Poster paper

ON THE ANOMALOUS LOW SPONTANEOUS EMISSION RATES FOR p-SERIES OF SODIUM DUE TO THE EFFECT OF NATURAL FÖRSTER RESONANCE

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In our work (Arefieff *et al.* 2015) we paid attention to a strong blockade of dipole matrix elements for l'- and l-series in the vicinity of Föster resonance. The latter occurs when the diference $\Delta\delta=\delta_{l'}-\delta_l$ between the series quantum defects becomes equal to 0.5. Table 1 demonstrates that the case of s-, p-series for Na atom practically meats this requirement. Radiative rate constants $A_{nl}=1/\tau_{nl}$ of Rydberg states spontaneous decay were shown in (Bezuglov *et al.* 1991) to obey the power law $A_{nl}=\alpha \cdot C_l \, n^{*-3}/(l+0.5)$ regarding to the effective quantum number $n^*=n-\delta_l$. The constant $\alpha=1.18\cdot10^{10}s^{-1}$ while C_p-coefficients are presented in Table 2 that demonstrates the anomalous law value (in bold) for Na case.

Table 1 Quantum defect δ_l for s-, p-series of the alkali and hydrogen atoms

l	Li	Na	K	Rb	Cs	H
s	0.40	1.35	2.19	3.13	4.06	0
p	0.04	0.85	1.71	2.66	3.59	0

Table 2 C_l-coefficient for s-, p-series of the alkali and hydrogen atoms

l	Li	Na	K	Rb	Cs	H
s	0.025	0.015	0.017	0.017	0.018	0.013
p	0.069	**0.014**	0.051	0.075	0.061	1.00

References

Arefieff, K. N., Bezuglov, N. N., *et al*: 2015, *J. Astrophys. Astr.,* **36**, 613.
Bezuglov, N. N., Borisov, E. N., *et al.*: 1991, *Sov. Phys. Usp ,* **34**, 3.