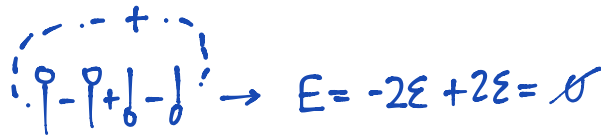# WHERE DOES _ORDER_ COME FROM? WHAT DOES KT MEASURE?

CHARGE

HPHOBE

POLAR

HPHOBIC

$\longleftrightarrow$ $-\varepsilon$ (FAVORABLE) $+\varepsilon$ (UNFAVORABLE)

$E = -4\varepsilon$

$\left(\stackrel{\cdot \ - \ + \ \cdot}{?-?+?-?} \right) \rightarrow E = -2\varepsilon + 2\varepsilon = \cancel{0}$
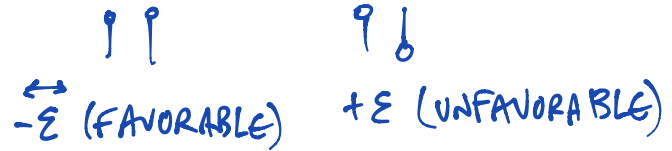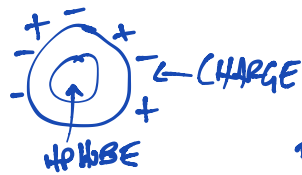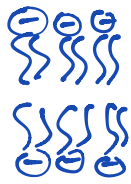
⇒ HOW DOES THIS EQUILBRATE?

✓ "DOWNHILL"   P FLIP $= e^{-\Delta E / RT}$

↑↓↓↑↑ ⇒ ↑↑↑↓↓↑ ⇒ ↑↑↑↑↓↓ → ↑↑↑↑↑↑ ← ORDERED PATHWAY!

WHAT HAPPENS WHEN I START SIM?
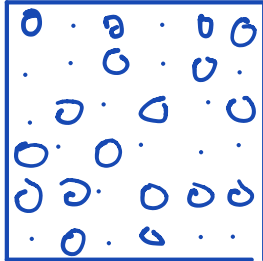
WHERE DO ORDERED DOMAINS COME FROM?
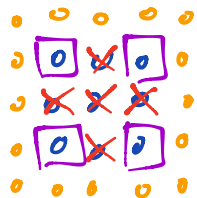
X UNFAVORABLE TO FLIP

☐ CAN FLIP BACK AND FORTH

WHAT HAPPENS IF YOU INCREASE TEMP?

ORDER MELTS AWAY.

WHAT HAPPENS IF YOU DECREASE TEMP?

FINER SCALE ORDER EMERGES.

TAKE AWAYS:

1. AMPHIPATHY
2. WEAK (TUNED) INTERACTIONS $\Big]\Rightarrow$ CONTROLLED ORDER!

ENTROPY FAVORS MIXING UP. ENTHALPY FAVORS ALIGNMENT.

$\uparrow\uparrow\uparrow\uparrow$ -4ε

$\left.\begin{array}{l}\downarrow\uparrow\uparrow\uparrow \\ \uparrow\downarrow\uparrow\uparrow \\ \uparrow\uparrow\downarrow\uparrow \\ \uparrow\uparrow\uparrow\downarrow\end{array}\right]$ $\emptyset$

$\left.\begin{array}{l}\uparrow\uparrow\downarrow\downarrow \\ \uparrow\downarrow\uparrow\downarrow \\ \uparrow\downarrow\downarrow\uparrow \\ \downarrow\uparrow\uparrow\downarrow \\ \downarrow\uparrow\downarrow\uparrow \\ \downarrow\downarrow\uparrow\uparrow\end{array}\right]$ $\emptyset$

$\left.\begin{array}{l}\uparrow\downarrow\downarrow\downarrow \\ \downarrow\uparrow\downarrow\downarrow \\ \downarrow\downarrow\uparrow\downarrow \\ \downarrow\downarrow\downarrow\uparrow\end{array}\right]$ $\emptyset$

$\downarrow\downarrow\downarrow\downarrow\ ]-4\varepsilon$

$2\ [-3\varepsilon]$ AND $14\ [-\varepsilon]$

$\Delta G_{ALIGN} = -4 - RT\ln\left(\dfrac{2}{14}\right)$

$\qquad = -4 + 2RT$

MAYBE DISCUSS