

INSPECT search on "ball lightning" from 1989 - Apr/1996

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96 citations (below)

Citation: 1 of 96

Accession No.: 5289239.
 Author: Lowke-J-J.
 Author Affil.: Div. of Appl. Phys., CSIRO, Sydney, NSW, Australia.
 Title: A theory of ball lightning as an electric discharge.
 Source: Journal of Physics D (Applied Physics). vol.29, no.5. pp. 1237-44. 14 May 1996.
 References: 49 refs.
 ISSN: 0022-3727.
 CODEN: JPAPBE.
 Language: eng.
 Year: 1996.
 Pub. Type: journal-article (J).
 Treatment: theoretical or mathematical (T).
 Report No.: CCCC: 0022-3727/96/051237+08\$19.50.
 Pub. Country: UK.
 Class. Code: A9260P. A5280. A5280H.
 Subject: corona. discharges-electric. lightning.
 Identifiers: plasma. atmosphere. theory. ball lightning. electric discharge. ion transport equations. electron transport equations. Poisson`s equation. Poisson. continuously varying. microsecond variability. corona-like discharge. electric field. lightning strike. preferred conducting path. formation. lifetime. energy source. motion.
 Abstract: It is proposed, on the basis of solutions of electron and ion transport equations, together with Poisson`s equation, that ball lightning is an electric discharge which is continuously varying on a microsecond time scale. It is further proposed that this corona-like discharge is sustained by electric fields associated with charges from a lightning strike dispersing along preferred conducting paths in the Earth. The theory gives an explanation of the formation, lifetime, energy source and motion of ball lightning.
 UW Load Date: 9606.

---- End of Citation ----

Citation: 2 of 96

Accession No.: 5236224.
 Author: Amirov-A-K. Bychkov-V-L.
 Author Affil.: Inst. of High Temp., Acad. of Sci., Moscow, Russia.
 Title: Influence of atmospheric thunderstorm conditions on the life time of ball lightning.
 Source: Physica Scripta. vol.53, no.2. pp. 252-5. Feb. 1996.
 References: 22 refs.
 ISSN: 0031-8949.
 CODEN: PHSTBO.
 Language: eng.
 Year: 1996.
 Pub. Type: journal-article (J).
 Treatment: theoretical or mathematical (T).
 Pub. Country: Sweden.

Class. Code: A9260P. A9260Q. A9260J.
 Subject: atmospheric-humidity. lightning. statistical-analysis.
 thunderstorms.
 Identifiers: atmospheric thunderstorm conditions. ball lightning. rank
 correlation method. thunderstorm influence. atmospheric
 humidity. electric field strength. statistical analysis.
 Abstract: A rank correlation method was applied to investigate the
 influence of atmospheric thunderstorm conditions on the life
 time (observation time) of ball lightning (BL). Data from the
 PC Stakhavov-Keul-Bychkov Data Bank on BL were used. For the
 analysis a ranking of BL over sizes has been made and a
 ranking of atmospheric conditions of the BL observations in
 respect to humidity and of thunderstorm conditions in respect
 to electric field strength of the atmosphere ground layer have
 been made. Statistical analysis reveals that both the
 increase of the humidity and of the electric field strength
 decreases the BL life time. These results are discussed from
 the point of view of the different BL models.
 UW Load Date: 9604.
 ----- End of Citation -----

Citation: 3 of 96

Accession No.: 5168280.
 Author: Zou-You-Suo.
 Author Affil.: Inst. of Atmos. Phys., Chinese Acad. of Sci., Beijing, China.
 Title: Some physical considerations for unusual atmospheric lights
 observed in Norway.
 Source: Physica Scripta. vol.52, no.6. pp. 726-30. Dec. 1995.
 References: 21 refs.
 ISSN: 0031-8949.
 CODEN: PHSTBO.
 Language: eng.
 Year: 1995.
 Pub. Type: journal-article (J).
 Treatment: experimental (X).
 Contract No.: PFR WI3BON;.
 Pub. Country: Sweden.
 Class. Code: A9410Q. A9260P.
 Subject: atmospheric-radiation. emission. lightning. plasma-waves.
 solitons.
 Identifiers: physical considerations. unusual atmospheric lights. Norway.
 nonlinear wave particle interactions. turbulent plasma. wave
 vortex interaction. fireball vortex structure. plasma
 solitons. plasma ball lightning.
 Abstract: Some unusual atmospheric lights observed in Norway have been
 explained as the results of nonlinear wave-particle
 interactions based on turbulent plasma theory and wave-vortex
 interaction as well as laboratory experiments on rocks. The
 paper also points out that the atmospheric lights have
 provided evidence for the vortex structure of fireballs and

for the physical mechanism of wave-particle interaction for
the formation of plasma ball lightning and solitons.

UW Load Date: 9601.

---- End of Citation ----

Citation: 4 of 96

Accession No.: 5144931.
 Author: Protasevich-E-T.
 Author Affil.: Tomsk Polytech. Univ., Russia.
 Title: Air discharge peculiarities at non-uniform humidity and
 pressure 1-20 torr.
 Source: Published by: Inst. Electr. Eng. Japan. Tokyo, Japan. 1995.
 Conf. Title: Proceedings of the Eleventh International Conference on Gas
 Discharges and Their Applications. Tokyo, Japan. pp. 52-4
 vol.2. 11-15 Sept. 1995.
 ISBN: 4886864996.
 Language: eng.
 Year: 1995.
 Pub. Type: conference-proceeding (C).
 Treatment: EXPERIMENTAL (X).
 Num. Indexing: pressure 1.3E+02 to 2.7E+03 Pa.
 Pub. Country: Japan.
 Class. Code: A9260P. A9130B. A8670G. A8670L. A5250.
 Subject: air-pollution-measurement. atmospheric-radiation.
 earthquakes. lightning. nuclear-explosions. plasma.
 plasma-production. radioactive-pollution.
 Identifiers: humidity. pressure. gas-discharge plasma. water vapour.
 air discharge peculiarities. air insulation. cool
 nonequilibrium plasma. lifetime. physico-chemical processes.
 atmospheric electricity phenomena. St. Elmo's fire. ball
 lightning. bead lightning. atmosphere glow. energy-active
 zones. earthquakes. underground nuclear explosions. natural
 electromagnetic background. radioactive pollution. 1 to 20
 torr.
 Abstract: The authors describe the properties of gas-discharge plasma
 and the possibility of its variations on account of the
 control of water vapour concentration in air insulation. It
 has been shown, preliminarily, that there is an optimal value
 of air humidity for each pressure value, which leads to the
 formation of cool nonequilibrium plasma with a lifetime from
 tens of milliseconds to seconds. The understanding of the
 mechanisms of the physico-chemical processes in such plasma
 offers to develop the principles of control of the atmospheric
 phenomena and to explain the nature of such atmospheric
 electricity phenomena as St. Elmo's fire, ball lightning,
 bead lightning and the atmosphere glowing in energy-active

zones (vicinities of earthquakes, underground nuclear explosions, etc.). Causes of the initiation of the natural electromagnetic background, its effect on the atmosphere and environment are considered. The article presents a technique for recording radioactive pollution by measuring radiation in the superhigh frequency region.

UW Load Date: 9512.

----- End of Citation -----

Citation: 5 of 96

Accession No.: 5144292.
 Author: Lowke-J-J.
 Author Affil.: Div. of Appl. Phys., CSIRO, Sydney, NSW, Australia.
 Title: Theory of ball lightning as an electric discharge.
 Source: Published by: Inst. Electr. Eng. Japan. Tokyo, Japan. 1995.
 References: 20 refs.
 Conf. Title: Proceedings of the Eleventh International Conference on Gas Discharges and Their Applications. Tokyo, Japan. pp. 258-61 vol.1. 11-15 Sept. 1995.
 ISBN: 4886864996.
 Language: eng.
 Year: 1995.
 Pub. Type: conference-proceeding (C).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: Japan.
 Class. Code: A9260P. A0250. A5280H.
 Subject: electric-fields. glow-discharges. lightning. plasma. Poisson-distribution.
 Identifiers: electric discharge. ball lightning. electron transport equations. ion transport equations. Poisson's equation. continuously varying discharge. corona like discharge. electric fields. lightning strike. conducting paths. glow discharge. convective cooling.
 Abstract: It is proposed, on the basis of solutions of electron transport and ion transport equations, together with Poisson's equation, that ball lightning is an electric discharge which is continuously varying on a microsecond time scale. It is further proposed that this corona-like discharge is sustained by electric fields associated with charges from a lightning strike dispersing along preferred conducting paths in the Earth.

UW Load Date: 9512.

