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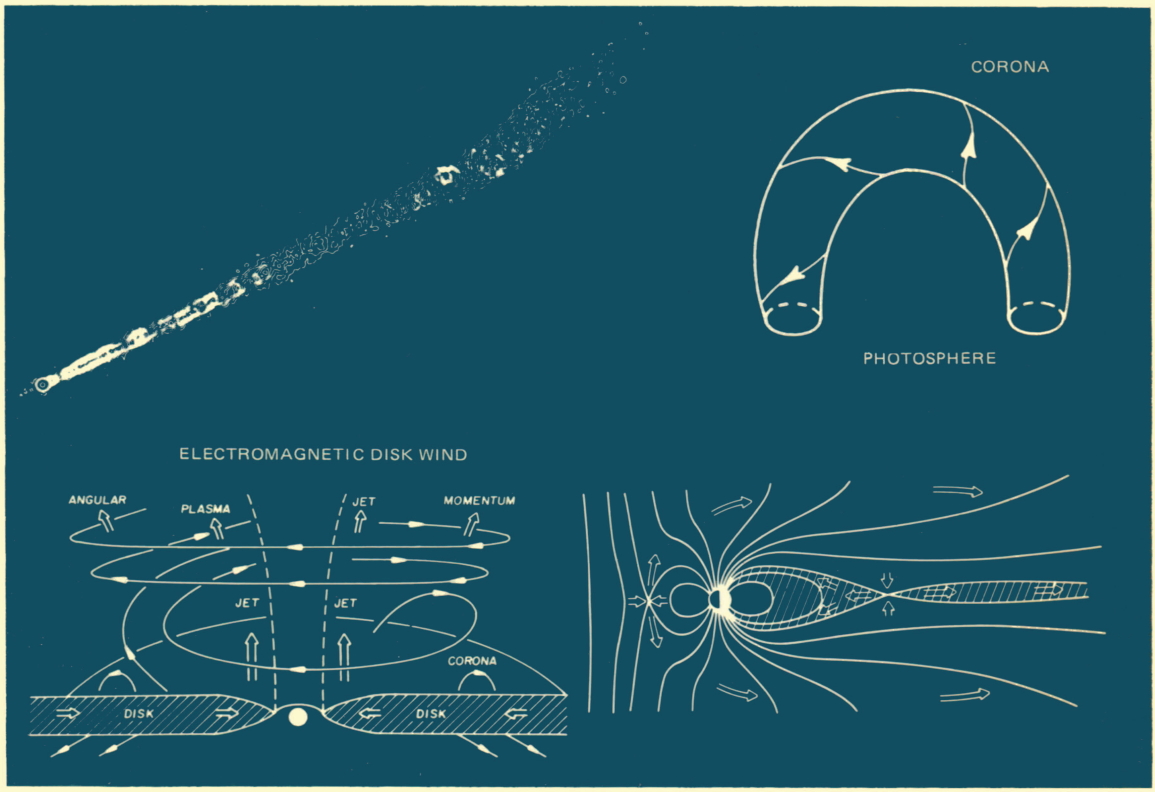
Edited by MUKUL R. KUNDU and GORDON D. HOLMAN



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EDITED BY

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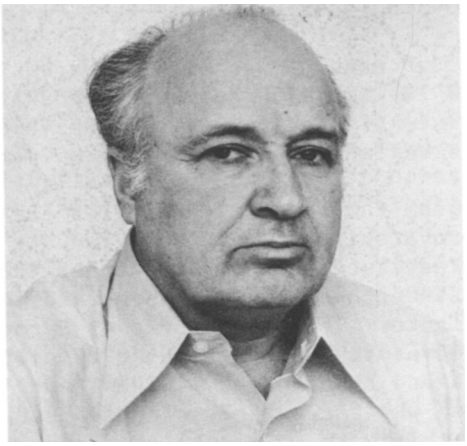

SERGEI I. SYROVATSKII
1925 - 1979

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DR. S. I. SYROVATSKII

Sergei Ivanovitch Syrovatskii was born on March 2, 1925 in the city of Bereznegovatoye. In 1941 when the second World War broke out, sixteen years old Syrovatskii went to war. He was awarded two orders and many medals for his valiant conduct during the war.

After graduation from the Physics faculty of the Moscow State University in 1951, Syrovatskii started post graduate studies in the P.N. Lebedev Physical Institute, and studied under the direction of Prof. S. Z. Belenky. Since that time he has worked in the Theoretical Department of the Institute. The first works of Syrovatskii were devoted to magnetohydrodynamics, in particular to different types of surface discontinuities and shock waves. "The Theory of Discontinuities in Magnetohydrodynamics" was the subject of his dissertation in 1954. In 1957 his results on this work were published and were among the first fundamental researches on magnetohydrodynamics carried out in the USSR.

