

По физике и диагностике протонных вспышек

Definition of the parameters of solar protons in the vicinity of the earth from radio bursts.

I. Intensity function.

Akin'yan, S. T.; Fomichev, V. V.; Chertok, I. M.

Geomagn. Aehron., Tom 17, p. 10 – 15, 1977

Definition of the parameters of solar protons in the vicinity of the earth from radio bursts.

II. Function of longitudinal weakening.

Akin'yan, S. T.; Fomichev, V. V.; Chertok, I. M.

Geomagn. Aehron., Tom 17, p. 177 – 183, 1977

Determination of the parameters of solar protons in the vicinity of the earth from radio bursts.

III - Temporal reference functions

Akinian, S. T.; Chertok, I. M.

Geomagnetism and Aeronomy, vol. 17, p. 407-410, 1978.

On quantitative diagnostics of proton bursts from characteristics of microwave radio bursts at $f \approx 9$ GHz frequency.

Akin'yan, S. T.; Alibegov, M. M.; Kozlovskij, V. D.; Chertok, I. M.

Geomagn. Aehron., Tom 18, p. 410 – 414, 1978

Estimates of the intensity of solar protons from the integral parameters of microwave radio bursts

Akinian, S. T.; Fomichev, V. V.; Chertok, I. M.

Geomagnetism and Aeronomy, vol. 18, p. 395-398, 1979.

Radio radiation as information source on proton fluxes from solar flares.

Akin'yan, S. T.; Fomichev, V. V.; Chertok, I. M.

Complex investigations of the sun, p. 119 - 130, 1982

The Proton Flare of 1976 April 30

Avdjushin, S. I.; Perejaslova, N. K.; Fomichev, V. V.; Chertok, I. M.

Proceedings of the STIP (Study of Travelling Interplanetary Phenomena) Symposium on Solar Radio Astronomy,

Interplanetary Scintillations and Coordination with Spacecraft, held in Narrabri, N.S.W., Australia, 28-30 Nov. 1979.

Edited by M.A. Shea, D.F. Smart, D.J. McLean, and G.J. Nelson. Hanscom AFB, MA: Air Force Geophysics Laboratory, 1982., p.65

Estimates of the proton energy spectrum exponent on the basis of solar microwave radio-burst data
Chertok, I. M.

Geomagnetizm i Aeronomiia, vol. 22, Mar.-Apr. 1982, p. 182-186. In Russian.

Abstract

A method is developed for the short-term prediction of the energy spectrum exponent (γ) of protons near the earth with energies of the order of tens of MeV; γ is determined on the basis of the ratio of maximum intensities of solar radio bursts at frequencies of 9 and 15.4 GHz (S9/S15). Data on 35 proton events are used to determine the relationship between S9/S15 and γ for flares on the western half of the disk, as well as the heliolongitudinal correction for protons arriving at the earth from eastern flares.

Effects characterizing the relationship of radio bursts and proton flares by data for 1980.

Akinyan, S. T.; Fomichev, V. V.; Chertok, I. M.; Aurass, H.; Kruger, A.

Publ. Debrecen Heliophys. Obs., Vol. 5, Nos. 4 - 5, p. 639 - 652, 1983

Abstract

The present paper contains the main results of a diagnostic analysis of proton events during January - October, 1980. The aims of this analysis are (1) the consideration of the radio emissions of the largest flares in a wide frequency range, (2) the estimation of the expected parameters of proton fluxes of the order of some tens MeV, and (3) the comparison of the obtained estimations with the data of direct measurements of the proton fluxes in the interplanetary space near the earth

Characteristics of radio bursts and proton fluxes from gamma-ray flares.

Fomichev, V. V.; Chertok, I. M.

Physics of solar flares, p. 88 - 97, 188, 1985

Origin: ARI

Bibliographic Code: 1985psf..conf...88F

Relation Between Gamma-Ray Emission Radio Burst and Proton Fluxes from Solar Flares

Fomichev, V. V.; Chertok, I. M.

