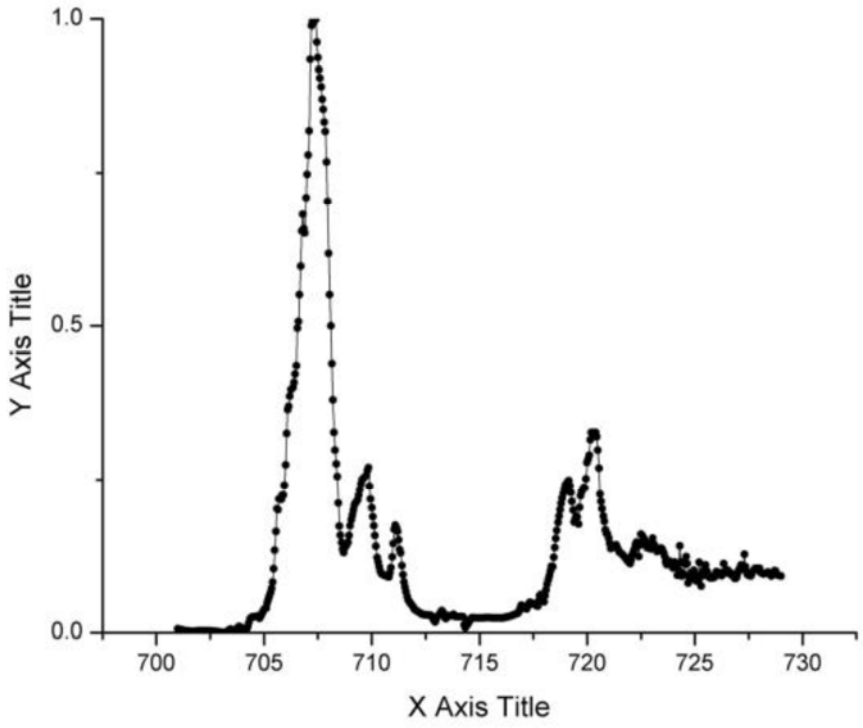
Atomic multiplet spectrum of Fe2+



a) Calculate the atomic multiplet spectrum of Fe2+, The experimental spectrum of an iron atom is given in the file fe2at.DAT.
b) Set the 3d spin-orbit coupling to zero and compare again with the experimental spectrum. What is the conclusion?
c) For zero spin orbit coupling, what is the term symbol of the ground state? Look at the energy levels. Count all states with an energy within 0.3 eV from the lowest energy.
d) With spin orbit coupling, what is the term symbol of the ground state? Look at the energy levels. Count all states with an energy within 0.3 eV from the lowest energy.
e) What is the effect of the 3d spin-orbit coupling?
f) Calculate the spectrum with spin-orbit coupling and with a temperature of 3000 K and compare with experiment. (The experiment has been performed at 1700 K). Try also 1700 K. If the 3000 K spectrum appears better than the 1700 K spectrum, what could be the reason?