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UNIVERSITÄT LEIPZIG

Experimental Physics IV IPSP

Problem Set 8

Deadline: Thursday, 06.06.2012, before the seminar

Problem 25: 4 points

How much more probable are Balmer lines compared to Paschen lines in the hydrogen spectrum of the sun (T=6000K)?

Problem 26: 5 points

An electron and a positron are circulating around their center of mass. Calculate their mean distance in the ground state using the postulates of Bohr. What is the ionization energy of this system?

Hint: Look up the mass of the electron and all necessary constants to calculate exact values.

Problem 27: 5 points

An atom emitts a photon of the wavelength 550nm- The emission time is 10ns. How high is the accuracy one can measure the direction of motion of the photon? How high is the uncertainty of the wavelength?

Hint: $\Delta E \, \Delta t \geq \hbar$