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Regularities in the stark parameters of spectral lines of neutral magnesium

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Abstract

Regularities in the Stark parameters of spectral lines of magnesium atoms are discovered. Based on proposed dependencies the Stark line widths and shifts of a series of spectral lines of magnesium atoms are calculated and literature experimental data are analysed. © 1999 Elsevier Science Ltd. All rights reserved.

1. Introduction

In a series of experimental [1–3] and theoretical [4–12] papers the Stark parameters of spectral lines of neutral magnesium where parameters are of great interest for diagnostics of laboratory and especially astrophysical plasmas. Moreover, recently solar infrared spectra of MgI [13, 14] were obtained and to interpret these spectra one should take into account the contribution of Stark broadening because its influence increases as principal quantum numbers of levels increase. However, experimental data for some levels obtained in different papers differ dramatically from one another and from theoretical calculations.

One of the ways to estimate the reliability of experimental data and theoretical calculations is determination of regularities in the behaviour of the Stark parameters of spectral lines. A series of simple regularities to be used with the goal above and to estimate parameters of unstudied lines are proposed in the literature [15–23].

In this paper, the regularities allowing us to calculate the widths and shifts of a number of the magnesium lines and to critically analyze the literature data are obtained. These dependencies enable one to estimate the Stark parameters of non-studied magnesium lines, in particular, we have

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