PERGAMON

Regularities in the Stark widths of spectral lines of ns–$n'p$ and np–$n's$ transitions for a series of neutral atoms

E.V. Sarandaev, O.A. Konovalova, M.Kh. Salakhov*

Physics Department, Kazan State University, Kremlevskaya str. 16, 420008 Kazan, Russia

Received 10 August 1999

Abstract

Dependencies enabling one to estimate the Stark widths of spectral lines due to s–p and p–s transitions of neutral atoms with an accuracy of about 30% are proposed. A simple parameter being a criterion of applicability of these dependencies is introduced. It is shown that these dependencies can be used to calculate the line widths of some heavy elements. © 2000 Elsevier Science Ltd. All rights reserved.

1. Introduction

At present there is a vast amount of literature data on the Stark widths and shifts of spectral lines of neutral atoms and ions of different multiplicity of ionization [1–7] which should be generalized and critically analyzed. It is highly desirable to determine tendencies and regularities in their distribution. In Refs. [8–12], e.g., simple relations enabling one to estimate the widths and shifts of lines of definite serial transitions based on the known ionization potential of the upper levels of the corresponding lines are proposed. The aim of this work is to further develop regularities in the behavior of Stark parameters of spectral lines found in Refs. [13–16].

2. Dependencies for the line widths

In Refs. [13–16] dependencies enabling one to estimate Stark parameters of lines within one atom (ion) were obtained. In this paper, the possibility of using analogous dependencies to estimate the line widths of lines within serial atoms is considered.

---

* Corresponding author. Tel./fax: 00-8432-362-597.
E-mail addresses: olga.konovalova@ksu.ru (O.A. Konovalova), msalakh@tatincom.ru (M.Kh. Salakhov).