----- End of Citation -----

Citation: 6 of 96

Accession No.: 5094891.
 Author: Raiser-R. Lortz-D.
 Author Affil.: Bayreuth Univ., Germany.
 Title: Ball lightning as an example of a magnetohydrodynamic equilibrium.
 Source: Physical Review E (Statistical Physics, Plasmas, Fluids, and Related Interdisciplinary Topics). vol.52, no.3, pt.B. pp. 3034-44. Sept. 1995.
 References: 23 refs.
 ISSN: 1063-651X.
 CODEN: PLEEE8.
 Language: eng.
 Year: 1995.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 1063-651X/95/52(3)/3034(11)/\$06.00.
 Pub. Country: USA.
 Class. Code: A9260P. A5230. A5235P. A5225L. A5225F. A5255. A5280.
 Subject: lightning. plasma-confinement. plasma-instability. plasma-magnetohydrodynamics. plasma-pressure. plasma-transport-processes.
 Identifiers: magnetohydrodynamic equilibrium. ball lightning. lightning-induced fireballs. decaying magnetic field. vanishing magnetic field. singly connected plasma region. atmospheric pressure confinement. spherical plasma boundary. pressure profile perturbation. current profile perturbation. spherical plasma boundary deformation. nonspherical boundary. stability.
 Abstract: Magnetohydrodynamic equilibria appropriate for describing ball lightning are discussed in this paper. It is argued that lightning-induced fireballs should have a magnetic field decaying at infinity. Such equilibria, in fact, have a vanishing magnetic field outside a singly connected plasma region and are confined by the atmospheric pressure only. An equilibrium of this type with a spherical plasma boundary is investigated, and characteristic quantities are computed. Perturbation of the pressure and current profiles leads to deformation of the spherical plasma boundary, thus indicating the existence of a large class of equilibria with a nonspherical boundary. Finally, some remarks are made concerning the stability of these equilibria.
 UW Load Date: 9511.
 ----- End of Citation -----

Citation: 7 of 96

Accession No.: 5078516.
 Author: Amirov-A-K. Bychkov-V-L.
 Author Affil.: Inst. of High Temp., Acad. of Sci., Moscow, Russia.
 Title: Correlation analysis of ball lightning distribution over colors of the SKB data bank.
 Source: Physica Scripta. vol.52, no.2. pp. 222-4. Aug. 1995.
 References: 10 refs.
 ISSN: 0031-8949.
 CODEN: PHSTBO.
 Language: eng.
 Year: 1995.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: Sweden.
 Class. Code: A9260P.
 Subject: collections-of-physical-data. colour. lightning. optical-correlation.
 Identifiers: correlation analysis. ball lightning distribution. SKB data bank. Stakhanov Bychkov Keul data bank. color.
 Abstract: A correlation analysis of ball lightning (BL) distribution over colors has been made using the information from the Stakhanov-Bychkov-Keul data bank. A total of 18 factors, which could affect the observers perception, were analyzed for six main colors of BL. The correlation coefficients for all the factors but four turned out to be in the 95% confidence interval from 0.903 to 1 of correlation coefficients for random samplings. Four factors falling out of this range are: observation in September, during night time and before thunderstorm and disappearance of BL through decay. Physical and physiological optics reasons for such a result are discussed.
 UW Load Date: 9510.
 ----- End of Citation -----

Citation: 8 of 96

Accession No.: 4994510.
 Author: Alexeff-I. Rader-M.
 Author Affil.: Dept. of Electr. & Comput. Eng., Tennessee Univ., Knoxville, TN, USA.
 Title: Possible precursors of ball lightning-observation of closed loops in high-voltage discharges.
 Source: Fusion Technology. vol.27, no.3. pp. 271-3. May 1995.
 References: 5 refs.
 ISSN: 0748-1896.
 CODEN: FUSTE8.
 Language: eng.
 Year: 1995.

Pub. Type: journal-article (J).
 Treatment: EXPERIMENTAL (X).
 Report No.: CCCC: 0748-1896/95/\$3.00.
 Pub. Country: USA.
 Class. Code: A9260P. A5280M. A2852J.
 Subject: fusion-reactor-theory. lightning. sparks.
 Identifiers: ball lightning. closed loops. ultrahigh voltage discharges.
 Abstract: Several hundred photographs of ultrahigh voltage discharges have been obtained that show closed current loops. These closed current loops may be precursors of ball lightning. One feature of these discharges may explain why observations of ball lightning may be infrequent; that is, there is a distinct threshold in voltage and/or current below which the closed loops do not occur. This threshold current fits other experimental data but is well above the usually observed currents in natural lightning.
 UW Load Date: 9507.
 ----- End of Citation -----

Citation: 9 of 96

Accession No.: 4994509.
 Author: Reece-Roth-J.
 Author Affil.: Tennessee Univ., Knoxville, TN, USA.
 Title: Ball lightning: What nature is trying to tell the plasma research community.
 Source: Fusion Technology. vol.27, no.3. pp. 255-70. May 1995.
 References: 20 refs.
 ISSN: 0748-1896.
 CODEN: FUSTE8.
 Language: eng.
 Year: 1995.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0748-1896/95/\$3.00.
 Pub. Country: USA.
 Class. Code: A9260P. A2852J.
 Subject: fusion-reactor-theory. lightning.
 Identifiers: ball lightning. energy storage. plasma-related phenomenon. magnetic energy storage.
 Abstract: Ball lightning has been extensively observed in atmospheric air, usually in association with thunderstorms, by untrained observers who were not in a position to make careful observations. These chance sightings have been documented by polling observers, who constitute perhaps 5% of the adult U.S. population. Unfortunately, ball lightning is not accessible to scientific analysis because it cannot be reproduced in the laboratory under controlled conditions. Natural ball lightning has been observed to last longer than 90 s and to have diameters from 1 cm to several metres. The energy density of a few lightning balls has been observed to be as high as 20 000 J/cm³, well above the limit of chemical energy storage of, for example, TNT at 2000 J/cm³. Such observations suggest a plasma-related phenomenon with significant magnetic energy storage. If this is the case, ball lightning should have very interesting implications for fusion research, industrial plasma engineering, and military applications, as well as being of great theoretical and practical interest to the plasma research community.
 UW Load Date: 9507.
 ----- End of Citation -----

Citation: 10 of 96

Accession No.: 4971529.
 Author: Maiorov-S-A. Tkachev-A-N. Yakovlenko-S-I.
 Author Affil.: Gen. Phys. Inst., Acad. of Sci., Moscow, Russia.
 Title: Metastable state of supercooled plasma.
 Source: Physica Scripta. vol.51, no.4. pp. 498-516. April 1994.
 References: 23 refs.
 ISSN: 0031-8949.
 CODEN: PHSTBO.
 Language: eng.
 Year: 1994.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: Sweden.
 Class. Code: A5225D. A5225F. A5225K. A5225L. A5265. A5220H.
 Subject: Fokker-Planck-equation. ion-recombination.
 metastable-states. plasma-collision-processes.
 plasma-density. plasma-simulation. plasma-temperature.
 plasma-transport-processes.
 Identifiers: supercooled plasma. metastable states. computer ab initio
 simulation. analytical theory. Coulomb plasma. plasma
 ionization degree. three body recombination. plasmoids.
 electron energy distribution functions. Coulomb collisions.
 stochastically isolated plasma. electron number. plasma
 total energy. isotherms. electron density.
 Abstract: The computer ab initio simulation and analytical theory, that
 revealed unexpected non-ergodic properties of a classical
 Coulomb plasma, is overviewed. The results of a
 many-charged-particles system simulation predict the possible
 existence of a real metastable plasma, supercooled with
 respect to its ionization degree. The three-body
 recombination at this state is suppressed. The existence of
 such a plasma state is a consequence of the entropy
 conservation in isolated Hamiltonian systems free from any
 stochastic action from the outside (external stochastic
 disturbance). The occurrence of a metastable supercooled
 plasma (rather similar to a supercooled vapor or superheated
 liquid) depends on two conditions: First, all the charged
 particles should behave exactly according to the laws of
 classical mechanics (hence, most negatively-charged particles
 should preferably be heavy ions). Second, the plasma
 ionization degree should be sufficiently high ($>10^{\sup -3}$).
 It is shown from thermodynamic consideration that a mixture of
 supercooled plasma with a perfect (ideal) gas might form a
 plasmoid of the ball-lightning type.
 UW Load Date: 9506.

---- End of Citation ----

Citation: 11 of 96

Accession No.: 4947185.
 Author: Grigorev-A-I. Grigoreva-I-D. Shiryaeva-S-O.
 Author Affil.: Yaroslavl State Univ., Russia.
 Title: Stability of ball lightning against its unneutralized

self-charge.

Source: Zhurnal Tekhnicheskoi Fiziki. vol.65, no.2. pp. 1-10. Feb. 1995.

References: 13 refs.

Trans. Title: Technical Physics. vol.40, no.2. pp. 117-21. Feb. 1995.

ISSN: 0044-4642. 1063-7842.

CODEN: ZTEFA3. TEPHEX.