SOVIET ASTR.(TR: A. ZHURN.) V.29, NO. 5/SEP, P.554, 1985

Radio Bursts and Proton Fluxes from Solar Y-Ray Flares

Chertok, I.; Fomichev, V.

Solar-Terrestrial Predictions: Proceedings of a Workshop at Meudon, France, June 18-22, 1984.

Edited by P.A. Simon, G. Heckman, and M.A. Shea.

Boulder, CO: National Oceanic and Atmospheric Administration, 1986., p.263

Development of Quantitative Proton Flare Diagnostics Technique by Radio Burst Data

Chertok, I.; Fomichev, V.

Solar-Terrestrial Predictions: Proceedings of a Workshop at Meudon, France, June 18-22, 1984.

Edited by P.A. Simon, G. Heckman, and M.A. Shea. Boulder, CO: National Oceanic and Atmospheric Administration, 1986., p.270

On the Connection Between the Solar Cosmic Ray Intensity and the Polar CAP Absorption Magnitudes
Nazarova, M. N.; Pereyaslova, N. K.; Uljev, V. A.; Shirochkov, A. V.; Chertok, I. M.
Proceedings of the 20th International Cosmic Ray Conference Moscow, Volume 3, p.109, 1987

Use of radio radiation for diagnosis of proton flares and geoeffective phenomena on the Sun.

Chertok, I. M.

Prediction of ionospheric, magnetospheric disturbances and of solar activity, p. 39-59, 1987

Origin: ARI

Bibliographic Code: 1987pimd.conf...39C

On the Relation Between Radio Bursts Gamma-Ray Emission and Proton Fluxes from Solar Flares
Chertok, I. M.; Fomichev, V. V.

Solar Maximum Analysis. Proceedings of the International Workshop, held in Irkutsk, USSR, June 17-24, 1985

Editors, V.E. Stepanov, V.N. Obridko;

Publisher, VNU Science Press, Utrecht, The Netherlands, P.315, 1987

Relationship between proton-flux delay with respect to a flare and radio-burst parameters

Chertok, I. M.; Bazilevskaia, G. A.; Sladkova, A. I.

Geomagnetizm i Aeronomiia (ISSN 0016-7940), vol. 27, p. 362-369. 1987, In Russian.

Abstract

Events with a large delay of the flux maximum of protons with energy greater than 10 MeV at the earth with respect to the corresponding solar flare are examined on the basis of data for 1966-1980. It is shown that western events with a delay of 10 hours are characterized by a soft frequency spectrum of centimeter-wave radio bursts (at a frequency not greater than about 5 GHz), a relatively soft proton energy spectrum, faint meter-wave radio emission, and a prolonged microwave burst.

Comparison of data on proton fluxes at the earth with results on the diagnostics of solar proton flares according to radio bursts

Fomichev, V. V.; Chertok, I. M.

Geomagnetizm i Aeronomiia (ISSN 0016-7940), vol. 28, May-June 1988, p. 353-359. In Russian.

Abstract

A method for estimating the parameters of proton fluxes with energies exceeding 10, 30, and 60 MeV near the earth according to radio-burst data is applied to events occurring during 1970-1980. It is shown that the recognition of proton flares on the basis of this approach leads to a greater frequency of correct recognition than previous approaches. Proton flux parameters (the maximum intensity and the time characteristics) calculated using the proposed approach are found to agree well with satellite data.

Dependence Between the Energy Spectrum of Protons and Maximum Spectral Frequency of Solar Microwave Bursts

Chertok, I. M.

SOLNECHNYE DANNYE. BYUL. GLAV.ASTR.OBS. NO.11, P. 83, 1989

Correlation method for determining the energy parameters of proton fluxes giving rise to inducing polar CAP absorption

Ul'Ev, V. A.; Chertok, I. M.

Geomagnetizm i Aeronomiia (ISSN 0016-7940), vol. 29, Mar.-Apr. 1989, p. 228-233. In Russian.

Abstract

A correlation method for determining the optimal threshold energy (E_0) and the energy of the maximum contribution (E_m) of proton fluxes giving rise to PCA. It is shown that for E_0 the best correlation is between the absorption amplitude and the integral flux, while for E_m the best correlation is between the absorption amplitude and the differential proton intensity. The mean values of E_0 and E_m are calculated to be 6.4 and 9.1 MeV from data on 89 events observed during 1970-1979.

