Stat Phys 416

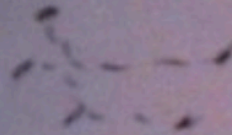
Stat Phys. Landau & Lifshitz
Exam & Final
Distribute Notes
Problems: due 1 week after section finished

Introduction 1

Newton: $F_i = m a_i$ $i = 1 \ldots s$

$s = 3N$

$q_i = \dot{q}_i$

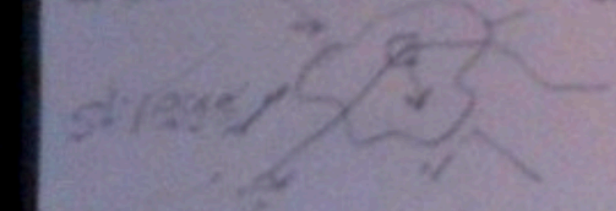


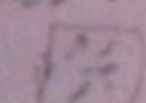
$q_i = q_i(t)$; $p_i = p_i(t)$ (particles)

Schrodinger & Heisenberg

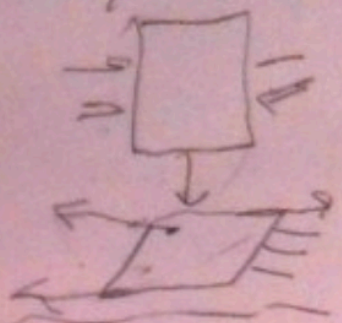
$\psi(q_1 \ldots q_s)$; $\Delta q_i \Delta p_i \geq \hbar$

Continuum Mechanics
water, gas, solids (rigid)
deform
stress





fluids $\rho(\vec{r})$, $\vec{v}$ Hydrodynamics (1)
solids $\vec{r}$



Thermodynamics
ρ, V, P, T, E, S
equilibrium

Stat. Phys Macroscopic matter from particle perspective
$\rho(q_1 \ldots q_s; p_1 \ldots p_s = \Pi_i)$

Molecular Dynamics (MD)

N part
forces given
m, $V_i(0)$, $\vec{r}_i$

$\vec{r}_i(t)$; $\vec{v}(t)$ $N = 10^7$

V P $\frac{1}{2} m \langle v \rangle^2 \leftrightarrow T$