

**Spektroskopi och materiens kvantmekaniska beskrivning,
FYST20, vårterminen 2012**

Questions for your discussion

Spectroscopy on atoms and selection rules

1- Theoretical description

What is a basis for the shell model?

What is the central field approximation?

What are the electron-electron interactions?

How the Pauli principle can effect the interactions?

What do configuration interaction (CI) means? What is the difference between ISCI and FSCI?

What does a phase mean in equation 2.32? Can you explain the other physical meaning of this equation?

An experiment measures cross-sections according to the Fermi's golden rule. How the CI can affect the measurement?

2- Experimental part

What is the difference between total cross section and partial cross section?

Why the absorption cross-section can differ from the ionization cross section?

What is a main-line (photo-line)? What is a satellite?

Can you explain a shake-up? What is the difference with a shake-off?

In Figure 3.15, why do you need to introduce ISCI to describe the experimental observation?

What is a shape resonance? What is the important term of equation 2.32 to describe this phenomenon? Do you know another phenomenon that depends on this term?