On the correlation between gamma-ray emission, radio bursts and proton fluxes from solar flares.

Chertok, I. M.

Soln. Dannye, Byull., No. 1989/8, p. 81 - 85

Abstract

The paper criticizes the assertion that the γ -ray line emission unlike other types of the flare emission (hard X-rays, microwave bursts) reveals a highly poor relation or even an anticorrelation with proton fluxes in the interplanetary space. About 30 flares (1972 - 1985) have been analyzed with known values of the γ -ray line emission in the 4 - 7 NeV band (F4-7) and the intensity of >10 MeV proton fluxes (J10). It is shown that (1) a considerable positive correlation between F4-7 and J10 takes place for large nonimpulsive flares with a significant metric component; (2) the γ -ray emission F4-7 correlates well with the maximum flux density of microwave bursts at 15 GHz. It is concluded that the γ -ray line emission in relation to interplanetary protons behaves as well as other types of flare emission.

Determination of the intensity of proton fluxes near the Earth from solar radio bursts taking into account their frequency spectrum.

Fomichev, V. V.; Chertok, I. M.; Del Poso, E.

Geomagn. Aehron., Tom 29, No. 4, p. 537 - 544, 1989

Determination of the index of energy spectra of proton fluxes near the Earth from frequency spectra of solar microwave bursts.

Fomichev, V. V.; Chertok, I. M.; Del Poso, E.

Geomagn. Aehron., Tom 29, No. 4, p. 545-550, 1989

Dependence between energy spectrum of protons and maximum spectral frequency of solar microwave bursts.

Chertok, I. M.

Soln. Dannye, Byull., No. 1989/11, p. 85 - 90, 1989

Abstract

It is shown by data for 1966 - 1986 that a specific dependence takes place between the power index γ of the proton energy spectrum in the range of tens of MeV near the Earth and the frequency f at which the flux density of centimetre bursts has the maximum. This relationship of the spectra agrees qualitatively with the model of the formation of the proton spectrum in coronal magnetic traps in a process of the interaction with the small-scale turbulence. Based on the discovered dependence the heliolongitude function describing the softening of the proton spectrum from east flares is determined. It is demonstrated that the parameter f_m may be used for the short-term prediction of the proton spectral index by radio data.

Surplus Proton Fluxes From Solar Flares with Soft Frequency Spectrum of Radio Bursts
Chertok, M. I.; Fomichev, V. V.
Proceedings of the 21st International Cosmic Ray Conference. Volume 5 (SH Sessions), p.171, 1990

Some Characteristics of Delayed Proton Events
Bazilevskaya, A. G.; Sladkova, I. A.; Chertok, M. I.
Proceedings of the 21st International Cosmic Ray Conference. Volume 5 (SH Sessions), p.175, 1990

Determination of the intensity of proton fluxes at the Earth from solar radio bursts with their frequency spectrum taken into account.
Fomichev, V. V.; Chertok, I. M.; Del Poso, E.
Geomagn. Aeron., Vol. 29, No. 4, p. 410-415, 1990
Abstract
During the period 1966 - 1986, the regularities of the relationship between solar radio bursts and proton fluxes at the Earth with $E > 10$ MeV (J10) were analyzed. It is established that the flux of protons is determined by the energy released (intensity of the microwave burst), conditions of escape of particles from the region of the burst (meter component of the radio radiation), and heliographic longitude of the flare. Also noted is the strong dependence of J10 on the frequency spectrum of the protons. The corresponding functional relations are derived to enable accounting for these effects in short-term prognoses of the proton flux parameters.