Language: eng.

Year: 1995.

Pub. Type: journal-article (J).

Treatment: THEORETICAL OR MATHEMATICAL (T).

Pub. Country: Russia. USA.

Class. Code: A9260P. A5235P. A4720. A4765.

Subject: electrohydrodynamics. interface-phenomena. lightning. plasma-instability. Rayleigh-Taylor-instability.

Identifiers: ball lightning. unneutralized self-charge. electrohydrodynamic stability. spherical interface. immiscible fluids. Taylor instabilities. Rayleigh instabilities. dimensionless physical parameters. critical condition. interfacial capillary-wave instability onset. gravity. electric field. self-charge.

Abstract: We investigate the electrohydrodynamic stability of the spherical interface between immiscible fluids against the Taylor and Rayleigh instabilities and obtain a functional relation between two dimensionless physical parameters that characterize the critical condition for the onset of the capillary-wave instability at the interface under the influence of gravity and in the electric field of the self-charge, respectively.

UW Load Date: 9505.

---- End of Citation ----

Citation: 12 of 96

Accession No.: 4921927.

Author: Amirov-A-Kh. Bychkov-V-L.

Author Affil.: Inst. of High Temp., Acad. of Sci., Moscow, Russia.

Title: Ball lightning diameter-lifetime statistical analysis of SKB databank.

Source: Physica Scripta. vol.51, no.3. pp. 413-16. March 1995.

References: 11 refs.

ISSN: 0031-8949.

CODEN: PHSTBO.

Language: eng.

Year: 1995.

Pub. Type: journal-article (J).

Treatment: EXPERIMENTAL (X). THEORETICAL OR MATHEMATICAL (T).

Pub. Country: Sweden.

Class. Code: A9260P. A0250.

Subject: diameter-measurement. lightning. statistical-analysis.

Identifiers: ball lightning. diameter statistical analysis. lifetime statistical analysis. SKB databank. regression analysis. radiation losses.

Abstract: Revelation of the significance of diameter as a factor for the lifetime as a parameter for different ways of Ball Lightning (BL) disappearance has been made. Methods for non-parametric regression analysis have been applied for pairs diameter-radiation losses in correspondence to BL disappearance. BL diameter as a factor turned out to be significant for BL lifetime in the case of explosion and decay and insignificant in the case of extinction. Dependence logarithm of radiation losses-logarithm of BL volume obtained with the help of nonparametric regression treatment turned out to be different according to BL ways of disappearance.

UW Load Date: 9504.
 ----- End of Citation -----

Citation: 13 of 96

Accession No.: 4863900.
 Author: Roth-J-R.
 Author Affil.: Dept. of Electr. & Comput. Eng., Tennessee Univ., Knoxville, TN, USA.
 Title: Ball lightning: What nature is trying to tell the plasma research community.
 Source: Published by: IEEE. New York, NY, USA.
 References: 5 refs.
 Conf. Title: IEEE Conference Record - Abstracts. 1993 IEEE International Conference on Plasma Science (Cat. No.93CH3334-0). Vancouver, BC, Canada. pp. 109. IEEE Nucl & Plasma Sci. Soc. Phys. Dept., Univ. British Columbia. 7-9 June 1993.
 ISBN: 0780313607.
 Language: eng.
 Pub. Type: conference-proceeding (C).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: USA.
 Class. Code: A2852J.
 Subject: fusion-reactor-theory. lightning.
 Identifiers: plasma research. energy density. lightning balls. chemical energy storage. magnetic energy storage. plasma-related phenomenon. ball lightning. fusion research. confinement duration. industrial plasma engineering. glow discharge. atmospheric surface treatment. military applications. nonmaining military antipersonnel weapon.
 Abstract: Summary form only given. The energy density of a few lightning balls has been observed to be as high as 20,000 joules per cubic centimeter, well above the limit of chemical

energy storage of, for example, TNT at 2000 joules per cubic centimeter. This suggests magnetic energy storage in a plasma-related phenomenon, which should be of great theoretical and practical interest to the plasma research community. If the physical processes responsible for ball lightning were understood, this would have very interesting implications for fusion research (because of their long confinement duration, high energy density, and ability to operate at one atmosphere); for industrial plasma engineering (because of their ability to exist for long durations as a glow discharge at one atmosphere, and provide active species for atmospheric surface treatment of materials); and for military applications (because of the observed ability of ball lightning to cause stunning and death), and perhaps provide a nonlethal and nonmaiming military antipersonnel weapon, as well as a potential form of portable electromagnetic pulse to distable sophisticated electronic weapons.

UW Load Date: 9502.

----- End of Citation -----

Citation: 14 of 96

Accession No.: 4857516.

Title: International Conference on Plasma Sciences (ICOPS).

Source: Published by: IEEE. New York, NY, USA. 250 pp.

Conf. Title: International Conference on Plasma Sciences (ICOPS).
Vancouver, BC, Canada. IEEE Nucl & Plasma Sci. Soc. Phys.
Dept., Univ. British Columbia. 7-9 June 1993.

ISBN: 0780313607.

Language: eng.

Pub. Type: conference-proceeding (C).

Treatment: GENERAL OR REVIEW (R).

Pub. Country: USA.

Class. Code: A0130C. A5250J. A5270. A2852J. B1350. B3120G. B2315.

Subject: electron-beams. fusion-reactor-design. fusion-reactors.
ion-beams. lighting. lightning. microwave-devices.
plasma-devices. plasma-diagnostics. plasma-production.
plasma-production-by-laser. plasma-switches.

Identifiers: intense electron beams. environmental science. EM launches.
ion beams. vacuum electronics. laser-produced plasmas.
plasma phenomena. energy. space plasmas. magnetic fusion.
plasma processing. beam microwaves. ball lightning.
spherical plasma configurations. magnetohydrodynamics.
gaseous electronics. electrical gas discharges. ultrafast
Z-pinchs. X-ray lasers. microwave-plasma interactions.
plasma diagnostics. fast-opening switches. computational
plasma science. ETH launchers. fast wave M/W devices.
plasma focus. solid-state plasmas. lighting.

Abstract: The following topics are dealt with: intense electron and ion
beams; vacuum electronics, laser-produced plasmas; basic
plasma phenomena; environmental and energy issues; space
plasmas; magnetic fusion; plasma processing; intense beam
microwaves; ball lightning and spherical plasma
configurations; magnetohydrodynamics; gaseous electronics
and electrical gas discharges; ultrafast Z-pinchs and X-ray
lasers; microwave-plasma interactions; plasma diagnostics;
fast-opening switches; computational plasma science; EM and
ETH launchers; fast wave M/W devices; plasma focus;
solid-state plasmas and switches; plasmas for lighting.

UW Load Date: 9501.

----- End of Citation -----

Citation: 15 of 96

Accession No.: 4833277.
 Author: Smirnov-B-M. Strizhev-A-Ju.
 Author Affil.: Inst. of High Temp., Acad. of Sci., Moscow, Russia.
 Title: Analysis of observational ball lightning by correlation methods.
 Source: Physica Scripta. vol.50, no.5. pp. 606-8. Nov. 1994.
 References: 11 refs.
 ISSN: 0031-8949.
 CODEN: PHSTBO.
 Language: eng.
 Year: 1994.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: Sweden.
 Class. Code: A9260P.
 Subject: lightning.
 Identifiers: observational ball lightning. correlation methods. indoors. outdoors. correlation analysis.
 Abstract: The distributions of observational ball lightning indoors and outdoors on some parameters are compared on the basis of methods of correlation analysis.
 UW Load Date: 9412.
 ----- End of Citation -----

Citation: 16 of 96

Accession No.: 4833275.
 Author: Bychkov-V-L.
 Author Affil.: Inst. of High Temp., Acad. of Sci., Moscow, Russia.
 Title: Polymer ball lightning model.
 Source: Physica Scripta. vol.50, no.5. pp. 591-9. Nov. 1994.
 References: 33 refs.
 ISSN: 0031-8949.
 CODEN: PHSTBO.
 Language: eng.
 Year: 1994.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: Sweden.
 Class. Code: A9260P. A9260Q. A0555. A3520B. A4660. A3620C.
 Subject: fractals. lightning. macromolecules. molecular-configurations. polymers. rheology. thunderstorms.
 Identifiers: polymer molecules. polymer ball lightning model. structure. polymer net. fractal properties. rheologic properties. dielectric properties. electrostatic energy discharges.

thunderstorms.

Abstract: A theoretical model of ball lightning (BL) is presented. According to this model the BL is an aggregate of polymer molecules. These macromolecules are interknitted or sewed together, and therefore the structure is a polymer net with the corresponding rheologic and fractal properties. Because of the dielectric properties such BL can accumulate and store large amounts of the electrostatic energy discharges of thunderstorms. The theory gives a reasonable agreement with observational values of the formation time, stored energy and the life time. It also explains some rheological BL properties, form and the appearance from "nowhere".

