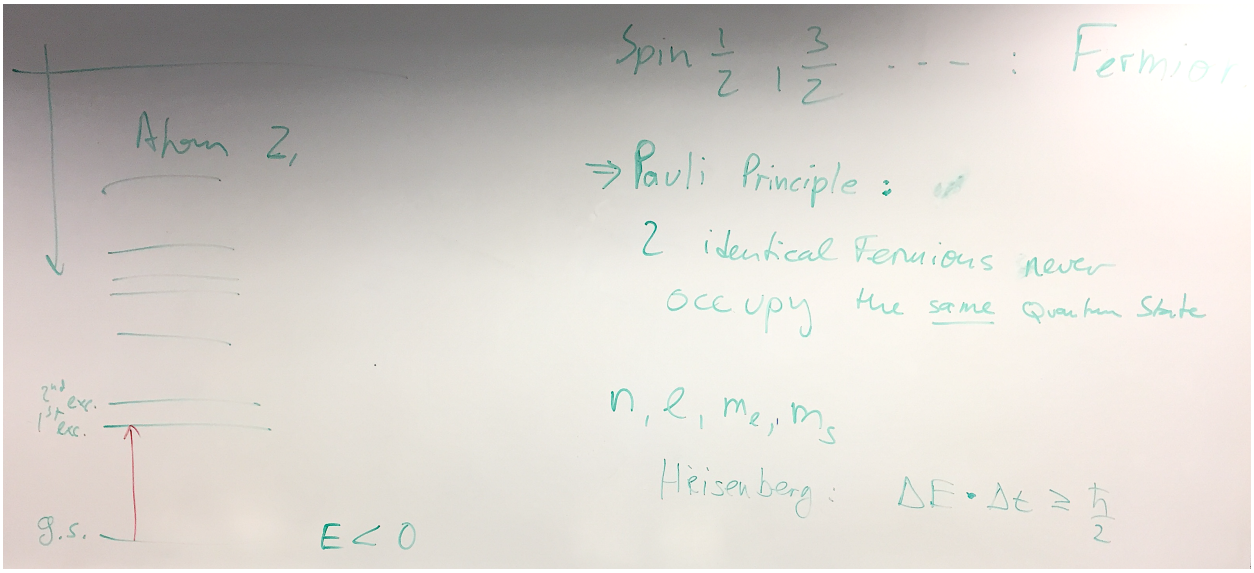
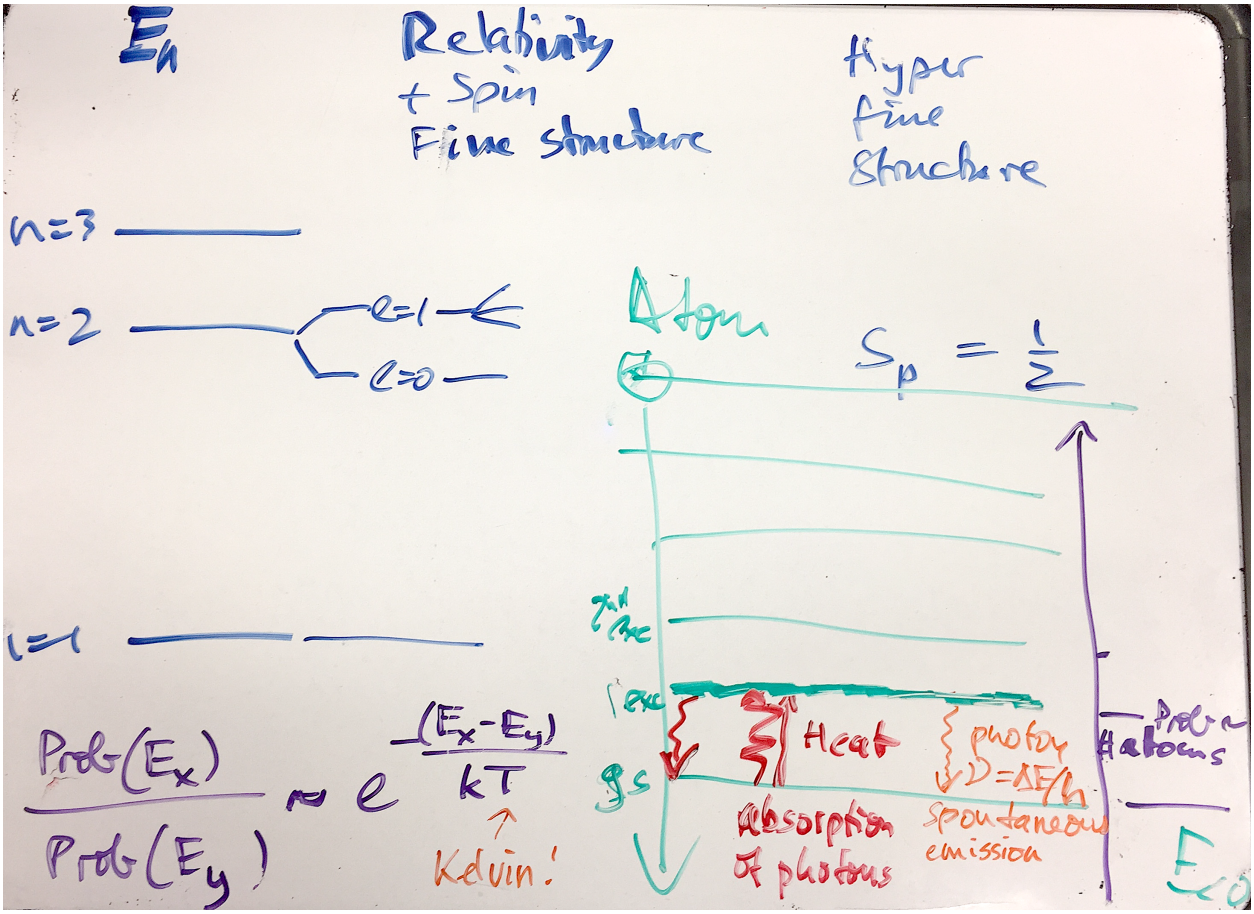
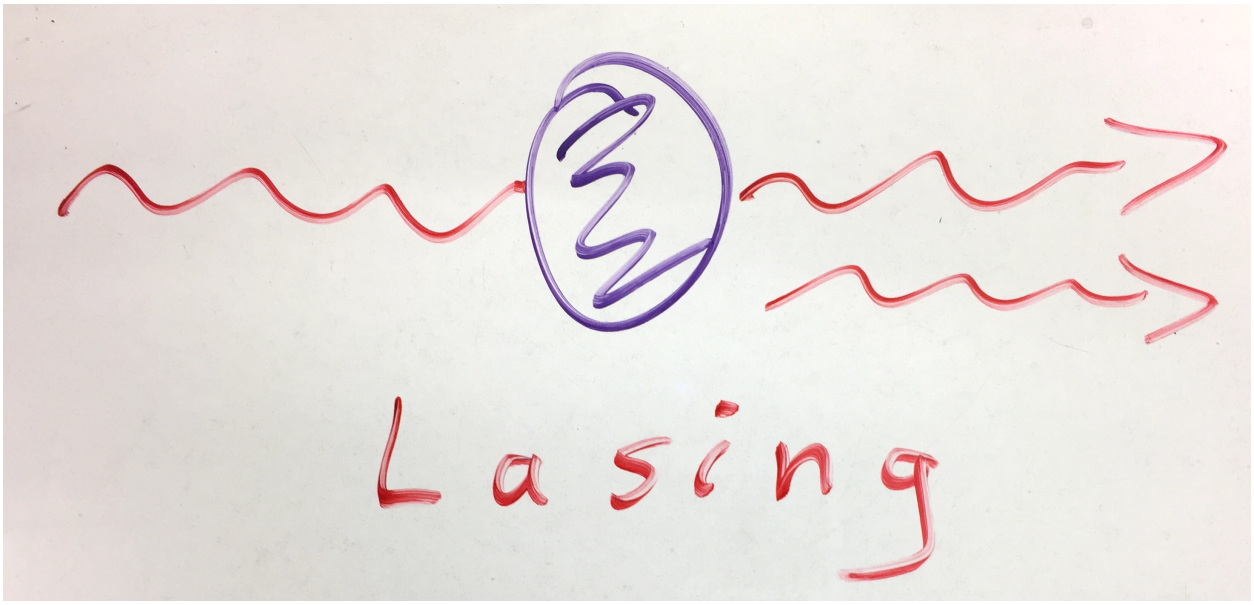
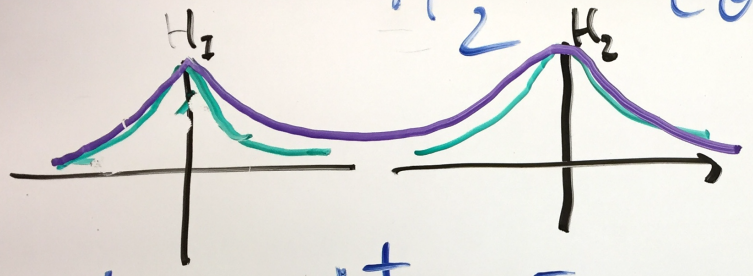

Atom Z
2nd exc.
1st exc.
g.s.
E < 0
Spin 1/2, 3/2 ... : Fermion
⇒ Pauli Principle :
2 identical Fermions never occupy the same Quantum State
n, ℓ, m_ℓ, m_s
Heisenberg : ΔE · Δt ≥ ħ/2


E_n
Relativity + Spin Fine structure
Hyper fine Structure
n=3
n=2
ℓ=1
ℓ=0
ℓ=1
Atom
S_p = 1/2
2nd exc
1st exc
g.s
Heat
photon
Absorption of photons
spontaneous emission
Prob(E_x) / Prob(E_y) ≈ e^(-(E_x - E_y)/kT)
Kelvin!
E < 0



$H + H \rightarrow H_2$ Covalent



H_2^+

Salt $Na^+ Cl^-$ ionic bound