured by thermometer $\rightarrow$ properties of materials depend on temp. $\rightarrow$ put a scale on the change

Examples: pressure of gas at fixed volume, volume of material at fixed pressure, color of light (think stars), voltage difference across material with Temp diff, ...

When 2 ^{inert} objects are in thermal contact, object at higher T loses energy to object at lower T. True, independent of properties of material!!!!



Xe mass $\gg$ He mass
 speed Xe $\approx$ speed He ???
 momentum Xe $\approx$ momentum He ???
 KE Xe $\approx$ KE He ???

What is meant by saying temp of two objects are the same?

Thermal equilibrium (same T!) between two objects when they are thermal contact for a time $\gg$ relaxation time.

Prob 1.5 When you take your temperature with thermometer, approximately what is the relaxation time?

Celsius	0°C	Freezing	100°C	Boiling	(water)
Kelvin	$T_K = T_C + 273^\circ\text{C}$		$T_K > 0$		(<u>absolute 0</u>)

Prob 1.3 Temperature in K of

a) Human body temp	36 °C	310 K
b) Boiling water	100 °C	373 K
c) coldest day in Al	-10 °C	263 K