UW Load Date: 9412.

----- End of Citation -----

Citation: 17 of 96

Accession No.: 4833274.

Author: Amirov-A-Kh. Bychkov-V-L.

Author Affil.: Inst. of High Temp., Acad. of Sci., Moscow, Russia.

Title: ANOVA of the parameters of ball lightning from the SKB data bank in correspondence to its location (indoors/outdoors).

Source: Physica Scripta. vol.50, no.5. pp. 588-90. Nov. 1994.

References: 8 refs.

ISSN: 0031-8949.

CODEN: PHSTBO.

Language: eng.

Year: 1994.

Pub. Type: journal-article (J).

Pub. Country: Sweden.

Class. Code: A9260P.

Subject: lightning.

Identifiers: variance analysis. ball lightning parameters.

Stakhanov-Bychkov-Keul data bank. indoor location. outdoor location. diameter. lifetime. radiation power. colour.

Abstract: Analysis of variance (ANOVA) of several parameters from the Stakhanov-Bychkov-Keul data bank on ball lightning (BL) has been made. The results show that the factor of the BL location (indoors/outdoors) proves to be significant for such parameters as diameter, lifetime and the radiation power (in comparison with the power of an incandescent lamp); the distribution of BL by colour does not depend on its location.

UW Load Date: 9412.

----- End of Citation -----

Citation: 18 of 96

Accession No.: 4751760.
 Author: Mayorov-S-A. Tkachev-A-N. Yakovlenko-S-I.
 Author Affil.: Inst. of Gen. Phys., Acad. of Sci., Moscow, Russia.
 Title: Metastable supercooled plasma.
 Source: Uspekhi Fizicheskii Nauk. vol.164, no.3. pp. 297-307. March 1994.
 References: 22 refs.
 Trans. Title: Physics-Uspekhi. vol.37, no.3. pp. 279-88. March 1994.
 ISSN: 0042-1294. 1063-7869.
 CODEN: UFNAAG. PHUSEY.
 Language: eng.
 Year: 1994.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: Russia. UK.
 Class. Code: A5265. A5225K.
 Subject: ab-initio-calculations. entropy. ionisation.
 plasma-simulation. supercooling. thermodynamic-properties.
 Identifiers: metastable supercooled plasma. computer ab initio simulation.
 analytical theory. nonergodic properties. classical Coulomb
 plasma. review. many-charged-particle system simulation.
 ionisation. entropy conservation. isolated Hamiltonian
 systems. stochastic action. classical mechanics. plasma
 ionisation degree. thermodynamic considerations. plasmoid.
 ball lightning.
 Abstract: The computer ab initio simulation and analytical theory that
 revealed unexpected nonergodic properties in a classical
 Coulomb plasma are reviewed. The results of a
 many-charged-particle system simulation predict the possible
 existence of a real metastable plasma, supercooled with
 respect to its degree of ionisation. The existence of such a
 plasma state is a consequence of the entropy conservation in
 isolated Hamiltonian systems free from any stochastic action
 from outside. The occurrence of a metastable supercooled
 plasma-similar to a supercooled vapour or superheated
 liquid-depends on two conditions. Firstly, all the charged
 particles should behave exactly according to the laws of
 classical mechanics (hence, most negatively-charged particles
 should preferably be heavy ions). Secondly, the plasma
 ionisation degree should be sufficiently high ($\alpha > 10/\sup -3/$). It is shown from thermodynamic considerations that a
 mixture of a supercooled plasma with an ideal gas might form a
 plasmoid of the ball lightning type.
 UW Load Date: 9410.
 ----- End of Citation -----

Citation: 19 of 96

Accession No.: 4729592.
 Author: Amirov-A-Kh. Bychkov-V-L.
 Author Affil.: Inst. of High Temp., Acad. of Sci., Moscow, Russia.
 Title: ANOVA of several parameters of the SKB data bank on ball
 lightning.
 Source: Physica Scripta. vol.50, no.1. pp. 93-6. July 1994.
 References: 7 refs.
 ISSN: 0031-8949.
 CODEN: PHSTBO.
 Language: eng.
 Year: 1994.
 Pub. Type: journal-article (J).

Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: Sweden.
 Class. Code: A9260P.
 Subject: lightning.
 Identifiers: SKB data bank. ball lightning. ANOVA.
 Stakhanov-Keul-Bychkov data bank. diameter. lifetime.
 parameters.
 Abstract: Revelation of the significance factors ball lightning (BL)
 color and way of disappearance for parameters BL diameter and
 BL lifetime was made. The information used in the analysis
 was from the Stakhanov-Keul-Bychkov data bank on ball
 lightning. The factor BL color turned out to be insignificant
 for the parameters BL lifetime and BL diameter while the
 factor BL way of disappearance was significant for them.
 UW Load Date: 9409.
 ---- End of Citation ----

Citation: 20 of 96

Accession No.: 4723148.
 Author: Handel-P-H. Leitner-J-F.
 Author Affil.: Dept. of Phys. & Astron., Missouri Univ., St. Louis, MO, USA.
 Title: Development of the maser-caviton ball lightning theory.
 Source: Journal of Geophysical Research. vol.99, no.D5. pp.
 10689-91. 20 May 1994.
 References: 9 refs.
 Conf. Title: Ninth International Conference on Atmospheric Electricity
 (ICAE). St. Petersburg, Russia. 15-19 June 1992.
 ISSN: 0148-0227.
 CODEN: JGREA2.
 Language: eng.
 Year: 1994.
 Pub. Type: conference-proceeding (C).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0148-0227/94/93JD-01021\$05.00.
 Pub. Country: USA.
 Class. Code: A9260P.
 Subject: lightning. masers.
 Identifiers: maser-caviton ball lightning theory. photon number evolution.
 single-mode maser. atmospheric maser. localized high-field
 soliton. plasma. VHF energy. electric field pulse.
 electrically shielded enclosures. electrostatic explosion.
 motion. buoyancy. maser spiking phenomena.
 Abstract: The maser-caviton ball lightning theory is briefly described,
 is compared with the available observations of ball lightning,
 and is further developed on the basis of the rate equations
 governing the evolution of the photon number in a single-mode
 maser. The focus of this paper is on the explosive growth of
 the photon number at the premature demise of a large
 atmospheric maser. Ball lightning is a localized high-field
 soliton forming a cavity surrounded by plasma in this theory.
 The source of VHF energy is a large atmospheric maser
 occupying a volume of several cubic miles for the case of open
 air ball lightning, and occupying the volume of the room in
 electrically shielded confined ball lightning cases. The
 main, well-known features of ball lightning, including its
 appearance immediately after a strong electric field pulse
 usually caused by lightning, its passage through closed
 windows and other dielectrics, its always harmless existence

in electrically shielded (e.g. metallic) enclosures, without the possibility of electrostatic-explosive demise, its total absence in the vicinity of high peaks or lightning observation stations, as well as the resonant character of its positioning and motion with respect to conducting bodies, and its apparent lack of buoyancy in the air can all be explained consistently with this theory. The explosive demise of open air ball lightning is described in terms of maser spiking phenomena with the help of elementary equations.

UW Load Date: 9408.

----- End of Citation -----

Citation: 21 of 96

Accession No.: 4718161.
 Author: Golka-R-K-Jr.
 Author Affil.: Golka Assoc., Brockton, MA, USA.
 Title: Laboratory-produced ball lightning.
 Source: Journal of Geophysical Research. vol.99, no.D5. pp. 10679-81. 20 May 1994.
 References: 8 refs.
 Conf. Title: Ninth International Conference on Atmospheric Electricity (ICAE). St. Petersburg, Russia. 15-19 June 1992.
 ISSN: 0148-0227.
 CODEN: JGREAA2.
 Language: eng.
 Year: 1994.
 Pub. Type: conference-proceeding (C).
 Treatment: EXPERIMENTAL (X).
 Report No.: CCCC: 0148-0227/94/93JD-03579\$05.00.
 Pub. Country: USA.
 Class. Code: A9260P. A5290. A5280.
 Subject: discharges-electric. lightning. plasma.
 Identifiers: atmosphere electricity. laboratory-produced. ball lightning. laboratory experiment. high current. cavity-formed plasmode. microwave oven.
 Abstract: For 25 years the author has actively been searching for the true nature of ball lightning and attempting to reproduce it at will in the laboratory. As one might expect, many unidentified lights in the atmosphere have been called ball lightning, including Texas Maffa lights (automobile headlights), flying saucers (UFOs), swamp gas in Ann Arbor, Michigan, etc. For 15 years the author thought ball lightning was strictly a high-voltage phenomenon. It was not until 1984 when he was short-circuiting the electrical output of a diesel electric railroad locomotive that he realized that the phenomenon was related more to a high current. Although he is hoping for some other types of ball lightning to emerge such as strictly electrostatic-electromagnetic manifestations, he has been unlucky in finding laboratory provable evidence.