Determination of the exponent of the energy spectrum of protons at the Earth according to the frequency spectrum of solar microwave bursts.
Fomichev, V. V.; Chertok, I. M.; Del Poso, E.
Geomagn. Aeron., Vol. 29, No. 4, p. 416-420, 1990
Abstract
It is shown from the data (1966 - 1986) that a close relationship exists between the exponent of the power spectrum of the protons at the Earth in the energy range $E > 10$ MeV and the ratio of the radio fluxes at frequencies of 7, 9, and 15 GHz. In particular, for western flares a soft energy spectrum corresponds to a soft radio radiation spectrum. A quantitative function is derived to describe the skewing (softening) of the proton energy spectrum from eastern flares. Also investigated is the energy dependence of the redundancy measure of the flux of protons. A possible use of the radio data for an advance estimate of the exponent of the proton spectrum at the Earth is demonstrated.

Possible Relation Between Solar Proton Fluxes in Interplanetary Space and the Formation of a Post-Flare System of Loops
Bazilevskaya, G. A.; Sladkova, A. I.; Fomichev, V. V.; Chertok, I. M.
SOVIET ASTR.(TR: A. ZHURN.) V.34, NO. 2, P.205, 1990

On the correlation between the solar gamma-ray line emission, radio bursts and proton fluxes in the interplanetary space
Chertok, I. M.

Comment On "An Investigation of the Relationship Between the Microwave Spectra of Solar Flares and the Delay to Maximum of Associated Proton Events at 1 AU

Cliver, E. W.; Kahler, S. W.; Chertok, I. M.; Campbell, I. M.; Bazilevskaya, G. A.; Sladkova, A. I.
Solar-Terrestrial Predictions -- IV: proceedings of a Workshop held May 18-22, 1992, at Ottawa, Canada.
Volume 2.

Published by the National Oceanic and Atmospheric Administration, Environmental Research
Laboratories, Boulder, CO USA,
1993, p.121

The High-Energy Gamma-Ray Flare of June, 15, 1991: Some Evidence of Prolonged Particle
Acceleration at the Post-Eruption Phase

Akimov, V. V.; Belov, A. V.; Chertok, I. M.; Kurt, V. G.; Leikov, N. G.; Magun, A.; Melnikov, V. F.
In: Proceedings of Kofu Symposium, Kofu, Japan, Sept. 6-10, 1993, p.371-374.

Some evidences of prolonged particle acceleration in the high-energy gamma-ray flare of June 15, 1991
Akimov, V. V.; Leikov, N. G.; Belov, A. V.; Chertok, I. M.; Kurt, V. G.; Magun, A.; Melnikov, V. F.
High-energy solar phenomena-A new era of spacecraft measurements. AIP Conference Proceedings,
Volume 294, pp. 106-111 (1994).

The GAMMA-1 data on the March 26, 1991 solar flare

Akimov, V. V.; Leikov, N. G.; Kurt, V. G.; Chertok, I. M.

High-energy solar phenomena-A new era of spacecraft measurements. AIP Conference Proceedings,
Volume 294, pp. 130-133 (1994).

Post-Eruption Particle Acceleration in the Corona: A Possible Contribution to Solar Cosmic Rays
Chertok, I. M.

24th International Cosmic Ray Conference, Vol. 4, held August 28-September 8, 1995 in Rome, Italy.
Edited by N. Iucci and E. Lamanna. International Union of Pure and Applied Physics, 1995., p.78

Time Evolution of Solar Proton Energy Spectra at the Earth Orbit and Possibility of Multi-Step Particle
Acceleration

Belov, A.; Chertok, I.; Struminsky, A.

24th International Cosmic Ray Conference, Vol. 4, held August 28-September 8, 1995 in Rome, Italy.
Edited by N. Iucci and E. Lamanna. International Union of Pure and Applied Physics, 1995., p.127

Transient Phenomena in the Energetic Behind-the-Limb Solar Flare of September 29, 1989
Bhatnagar, A.; Jain, R. M.; Burkepile, J. T.; Chertok, I. M.; Magun, A.; Urbarz, H.; Zlobec, P.

