



## **STRENGTHENING ATMOSPHERIC EMISSIONS IN THE COLLISION OF COMET SHOEMAKER-LEVY 9 WITH THE PLANET JUPITER**

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**Abstract:** *The phenomena of increasing intensity of atomic oxygen lines  $\lambda=5577\text{\AA}$  and  $\lambda=6300\text{\AA}$  during collision of Shoemaker-Levy 9 comet with the Jupiter are considered. The corresponding physical mechanisms of generation of those glow are presented.*

**Key words:** *emission, background, quench, broadband.*

The results of the additional emission of atmospheric emissions of the Earth is caused by the collision of comet Shoemaker-Levy 9 with the planet Jupiter. The basic mechanisms of generating glow green and red lines of atmospheric oxygen are established and explained by the origin with aeronomical processes.

On the 16 of June 1994, 24.00 LT for the time in the history of mankind has been registered predicted collision of two celestial bodies: up to twenty fragments of Comet Shoemaker-Levy at  $\sim 65\text{km/s}$  entered the atmosphere of the planet Jupiter and caused large-scale perturbations [1]. Study of this phenomenon was realized in many observatories and spacecrafts, which resulted in the obtained important experimental observational material. The measurements were carried out in a wide range of the electromagnetic spectrum in the problem research laboratory of space physics Kutaisi State University and the results were published in [2, 3]. According to these studies, nearly two hours after the collision, in the Hz range of geomagnetic pulsations considerable variation were recorded in geoelectromagnetic fields, which lasted for two hours. This effect was recorded at night (02.10 LT), which is a very rare event

under normal ionospheric conditions it doesn't and usually happens without any extraordinary processes. In the Jupiter atmosphere and its satellites during the collision of a comet different observatories of the world were fixed of different types. Of optical effects they were due to release at the time of collision of enormous energy, which is equal to approximately  $10^{25}$ - $10^{29}$  erg. However, direct confrontation does not significantly affect on the Earth, but it repulsed ionospheric-magnetospheric effects, which were recorded in Geoelectromagnetic and optical variations. These latter variations were recorded in Abastumani Astrophysical Observatory Georgian Academy of Sciences and is mainly reflected in the changes in the emission intensity of atmospheric oxygen in the lines  $\lambda = 5577\text{\AA}$ ;  $6300\text{\AA}$ . While strengthening the emission intensity was not significant, but they managed to register securely. These glow quickly weakened and a few minutes later caught up with the background.

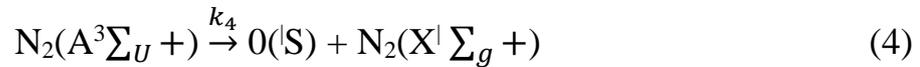
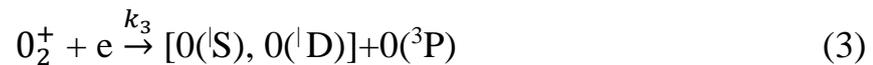
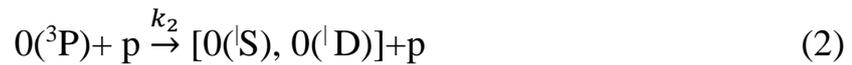
We attempted to establish mechanisms for the generation of luminescence. First, we briefly touch upon the issue of voltage disturbances Geoelectromagnetic fields.

The following mechanisms are introduced to explain possible fix variants: 1) Introduce the trapped particles in the magnetosphere of Jupiter in the loss cone and their acceleration formed during the explosion shock waves [2], 2) emissions of particles from Jupiter's magnetic traps and the acceleration due to the increase of the electric field in the tail of the planet, and 3) acceleration of particles in the tail of the magnetosphere of Jupiter as a result of the decay of the comet. These considerations are confirmed by the fact that increases the flux of high-energy particles detected in interplanetary space. These processes play an essential role in the formation of broadband electromagnetic radiation, which was also recorded by astronomical observations [4].

Accelerated particles electrons and protons in the spectrum were observed to reach the heights of the Earth magnetosphere and caused pulsations Pc 3 types that have been reported in the laboratory at KSU. Source generating a pulsations range 0.01 - 1 Hz are high-energy protons and electrons [5].

The main mechanisms for enhancing the emission intensity lines  $\lambda = 5577\text{\AA}$  and  $\lambda = 6300\text{\AA}$  can be the following processes [6].





Quench the excited states of  $O(^1S)$  and  $O(^1D)$  can occur as a result of collisions with molecules and atoms of nitrogen and oxygen.

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