Cavity-formed plasmodes can be made by putting a 2-inch burning candle in a home kitchen microwave oven. The plasmodes float around for as long as the microwave energy is present.

UW Load Date: 9408.

----- End of Citation -----

Citation: 22 of 96

Accession No.: 4703426.
 Title: Ninth International Conference on Atmospheric Electricity (ICAE).
 Source: Journal of Geophysical Research. vol.99, no.D5. 20 May 1994.
 Conf. Title: Ninth International Conference on Atmospheric Electricity (ICAE). St. Petersburg, Russia. 15-19 June 1992.
 ISSN: 0148-0227.
 CODEN: JGREAA2.
 Language: eng.
 Year: 1994.
 Pub. Type: conference-proceeding (C).
 Pub. Country: USA.
 Class. Code: A0130C. A9260Q. A9260P.
 Subject: atmospheric-electricity. lightning. thunderstorms.
 Identifiers: surface layer. charge. ice. thunderstorms. lightning. ball lightning. mobility.
 Abstract: The following topics were dealt with: surface layer, charge, ice, thunderstorms, lightning, ball lightning, mobility.

UW Load Date: 9407.

----- End of Citation -----

Citation: 23 of 96

Accession No.: 4701809.
 Author: Gaidukov-N-I.
 Title: Steady-state motion of the ball lightning observed by M.T. Dmitriev at the Onega River.
 Source: Zhurnal Tekhnicheskoi Fiziki. vol.64, no.2. pp. 38-48. Feb. 1994.
 References: 15 refs.
 Trans. Title: Technical Physics. vol.39, no.2. pp. 137-42. Feb. 1994.
 ISSN: 0044-4642. 1063-7842.
 CODEN: ZTEFA3. TEPHEX.
 Language: eng.
 Year: 1994.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: Russia. USA.
 Class. Code: A9260P. A9330G.

Subject: electric-charge. electrostatics. lightning.
magnetic-fields.

Identifiers: steady-state motion. ball lightning. Onega River. electric
charge. electrostatic attraction. Stokes force. wind.
magnetic field orientation. Russia.

Abstract: The unique and well-known observation of motion of ball
lightning by Prof. M.T. Dmitriev and the Onega River can be
described by a fairly simple system of equations. Certain
simplifying assumptions are used in the construction of this
system. This system of equations leads an estimate of the
electric charge in ball lightning moving under the influence
of electrostatic attraction and the Stokes force created by
wind. This system of equations also yields the orientation of
the magnetic field of the ball lightning.

UW Load Date: 9407.
----- End of Citation -----

Citation: 24 of 96

Accession No.: 4701764.

Author: Gaidukov-N-I.

Author Affil.: Pedagogical Inst., Orekhovo-Zuevo, Russia.

Title: Equations of motion of ball lightning in the magnetic field of
a hanging conductor.

Source: Zhurnal Tekhnicheskoi Fiziki. vol.63, no.10. pp. 20-9. Oct.
1993.

References: 18 refs.

Trans. Title: Technical Physics. vol.38, no.10. pp. 844-8. Oct. 1993.

ISSN: 0044-4642. 1063-7842.

CODEN: ZTEFA3. TEPHEX.

Language: eng.

Year: 1993.

Pub. Type: journal-article (J).

Treatment: THEORETICAL OR MATHEMATICAL (T).

Pub. Country: Russia. USA.

Class. Code: A9260P.

Subject: lightning. magnetic-field-effects. magnetic-fields.

Identifiers: equations of motion. ball lightning. external magnetic
field. hanging conductor. high-velocity air flow. rolling.

Abstract: Observations of the motion of ball lightning in high-velocity
air flow and observations of the "rolling" of ball lightning
along a conductor are used to determine the configuration of
the magnetic field of the ball lightning. The equations of
motion of ball lightning in an external magnetic field are
constructed.

UW Load Date: 9407.
----- End of Citation -----

Citation: 25 of 96

Accession No.: 4696811.
 Author: Gaidukov-N-I.
 Author Affil.: Pedagogical Inst., Orekhovo-Zuevo, Russia.
 Title: Hydrodynamic model of the interaction of ball lightning with
 the airstream of an aircraft in flight.
 Source: Zhurnal Tekhnicheskoi Fiziki. vol.63, no.9. pp. 16-25.
 Sept. 1993.
 References: 22 refs.
 Trans. Title: Technical Physics. vol.38, no.9. pp. 747-51. Sept. 1993.
 ISSN: 0044-4642. 1063-7842.
 CODEN: ZTEFA3. TEPHEX.
 Language: eng.
 Year: 1993.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC-1063-7842/93/090747-05\$10.00.
 Pub. Country: Russia. USA.
 Class. Code: A9260P.
 Subject: atmospheric-movements. hydrodynamics. lightning.
 Identifiers: large-radius ball lightning. airstream. aircraft in flight.
 hydrodynamic model. equations of motion.
 Abstract: Observations of the motion of large-radius ball lightning in
 the airstreams of moving aircraft are used to determine its
 equations of motion for a specially selected model, so that
 its behavior can be investigated in various special cases
 encountered in real environments. These equations have
 applications in describing the interaction of lightning with
 the airstream of an aircraft and in establishing flight
 regimes that will ensure flight safety when an aircraft
 encounters ball lightning of large radius.
 UW Load Date: 9407.
 ----- End of Citation -----

Citation: 26 of 96

Accession No.: 4678293.
 Author: Alanakyan-Yu-R.
 Title: Energy capacity of an electromagnetic vortex in the
 atmosphere.
 Source: Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki. vol.105,
 no.3. pp. 601-13. March 1994.
 References: 16 refs.
 Trans. Title: Journal of Experimental and Theoretical Physics. vol.78,

no.3. pp. 320-6. March 1994.
 ISSN: 0044-4510. 1063-7761.
 CODEN: ZETFA7. JTPHES.
 Language: eng.
 Year: 1994.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 1063-7761/94/030320-07\$10.00.
 Pub. Country: Russia. USA.
 Class. Code: A5230. A9260P.
 Subject: lightning. plasma-flow.
 Identifiers: electromagnetic vortex. atmosphere. energy capacity.
 self-localization. plasma. unneutralized charges.
 high-frequency field. positively charged solid object.
 hydrodynamic vortex. momentum transfer. ball lightning.
 Abstract: The self-localization of an electromagnetic vortex is
 investigated under conditions such that partial charge
 separation occurs in the plasma that forms near the vortex:
 outside the vortex there is an excess of electrons and inside
 it there is an excess of positive charges. It is shown that
 the presence of unneutralized charges increases the energy
 content of the vortex without increasing the energy
 dissipation of the high-frequency field in the plasma. The
 lifetime of the vortex can thereby be substantially increased.
 A mechanism is examined for confining a positively charged
 solid object in the interior of the vortex. This body serves
 as ballast and can retard the buoyant rise of the vortex in
 the atmosphere. The question of the formation of a
 hydrodynamic vortex at the periphery of an electromagnetic
 vortex by transfer of momentum from a high-frequency field to
 the surrounding medium is discussed; this affects the nature
 of the motion of the vortex in a free atmosphere. It is shown
 that the properties of the vortex are consistent with some of
 the properties of ball lightning.
 UW Load Date: 9406.
 ---- End of Citation ----

Citation: 27 of 96

Accession No.: 4675921.
 Author: Turner-D-J.
 Author Affil.: Interface Anal. Centre, Bristol Univ., UK.
 Title: The structure and stability of ball lightning.
 Source: Philosophical Transactions of the Royal Society, Series A
 (Physical Sciences and Engineering). vol.347, no.1682. pp.
 83-111. 15 April 1994.
 References: 33 refs.
 ISSN: 0962-8428.
 Language: eng.
 Year: 1994.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: UK.
 Class. Code: A9260P.
 Subject: lightning. plasma.
 Identifiers: ball lightning. stability. structure. shape. size range.
 brightness. motion. energy content. central plasma core.
 high-energy ion recombination. hydrated ions. hydration
 zone. thermochemical refrigeration.

Abstract: The main characteristics of ball lightning are well established. They include its general appearance (shape, size range, brightness, etc.), its peculiar motion and, less satisfactorily, its energy content. A remarkably consistent picture emerges from the thousands of detailed descriptions which are now available. There is, however, no such consistency in the various hypotheses that have been put forward to explain ball lightning. The only thing most of them share is an ability to explain a few aspects of the phenomenon at the expense of physically impossible requirements in other areas. A model is described of a central plasma core surrounded by a cooler, intermediate zone, in which recombination of most or all of the high-energy ions takes place. Further out is a zone in which temperatures are low enough for any ions present to become extensively hydrated. Hydrated ions can also form spontaneously in the inner, hotter, parts of this hydration zone. Near the surface of the ball is a region, quite essential to the model, in which thermochemical refrigeration can take place.