In 1959 Syrovatskii published in the Soviet Astronomical Journal an analysis of relativisitic electron distribution in the Galaxy and of the determination of the Galactic background radio emission. This paper led to the beginning of a long collaboration between Syrovatskii and Ginzburg in radioastronomy.

It was a great achievement in cosmic ray physics when a phenomenological diffusion model of cosmic ray propagation was developed by Ginzburg and Syrovatskii. In the 1960's Syrovatskii along with Ginzburg and Sazonov solved many problems associated with magnetobremsstrahlung radiation, and elaborated many of its characteristic features. Using the first measurements of relativistic galactic cosmic ray electron flux and of the Galactic background radio intensity, Ginzburg and Syrovatskii investigated in 1961 the question of origin of relativistic electrons in the Galaxy. They showed that direct acceleration of electrons in the Galactic sources was important for radio emission rather than their origin as secondary products due to nuclear interactions in cosmic rays. In 1963, Ginzburg and Syrovatskii published the famous monograph "The Origin of Cosmic Rays".

In mid 1960's, Syrovatskii started studies of plasma behavior in strong magnetic fields. He showed that in the neighborhood of the zero point of magnetic fields in a plasma, there can develop a current sheet with a width much larger than the thickness. These studies were used for modelling plasma behaviour in the solar corona, where the magnetic field energy density is much higher than the plasma energy density. The processes of formation, stability and disruption of current sheets has been studied for many years theoretically, numerically and under laboratory conditions by Syrovatskii and his group. A very important

property of current sheets is their stability. In the typical solar corona their lifetime is several hours. This property enables a very large energy to be accumulated in the solar atmosphere in the form of magnetic energy of a current sheet. Current sheet disruption causes release of the accumulated energy in different forms, which is a solar flare in the Syrovatskii's model.

Over the years, the problems studied by Syrovatskii's group involved many new branches of solar physics. These problems include hydrodynamics of the convective zone of the Sun, solar dynamo, particle acceleration in solar flares and secondary processes on the Sun. Syrovatskii had more than 200 scientific publications to his credit.

Syrovatskii became a Professor at the Lebedev Phyisical Institute in 1979. On September 26, 1979 he died of a heart attack.

In 1982, Sergei Syrovatskii (posthumously) and his collaborators were awarded the State Prize of the USSR for a series of papers on "Dynamics of Current Sheets and Solar Activity".

- Volodya Dogiel
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Moscow, U.S.S.R.

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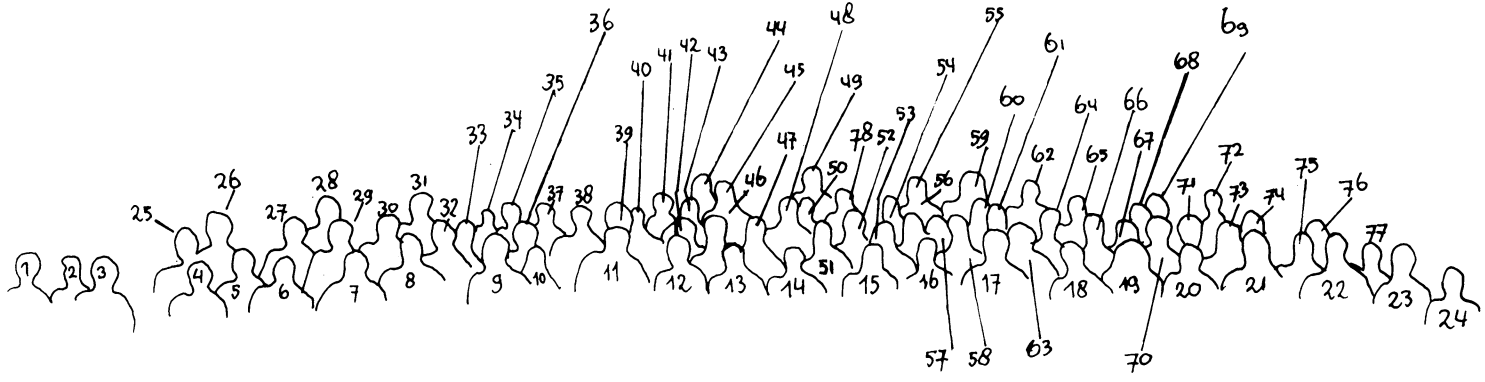

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