Abstract of Invited lecture

QUASIMOLECULAR BANDS IN OPTICAL SPECTRA OF WEAKLY IONIZED PLASMAS

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Even though the ion-atom radiative charge exchange and photoassociative processes has known for a long time, their investigation, as a sources of continuous electromagnetic spectra of low temperature plasmas, has been begun recently The aim of this work is that underlines necessity of taking into account above mentioned radiative processes during the analysis of molecular bands or atomic spectral lines.

The significant progress in this area has been reached by very detailed investigations of the influence of the slow symmetrical radiative collisions

$$A^+ + A \leftrightarrow \hbar\omega + A + A^+ , \tag{1.a}$$

$$A^+ + A \leftrightarrow \hbar\omega + A_2^+ , \tag{1.b}$$

at the radiative characteristics of weakly ionized plasmas. Their importance were shown convincingly in the cases $A=H$, *He, Li* and *Na* for different types of both astrophysical and laboratorical plasmas, which could be treated as a chemically homogenous plasmas (Mihajlov et al 1993, Mihajlov et al 1994, Ermolaev et al 1995). However, in the chemically inhomogenous, weakly ionized plasmas, we have to take into account the non-symmetrical ion-atom processes. The following processes will be considered:

$$A^+ + B \leftrightarrow \hbar\omega + A + B^+ , \tag{2.a}$$

$$A^+ + B \leftrightarrow \hbar\omega + AB^+ , \tag{2.b}$$

$$(AB^+)^* \leftrightarrow \hbar\omega + A + B^+ . \tag{2.c}$$

In dependence on varying of ionization potentials I_A and I_B, the character of the considered ion-atom systems changes in the wide borders: from the almost symmetrical systems, which are composed of the atom and ion of different isotopes of the same element, to the quite non-symmetrical systems. Accordingly to that, the features of ion-atom systems are change very strong, as well as the spectra of photons emmited/absorbed in the course of reactions (2). Because of that, in the frame of this work we shall consider two characteristical cases:

* the collisional system is weakly non-symmetrical; representative for this case will be the system with $A=Li$ and $B=Na$,
* the collisional system is extremely non-symmetrical; representative for this case will be the system with $A=H$ and $B=Li$.

References

Ermolaev A.M., Mihajlov A.A., Ignjatović Lj.M. and Dimitrijević M.S.: 1995, *J. Phys. D: Appl. Phys.*, **28**, 1047

Mihajlov A.A., Dimitrijević M.S. and Ignjatović Lj.M.:1993, *Astronomy and Astrophys.*, **276**, 187

Mihajlov A.A., Dimitrijević M.S. and Ignjatović Lj.M.:1994, *Astronomy and Astrophys.*, **287**, 1026