UW Load Date: 9406.

---- End of Citation ----

Citation: 28 of 96

Accession No.: 4670300.
 Author: Smirnov-B-M.
 Author Affil.: Inst. of High Temp., Moscow, Russia.
 Title: Gasdynamics of a fractal ball.
 Source: Zhurnal Tekhnicheskoi Fiziki. vol.63, no.4. pp. 190-3. April 1993.
 References: 16 refs.
 Trans. Title: Technical Physics. vol.38, no.4. pp. 359-60. April 1993.
 ISSN: 0044-4642. 1063-7842.
 CODEN: ZTEFA3. TEPHEX.
 Language: eng.
 Year: 1993.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 1063-7842/93/040359-02\$10.00.
 Pub. Country: Russia. USA.
 Class. Code: A4740D. A9260P.
 Subject: aggregation. drag. fluid-dynamics. fractals. lightning.
 Identifiers: gas dynamics. connected material. fractal ball. fractal cluster. entangled fractal fibers. expansion. weakly ionized vapor. condensation. solid particles. fractal aggregates. external electric field. ball lightning. surface tension. viscous layer. interface. Reynolds number. kinematical viscosity. Stokes formula. drag force. movement. air.

Abstract: A fractal cluster is a system of entangled fractal fibers. This object is formed in a gas as a result of laser or electrical discharge action on a surface. The expansion of the weakly ionized vapor that is formed, which is accompanied by the condensation of the vapor on the ions, leads to the formation of solid particles that then join into fractal aggregates. The latter, in turn, under the action of an

external electric field, then join into fractal fibers, out of which are formed the fractal clusters. A physical object that has the structure of a fractal cluster is ball lightning. The gasdynamics of ball lightning has been studied thoroughly by N.I. Gaidukov (1989). Without specifying in detail the structure of ball lightning, he assumed that the material of ball lightning is connected like a liquid, so that it can be characterized by a surface tension. Moreover, the molecules of air do not attach to it. Using this model, Gaidukov was able to describe a large number of effects associated with ball lightning: its passage through small holes and slits and its capture by the trail of airplanes or helicopters. In the next stage of the investigations, by analyzing the effects associated with the sighting of ball lightning, Gaidukov pointed out that to explain these effects it would be necessary to postulate the absence of a viscous layer at the interface between the ball lightning and the air. The authors formulate this result by another means. They introduce the Reynolds number $Re=Rv/\nu$, where $\nu=0.16$ cm²/s is the kinematical viscosity of the air. For low Reynolds numbers the Stokes formula is valid, which gives $C=6/Re$. At large Reynolds numbers the parameter C approximately 1 depends only weakly on the Reynolds number. The conclusion of Gaidukov in this terminology reduces to the statement that the parameter C for ball lightning does not depend on the Reynolds number even when that number is small. The article presents calculations of the drag force experienced by a fractal cluster in its movement through the air. The expression obtained supports Gaidukov's conclusion.

UW Load Date: 9406.

---- End of Citation ----

Citation: 29 of 96

Accession No.: 4655067.
 Author: Gaidukov-N-I.
 Author Affil.: Pedagogical Inst., Moscow, Russia.
 Title: Magnetic field of ball lightning.
 Source: Teplofizika Vysokikh Temperatur. vol.31, no.6. pp. 1038. Nov.-Dec. 1993.
 Trans. Title: High Temperature. vol.31, no.6. pp. 954. Nov.-Dec. 1993.
 ISSN: 0040-3644. 0018-151X.
 CODEN: TVYTAP. HITEA4.
 Language: eng.
 Year: 1993.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: Russia. USA.
 Class. Code: A9260P.
 Subject: geomagnetism. lightning.
 Identifiers: ball lightning. atmospheric flows. magnetic induction vector. spherical coordinates. plasma object. thermodynamic object. cylindrical coordinate system. electrodynamic forces. drift motion. intrinsic electromagnetic field. charge density. magnetization.
 Abstract: Summary form only given. Analysis of the data on experimentally observed motion of a ball lightning in various atmospheric flows of air and its "rolling" along a conductor with current helped establish the presence of a magnetic field of the lightning. The components of the magnetic induction vector of this field inside and outside the lightning are determined in the spherical coordinates by the expressions

$B_r = B_0 \cos \theta$, $B_\theta = -B_0 \sin \theta$, $0 \leq r < a$; $B_r = ((B_0/a^3)/(r^3)) \cos \theta$, $B_\theta = ((B_0/a^3)/(2r^3)) \sin \theta$, $a < r < \infty$; $B_0 = \text{const}$. Since the ball lightning is an electrically charged and magnetized plasma object, equilibrium of this thermodynamic object in the axial direction of the cylindrical coordinate system is due to the zero balance of the electrodynamic forces acting on any lightning segment cut off by the plane $z = h < a$. Lightning equilibrium in the radial direction of the same coordinate system is provided by drift motion of ions "maintaining" the magnetic field in the intrinsic electromagnetic field. This results in rotation of the lightning about the z axis. Under the equilibrium conditions, the charge density ρ and magnetization M of the plasma of the ball lightning are related by $\rho = \sqrt{3M/a}$, where a is the radius of the ball lightning.

UW Load Date: 9405.

----- End of Citation -----

Citation: 30 of 96

Accession No.: 4619612.
 Author: Klimov-A-I. Mishin-G-I.
 Author Affil.: A.F. Ioffe Physicotechnical Inst., Acad. of Sci., St. Petersburg, Russia.
 Title: Anomalous wave and gasdynamic properties of long-lived high-energy plasmoids.
 Source: Pis'ma v Zhurnal Tekhnicheskoi Fizika. vol.19, no.13-14. pp. 19-24. July 1993.
 References: 8 refs.
 Trans. Title: Technical Physics Letters. vol.19, no.7. pp. 405-7. July 1993.
 ISSN: 0320-0108. 1063-7850.
 CODEN: PZTFDD. TPLEED.
 Language: eng.
 Year: 1993.
 Pub. Type: journal-article (J).
 Treatment: EXPERIMENTAL (X).
 Report No.: CCCC 1063-7850/93/070405-03\$10.00.
 Pub. Country: Russia. USA.
 Class. Code: A5230. A5225F. A5235.
 Subject: plasma-flow. plasma-transport-processes. plasma-waves.
 Identifiers: wave properties. gasdynamic properties. long-lived high-energy plasmoids. simulate natural ball lightning.
 Abstract: There has recently been increased interest in the study of long-lived high-energy plasmoids (LEPs) generated by pulsed erosion plasmotrons in view of their possible use in solving a number of practical problems and also of attempts to simulate natural ball lightning. The work now reported was devoted to investigating certain unusual properties of such LEPs.

UW Load Date: 9404.

----- End of Citation -----

Citation: 31 of 96

Accession No.: 4573518.
 Author: Smirnov-B-M.
 Author Affil.: Inst. of High Temp., Acad. of Sci., Moscow, Russia.
 Title: Observational parameters of ball lightning.
 Source: Physica Scripta. vol.48, no.5. pp. 638-40. Nov. 1993.
 References: 21 refs.
 ISSN: 0031-8949.
 CODEN: PHSTBO.

Language: eng.
 Year: 1993.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: Sweden.
 Class. Code: A9260P.
 Subject: lightning.
 Identifiers: observational parameters. ball lightning. data bank. error. observational events.
 Abstract: Distributions of ball lightning depending on some parameters are given as a result of summarizing available evidence of its observations. The accuracy of the data is connected with correlations between different parts of the total data bank. The main error of the output data is determined by treatment methods of observational events inside individual data banks.
 UW Load Date: 9402.
 ----- End of Citation -----

Citation: 32 of 96

Accession No.: 4555338.
 Author: Gaidukov-N-I.
 Title: Hydrodynamic interaction of ball lightning and unsteady airflows.
 Source: Izvestiya Akademii Nauk SSSR, Mekhanika Zhidkosti i Gaza. vol.28, no.1. pp. 192-5. Jan.-Feb. 1993.
 References: 12 refs.
 Trans. Title: Fluid Dynamics. vol.28, no.1. pp. 145-8. Jan.-Feb. 1993.
 ISSN: 0568-5281. 0015-4628.
 CODEN: IMZGAB. FLDYAH.
 Language: eng.
 Year: 1993.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0015-4628/93/2801-0145\$12.50.
 Pub. Country: Russia. USA.
 Class. Code: A9260P. A4740. A4720.
 Subject: aerodynamics. flow-instability. hydrodynamics. lightning.
 Identifiers: hydrodynamic interactions. jet engine. fighter. ball lightning. unsteady airflows. high-velocity airflows. nondeformable sphere. ideal incompressible fluid. aircraft. engines. spherical shape. hydrodynamic forces. one-dimensional motion. flight conditions.
 Abstract: Numerous observational results relating to the characteristics of the motion of ball lightning in high-velocity airflows give reason to suppose that in an airflow it behaves like a nondeformable sphere in an ideal incompressible fluid. Nevertheless, the lightning, whose dimensions are comparable with those of an aircraft, is captured by the engines and pursues the aircraft persistently, moving at velocities of 150 to 200 m/sec, while retaining its spherical shape and a constant distance from the tail. If the lightning with a radius of 5 m were replaced by a solid sphere of the same radius, then for it to pursue the aircraft it would be necessary to apply to it a force of the order of several tons. Obviously, in that case there can be no question of the

pursuit of an aircraft under the influence of hydrodynamic forces. Leaving aside the physical causes of this behavior of lightning in an air medium, we will assume the property to be an established experimental fact. The author considers the one-dimensional motion of ball lightning in the unsteady airflow created by an aircraft moving in a constant direction, on the assumption that the lightning may be either in front of or behind the aircraft. This formulation of the problem follows from observations made under actual flight conditions when lightning with dimensions comparable with those of the aircraft interacted hydrodynamically with its engines.

