

Feldstein Y I & Starkov G V. Dynamics of auroral belt and polar geomagnetic disturbances. *Planet. Space Sci.* 15:209-29, 1967.

[World Data Centre, Izmiran, Moscow, and Polar Geophysical Institute Academy of Sciences, Murmansk, USSR]

The nearpole and equatorial boundary position above the Earth's surface of the auroral luminescence has been obtained. It has been shown that the luminescence region which has received the name of auroral oval is a permanent phenomenon surrounding the geomagnetic poles of the Earth. The oval's size is determined by the intensity of geomagnetic field disturbances. A scheme is given showing the location of the auroral forms and motions over the whole high-latitude region throughout all hours local time. [The *SCI*[®] indicates that this paper has been cited over 120 times since 1967.]

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"The existence of a luminescence belt located at high latitudes asymmetrically relative to the geomagnetic pole along the Earth-Sun line was discovered in the early 60s soon after the International Geophysical Year (ICY). These investigations have been published in several journals in Russian, and Leven called this luminescence belt a 'brilliant necklace of our planet' (by the way, there are at least as many references to these papers as to this one of 1967).^{1,2}

"During the IGY I stayed with G.V. Starkov in the Dixon Arctic observatory on the shore of the Arctic Ocean. Then I returned to Moscow while Starkov became a staff worker of the Polar Geophysical Institute in Murmansk. Still we remained good friends with many common interests.

"In 1964 Starkov became a postgraduate student and, since it was clear that the luminescence region size was closely connected with the magnetic disturbances intensity, we carried out a handling of the all-sky camera photographs which were by that time concentrated in the World Data Centre

in Moscow. The main difficulty in handling and analyzing the data consisted in the more than 2,000 kilometers lying between us. But what helped us was a clear division of our duties and the coincidence of our concepts about the aurorae which were not generally accepted at that time.

"The results of our work proved to be useful to scientists working in different fields of solar-terrestrial physics, since the auroral oval and its dynamics were closely connected with the large-scale of the Earth's magnetosphere. Besides, various geophysical processes have a distinctly different course depending not on the geomagnetic latitudes but on the location of the observation point with respect to the auroral oval.

"Here is the explanation of the frequent citation of the result of our investigation in the geophysical literature. The paper was a brief outline of a number of our Russian publications in different journals and collections of papers, and therefore it contained quite a lot of varied information concerning the planetary regularities of aurorae in connection with the geomagnetic field variations. Some of its sections are cited more often, some less. I regret that our contribution to the study of the auroral substorm on the day side of the Earth remained practically unnoticed in the literature. The familiar Akasofu scheme³ of the auroral substorm, which had been reported only for the night hemisphere, has been generalized to the day region in the cited work. As to the concept of the auroral substorm, this is, concurrent with the concept of the auroral oval, one of the fundamental concepts of the physics and morphology of auroral phenomena on a planetary scale. Further development of the science has shown that both the aurorae and the geomagnetic disturbances are the result of the processes in the near-earth space plasma. The influence of the interplanetary magnetic fields is especially great. This field was developed further in my papers with Starkov and postgraduate students V.G. Vorobjev and V.L. Zverev, which have been partially published *Planetary and Space Science*.^{4,5}

1. Feldstein Y I. Geographical distribution of the aurorae and azimuths of auroral arcs. *Investigations of the aurorae* 4:61-78, 1960.
2. Feldstein Y I. On morphology of aurorae and magnetic disturbances in high latitudes. *Geomagn. Aeron. SSSR* 3:227-39, 1963.
3. Akasofu S I. The development of the auroral substorm. *Planet. Space Sci.* 12:273-82, 1964.
4. Vorobjev V G, Starkov G V & Feldstein Y I. The auroral oval during the substorm development. *Planet. Space Sci.* 24:955-65, 1976.
5. Zverev V L, Starkov G V & Feldstein Y I. Influences of the interplanetary magnetic field on the auroral dynamics. *Planet. Space Sci.* 27:665-7, 1979.