Solar and Interplanetary Transients, proceedings of IAU Colloquium 154, held in Pune, India, January 23-27, 1995. ASTROPHYSICS AND SPACE SCIENCE I Vol. 243 No. 1 1996; edited by S. Ananthakrishnan; A. Pramesh Rao., p.209

Evidence for prolonged acceleration based on a detailed analysis of the long-duration solar gamma-ray flare of June 15, 1991

Akimov, V. V.; Ambrož, P.; Belov, A. V.; Berlicki, A.; Chertok, I. M.; Karlický, M.; Kurt, V. G.; Leikov, N. G.; Litvinenko, Yu. E.; Magun, A.; and 3 coauthors
Solar Physics, Volume 166, Issue 1, pp.107-134, 1996

The role of coronal mass ejections and post-eruption energy release in solar high-energy phenomena.
Chertok, I. M.

J. Mosc. Phys. Soc., Vol. 7, No. 1, p. 31 – 40, 1977

Post-CME Energy Release from Solar Sources of the Largest Geospace Disturbances

Chertok, I. M.; Kryakunova, O. N.

Correlated Phenomena at the Sun, in the Heliosphere and in Geospace. 31st ESLAB Symposium held 22-25 September, 1997, at ESTEC, Noordwijk, The Netherlands. Edited by A. Wilson. European Space Agency, ESA SP-415, 1997. ISBN: 92-9092-660-0., p.407, 1977

Post CME Energy Release in the Corona and Associated Solar-terrestrial Disturbances

Chertok, Ilya M.

Advances in Solar Connection with Transient Interplanetary Phenomena, Proceedings of the Third SOLTIP Symposium held 14-18 October, 1996 in Beijing, China. Edited by Xueshang Feng, Fengsi Wei and Murray Dryer. Beijing: International Academic Publishers, 1998., p.201

High-Energy ^3He -Rich Solar Particle Events

Torsti, Jarmo; Kocharov, Leon; Laivola, Jarno; Chertok, Ilya; Thompson, Barbara J.

Solar Physics, v. 214, Issue 1, p. 177-193 (2003).

An Extreme Solar Event of 20 January 2005: Properties of the Flare and the Origin of Energetic Particles

Grechnev, V. V.; Kurt, V. G.; Chertok, I. M.; Uralov, A. M.; Nakajima, H.; Altyntsev, A. T.; Belov, A. V.; Yushkov, B. Yu.; Kuznetsov, S. N.; Kashapova, L. K.; and 2 coauthors

Solar Physics, Volume 252, Issue 1, pp.149-177, 2008

On the correlation between spectra of solar microwave bursts and proton fluxes near the Earth

Chertok, I. M.; Grechnev, V. V.; Meshalkina, N. S.

Astronomy Reports, Volume 53, Issue 11, pp.1059-1069, 2009

По диагностике геоэффективности солнечных эрупций (CMEs)

Magnetic Flux of EUV Arcade and Dimming Regions as a Relevant Parameter for Early Diagnostics of Solar Eruptions - Sources of Non-recurrent Geomagnetic Storms and Forbush Decreases

Chertok, I. M.; Grechnev, V. V.; Belov, A. V.; Abunin, A. A.

Solar Physics, Volume 282, Issue 1, pp.175-199, 2013

I.M. Chertok, A.A. Abunin, A.V. Belov, V.V. Grechnev. Dependence of Forbush-decrease characteristics on parameters of solar eruptions. *Journal of Physics: Conference Series*, v. 409, 012150, 2013 (<http://iopscience.iop.org/1742-6596/409/1/012150>).

V. Kurt, B. Yushkov, A. Belov, I. Chertok, V. Grechnev. Determination of Acceleration Time of Protons Responsible for the GLE Onset. *Journal of Physics: Conference Series*, v. 409, 012151, 2013 (<http://iopscience.iop.org/1742-6596/409/1/012151>).

Черток И.М., А.А.Абунин, А.В. Белов, В.В. Гречнев. Зависимость характеристик Форбуш-понижений от параметров солнечных эрупций, Известия РАН, Серия физическая, том 77, № 5, с. 615–617, 2013.

Курт В. Г., Юшков Б. Ю., Белов А. В., Черток И. М., Гречнев В. В. Определение времени ускорения протонов, ответственных за начало возрастаний солнечных космических лучей. Известия РАН, Серия физическая, том 77, № 5, с. 546–549, 2013.

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