UW Load Date: 9401.

----- End of Citation -----

Citation: 33 of 96

Accession No.: 4551572.
 Author: Endean-V-G.
 Author Affil.: Sch. of Eng. & Comput. Sci., Durham Univ., UK.
 Title: Spinning electric dipole model of ball lightning.
 Source: IEE Proceedings A (Science, Measurement and Technology).
 vol.140, no.6. pp. 474-8. Nov. 1993.
 References: 17 refs.
 ISSN: 0960-7641.
 CODEN: IPATEI.
 Language: eng.
 Year: 1993.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0960-7641/93/\$7.50+0.00.
 Pub. Country: UK.
 Class. Code: A9260P. B5110. A4110F.
 Subject: electromagnetic-field-theory. lightning.
 Identifiers: spinning electric dipole model. ball lightning. spherical
 geometry. oscillating electric dipole model. time averaged
 electrical force. radial plasma pressure gradient. plasmoid.
 virial theorem.
 Abstract: An analytical solution is spherical geometry of a very rapidly
 rotating and oscillating electric dipole model of ball
 lightning is presented. Total current (conduction plus
 displacement) is assumed to be zero everywhere, resulting in
 the considerable simplification of no magnetic field. The
 time averaged electrical force is radial, depends only on
 radius, and is balanced by a radial plasma pressure gradient.
 Average energy densities can exceed the external atmospheric
 pressure by large factors. Objections to the plasmoid
 explanation of ball lightning based on the virial theorem are
 therefore satisfactorily dealt with. Compared with

alternative explanations of ball lightning, the model has the virtues of simplicity, a straightforward, natural generation mechanism, and no special requirements such as aerogels and the reactive substances of chemical theories.

UW Load Date: 9401.

---- End of Citation ----

Citation: 34 of 96

Accession No.: 4535431.
 Author: Smirnov-B-M.
 Author Affil.: Sci. Assoc., IVTAN, Acad. of Sci., Moscow, Russia.
 Title: Radiative processes involving fractal structures.
 Source: Uspekhi Fizicheskii Nauk. vol.163, no.7. pp. 51-63. July 1993.
 References: 95 refs.
 Trans. Title: Physics-Uspekhi. vol.36, no.7. pp. 592-603. July 1993.
 ISSN: 0042-1294. 1063-7869.
 CODEN: UFNAAG. PHUSEY.
 Language: eng.
 Year: 1993.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 1063-7869/93/070592-12\$10.00.
 Pub. Country: Russia. USA.
 Class. Code: A8240P. A5280. A9260P.
 Subject: discharges-electric. flames. fractals. lightning.
 Identifiers: radiative processes. fractal structures. flame. candle. fractal discharges. fractal aggregates. ball lightning. fractal tangle.
 Abstract: Radiative processes in the flame of a candle and fractal discharges associated with the presence in them of fractal aggregates are examined. A brief description is given of the modern fractal concept of ball lightning. An analysis is given of a specific physical object-a fractal tangle.

UW Load Date: 9401.

---- End of Citation ----

Citation: 35 of 96

Accession No.: 4517777.
 Author: Maiorov-S-A. Tkachev-A-N. Yakovlenko-S-I.
 Author Affil.: Inst. of Gen. Phys., Acad. of Sci., Russia.
 Title: Recombination of a Coulomb plasma and nonbinary interaction effects.
 Source: Izvestiya Vysshikh Uchebnykh Zavedenii, Fizika. vol.36, no.1. pp. 68-89. Jan. 1993.
 References: 17 refs.
 Trans. Title: Russian Physics Journal. vol.36, no.1. pp. 55-73. Jan. 1993.
 ISSN: 0021-3411. 1064-8887.
 CODEN: IVUFAC. RPJOEB.

Language: eng.
Year: 1993.
Pub. Type: journal-article (J).
Treatment: THEORETICAL OR MATHEMATICAL (T).
Report No.: CCCC: 1064-8887/93/3601-0055\$12.50.
Pub. Country: Russia. USA.
Class. Code: A5225D. A9260P. A5220H.
Subject: ion-recombination. plasma-kinetic-theory.
plasma-transport-processes.
Identifiers: nonbinary interaction effects. Coulomb plasma. diffusion.
kinetic models. two-level atoms. diffusion coefficients.
electron-hole plasma. recombination rate. recombination
time. ion-ion plasma. ball lightning.
Abstract: A theory has been constructed for the recombination of a
Coulomb plasma with allowance for the anomalous nature of
diffusion along the energy axis in the negative energy region
of Coulomb particles. These anomalies, which were revealed
earlier by first-principles numerical simulation, are due to
the dynamic memory of a classical Coulomb plasma. Two kinetic
models are presented. The first takes random collisions with
a hypothetical gas of two-level atoms into account.
Comparison of the results of this model with first-principles
calculations shows that the characteristic of the diffusion
coefficients is missing. The second model takes the discrete
nature of bound states into account. Calculations show that
for an electron-hole plasma the recombination rate deviates
substantially from the results of conventional theory only
when either the recombination time is very short or the effect
is masked by radiative recombination. For an ion-ion plasma,
the deviations from conventional recombination theory run to
several orders of magnitude. This is of interest in relation
to ball lightning.
UW Load Date: 9311.
----- End of Citation -----

Citation: 36 of 96

Accession No.: 4515505.
Author: Avramenko-R-F. Gridin-A-Yu. Klimov-A-I. Nikolaeva-V-I.
Author Affil.: Sci. Res. Inst. of Radio Apparatus Constr., Moscow, Russia.
Title: Experimental study of energetic compact plasma formations.
Source: Teplofizika Vysokikh Temperatur. vol.30, no.6. pp. 1057-61.
Nov.-Dec. 1992.
References: 7 refs.
Trans. Title: High Temperature. vol.30, no.6. pp. 870-3. Nov.-Dec. 1992.
ISSN: 0040-3644. 0018-151X.
CODEN: TVYTAP. HITEA4.
Language: eng.
Year: 1992.
Pub. Type: journal-article (J).
Treatment: EXPERIMENTAL (X).
Report No.: CCCC: 0018-151X/92/3006-0870\$12.50.
Pub. Country: Russia. USA.
Class. Code: A5280. A5250D.
Subject: discharges-electric. lightning. plasma-production.
Identifiers: energetic compact plasma formations. erosion discharge. gas
dynamic behavior. ball lightning.
Abstract: The structure of energetic plasma formations obtained using an
erosion discharge and the gas dynamic behavior of these
objects are studied experimentally. An energetic plasma
formation is similar to natural ball lightning in several

respects.
 UW Load Date: 9311.
 ----- End of Citation -----

Citation: 37 of 96

Accession No.: 4510931.
 Author: Smirnov-B-M.
 Author Affil.: IVTRAN, Moscow, Russia.
 Title: Radiation of some fractal structures.
 Source: International Journal of Theoretical Physics. vol.32, no.8.
 pp. 1453-64. Aug. 1993.
 References: 60 refs.
 ISSN: 0020-7748.
 CODEN: IJTPBM.
 Language: eng.
 Year: 1993.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0020-7748/93/0800-1453\$07.00.
 Pub. Country: USA.
 Class. Code: A8240P. A9260P. A5280.
 Subject: discharges-electric. flames. fractals. lightning.
 Identifiers: fractal structures. candle flame. fractal discharges. ball lightning.
 Abstract: The fractal properties of a candle flame and fractal discharges are considered. The fractal concept is applied to ball lightning.
 UW Load Date: 9311.
 ----- End of Citation -----

Citation: 38 of 96

Accession No.: 4459211.
 Author: King-M-B.
 Title: Progress and results in zero-point energy research.
 Source: Published by: Soc. Automotive Eng. Warrendale, PA, USA.
 1992.
 References: 49 refs.
 Conf. Title: Proceedings of the 27th Intersociety Energy Conversion Engineering Conference (IEEE Cat. No.92CH3164-1). San Diego, CA, USA. pp. 4.297-4.302 vol.4. IEEE. ACS. AIAA. AIChE. ANS. ASME. SAE. 3-7 Aug. 1992.
 ISBN: 0780306937.
 Language: eng.
 Year: 1992.
 Pub. Type: conference-proceeding (C).
 Treatment: EXPERIMENTAL (X).
 Pub. Country: USA.
 Class. Code: A8610Z. A5235F. A5235D. A5280. A8245. A2588. A2570J. A2470.
 Subject: discharges-electric. electrochemistry.
 heavy-ion-nucleus-reactions. nuclear-fusion.

nuclear-polarisation. plasma-oscillations. plasma-waves.
sonoluminescence.

