Theoretical Determination of the potassium far-wing photoabsorption spectra

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Résumé

In this work, we have studied quantum mechanically the effect of the interatomic interactions on the resonance line 4p←4s of the photoabsorption spectra of a gas made of potassium atoms K. This phenomenon shows the appearance of a satellite structure in the wings of the spectra. The simulation of the reduced absorption coefficient leads to the existence of four satellites. The first two satellites appear in the red wing near the wavelengths 1048 and 1100nm . The two others belong to the blue wing and are situated respectively close to the wavelengths 721 and 731nm . These results agree very well with those obtained experimentally or by other theoretical studies. We have also studied the effect of temperature, in the interval 850-3000K , on the photoabsorption spectra. The calculations show that the influence of temperature on the intensity of the satellites is important for transitions between singlet states but very weak for those among the triplet states. However, the positions of satellites remain unchanged.

Mots-Clés: Potential, energy curve, Radiative lifetime, Photoabsorption, Absorption coefficient

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