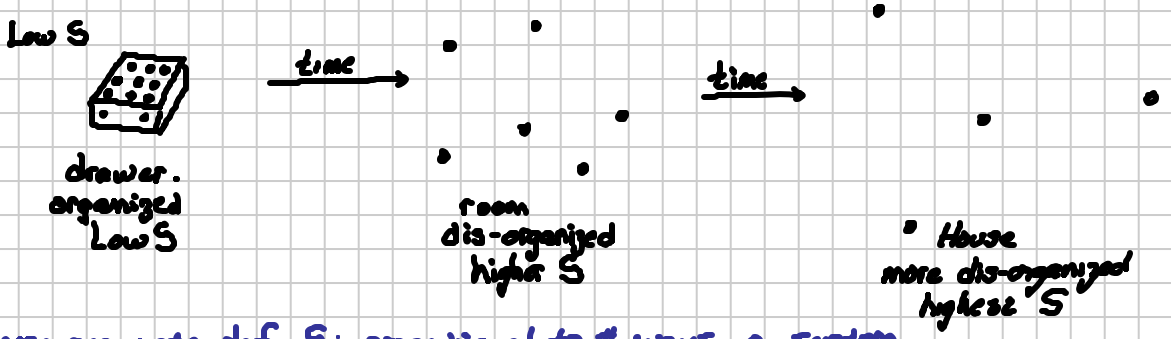
Lecture 17 3 Entropy S

Note Title

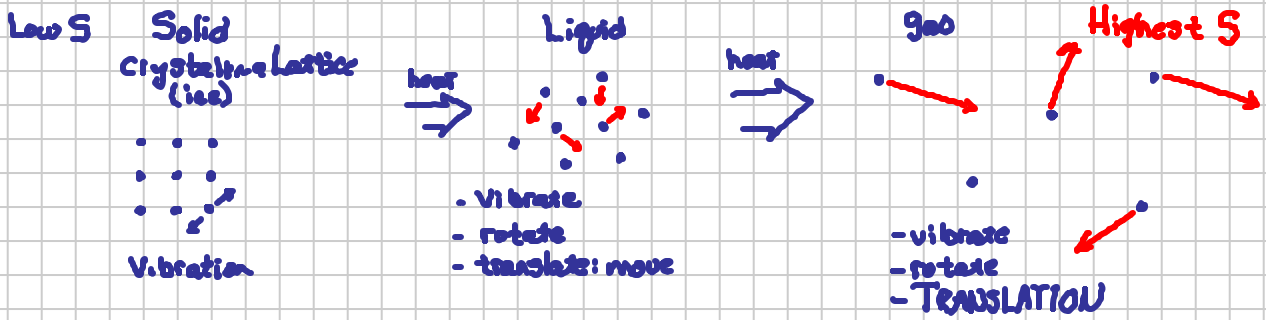
Entropy . . related to randomness and disorganization

S

High entropy situations are highly randomized

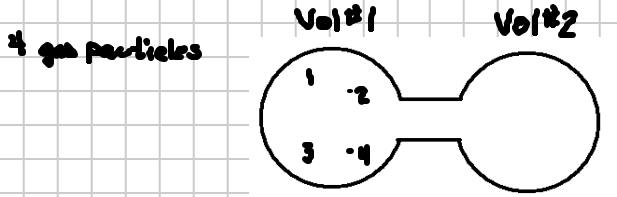


A more accurate def. S: proportional to # ways a system can accommodate its energy.



Entropy: $S = k \ln W$ ← # of microstates
microstate. equiv. rearrangement of atoms & molecules.

↑ Boltzman Constant: 1.38×10^{-23} J/K
units S



Macrostates

#1	#2	#3	#4	#5
V_1 V_2	V_1 V_2	V_1 V_2	V_1 V_2	V_1 V_2
::	:.	:.	:	::
Micro states: 1,2,3,4	• 1,2,3 4	• 1,2 3,4		
	• 1,2,4 3	• 1,3 2,4		
	• 1,3,4 2	• 1,4 2,3		
	• 2,3,4 1	• 2,3 1,4		
		• 2,4 1,3		
		• 3,4 1,2		
		greatest S		
W = 1	W = 4	W = 6	W = 4	W = 1
$S = 0$ J/K	$S = k \ln 4$	$S = k \ln 6$		
	$S = 1.91 \times 10^{-23}$ J/K	$S = 2.47 \times 10^{-23}$ J/K	$S = 1.91 \times 10^{-23}$ J/K	$S = 0$ J/K

$S = k \ln W$