

# Overview

## 1 Thermodynamics Categories

Compare classical TD, statistical TD and kinetics of gases.

<i>Classical Thermodynamics</i>	<i>Statistical Thermodynamics</i>	<i>Kinetics of Gases</i>
Deals with bulk matter without regards for molecules	Treat matter as a collection of molecules	Treat matter as a collection of moving molecules
Based on empirical laws	Uses a statistical approach	
Determines relations between TD quantities	Provides framework to interpret EM radiation	
Problematic at high temperatures		
Time independent/Equilibrium only	Time independent/Equilibrium only	Deals with rate processes (time is a variable)

Figure 1: Comparison

Some remarks:

1. **Thermodynamics** is the interaction about energy and matter, and the radiation is about the pure energy, no matter.
2. **Statistics Thermodynamics** is in microscopic view, focuses on calculating properties of matter.
3. **Kinetics** is not in equilibrium.

## 2 Zeroth Law

Bodies are in thermal equilibrium with each other only when they have the same degree of hotness. Therefore, there must be a TD property that is a measure of **hotness**, we call it **temperature**. Under this definition, **temperature is a property of matter and can only be defined when a body is in equilibrium**.

If bodies A and B are in thermal equilibrium with a third body C, then A and B are in thermal equilibrium with each other.