Identifiers: zero-point energy research. concentrated vacuum polarization.
atomic nuclei. synchronous motion. heavy-ion collisions.
plasma ion-acoustic oscillations. sonoluminescence.
fractoemission. large charge density plasmoids. ball
lightning. abrupt electric discharges. light water cold
fusion. voltage spikes. ion-acoustic activity. Hyde's
voltage divider. solid state methods. lattice spinor waves.

Abstract: It is pointed out that from the concentrated vacuum
polarization of atomic nuclei arises the possibility of
triggering a macroscopic zero-point energy (ZPE) coherence
with the synchronous motion of many nuclei. Experimental
evidence arises from energy anomalies associated with
heavy-ion collisions, plasma ion-acoustic oscillations,
sonoluminescence, fractoemission, large charge density
plasmoids, ball lightning, abrupt electric discharges, and
light water cold fusion experiments. Further supporting
evidence arises from inventions that utilize coherent ion
motions and output excessive energy. The sharp voltage spikes
that arise from ion-acoustic activity can be converted by use
of circuits such as Hyde's voltage divider. The largest
effects might be produced by solid state methods that manifest
dual, counter-rotating, acoustical, lattice spinor waves. If
synchronous ion-acoustic activity coheres the zero-point
energy, there will be many more inventions forthcoming, and a
new energy source will be recognized.

UW Load Date: 9308.

----- End of Citation -----

Citation: 39 of 96

Accession No.: 4453930.
Author: Mal-R-K. Sengupta-P-R.
Author Affil.: Dept. of Math. Krishnath Coll., West Bengal, India.
Title: Radial motion of a non-homogeneous solid spherical body in a
magnetic field (Earth).
Source: Proceedings of the Indian National Science Academy, Part A.
vol.59, no.2. pp. 157-67. March 1993.
References: 17 refs.
ISSN: 0370-0046.
CODEN: PIPSBD.
Language: eng.
Year: 1993.
Pub. Type: journal-article (J).
Treatment: THEORETICAL OR MATHEMATICAL (T).
Pub. Country: India.
Class. Code: A9135C. A9125Q. A9135G. A9135E.

Subject: Earth-core. Earth-structure. geomagnetism.
magnetic-field-effects. terrestrial-electricity.

Identifiers: ball lightning. Earth. nonhomogeneous body. radial motion.
initially stressed solid spherical body. magnetic field.
azimuthal direction. power-law variation. elastic
parameters. initial stress. creep. current density.
implosion behaviour. polar regions.

Abstract: The object of the present paper is to investigate the radial
motion of an initially stressed solid spherical body, assumed
to be non-homogeneous, isotropic and elastic, in the presence
of a magnetic field in the azimuthal direction. The
non-homogeneity of the solid is characterised by assuming a
power-law variation of the elastic parameters only, and the
initial stress being hydrostatic in nature, produced by a slow
process of creep due to extra mass over the surface of the
Earth, which has been taken as the direct application of the
theory. The final mathematical results on the displacement,
stresses the current density enunciate certain peculiarities
in the behaviour of the Earth's phenomenological changes, such
as the uncommon implosion behaviour in the deformation of the
Earth and the high concentration of the current density in the
polar regions.

UW Load Date: 9308.
----- End of Citation -----

Citation: 40 of 96

Accession No.: 4431748.

Author: Grigorev-A-I. Grigoreva-I-D. Shiryaeva-S-O.

Title: Some characteristics of the initiation and termination of ball
lightning.

Source: Pis'ma v Zhurnal Tekhnicheskoi Fizika. vol.18, no.23-24. pp.
46-8. Dec. 1992.

References: 10 refs.

Trans. Title: Soviet Technical Physics Letters. vol.18, no.12. pp. 781.
Dec. 1992.

ISSN: 0320-0108. 0360-120X.

CODEN: PZTFDD. STPLD2.

Language: eng.

Year: 1992.

Pub. Type: journal-article (J).

Treatment: THEORETICAL OR MATHEMATICAL (T). EXPERIMENTAL (X).

Report No.: CCCC: 0360-120X/92/120781-01\$02.00.

Pub. Country: Russia. USA.

Class. Code: A9260P.

Subject: lightning.

Identifiers: initiation. termination. ball lightning. statistical
analysis. site of origin.

Abstract: In the last decade there has been a considerable revival of
interest on the part of researchers in such obscure
geophysical phenomena as ball lightning. Up to now the major
source of new information on ball lightning has been analyses
of observers' descriptions of its appearance under natural
conditions. Over several years the authors have collected
previously unknown descriptions of ball lightning and prepared

them for statistical analysis on a computer. The number of descriptions of ball lightning prepared for statistical analysis has now reached 5315, which allows for a rigorous analysis. One of the most interesting and unexpected results of analyzing these observational data on a computer has been the discovery of a statistically significant difference among characteristics of the termination of ball lightning that are distinguished by the site of origin.

UW Load Date: 9307.

---- End of Citation ----

Citation: 41 of 96

Accession No.: 4426348.
 Author: Smirnov-B-M.
 Author Affil.: Inst. of High Temp., IVTAN, Moscow, Russia.
 Title: Physics of ball lightning.
 Source: Physics Reports. vol.224, no.4. pp. 151-236. March 1993.
 References: 18 refs.
 ISSN: 0370-1573.
 CODEN: PRPLCM.
 Language: eng.
 Year: 1993.
 Pub. Type: journal-article (J).
 Treatment: GENERAL OR REVIEW (R). THEORETICAL OR MATHEMATICAL (T).
 EXPERIMENTAL (X).
 Num. Indexing: temperature 2.0E+03 K.
 Report No.: CCCC: 0370-1573/93/\$24.00.
 Pub. Country: Netherlands.
 Class. Code: A9260P. A9260W. A9260K.
 Subject: atmospheric-radiation. atmospheric-temperature. lightning.
 plasma.
 Identifiers: plasma. gas dynamics. mechanics. energetic radiative
 processes. ball lightning. spotted structure. glow.
 temperatures. electrical processes. sparse fractal
 structure. density. knot of fractal fibers. thermal waves.
 surface energy. glowing hot zones. 2000 K.
 Abstract: A description of the state of the ball lightning problem is
 given. The properties of ball lightning have been derived
 from a statistical treatment of thousands of observations.
 The experimental modeling of ball lightning as a whole is
 reviewed. The analysis leads to the conclusion that ball
 lightning has a rigid skeleton; the spotted structure of its
 glow follows from the large difference between the radiative
 and mean temperatures of the ball lightning. Ball lightning
 is a many-sided phenomenon, and therefore has a number of
 analogs which are related to its separate properties and which
 can be modeled. The mechanical gas-dynamical, energetic
 radiative and electrical processes of ball lightning are
 analyzed on the basis of such analogs and scientific
 information. According to this analysis, the substance
 composing ball lightning has a sparse fractal structure,
 similar to an aerogel, with the density of a gas and the

behavior of a solid or liquid. The best model resembling the ball lightning structure is a knot of fractal fibers. The glow of ball lightning is created by many thermal waves that propagate along separate fibers, use the surface energy of the structure, and form glowing hot zones with a temperature of about 2000 K. A number of models considered allow one to study the nature of ball lightning in detail.

UW Load Date: 9307.

----- End of Citation -----

Citation: 42 of 96

Accession No.: 4395364.
 Title: IEEE Conference Record - Abstracts. 1992 IEEE International Conference on Plasma Science (Cat. No.92CH3184-9).
 Source: Published by: IEEE. New York, NY, USA. 188 pp. 1992.
 Conf. Title: IEEE Conference Record - Abstracts. 1992 IEEE International Conference on Plasma Science (Cat. No.92CH3184-9). Tampa, FL, USA. IEEE. 1-3 June 1992.
 ISBN: 078030716X.
 Language: eng.
 Year: 1992.
 Pub. Type: conference-proceeding (C).
 Treatment: GENERAL OR REVIEW (R). PRACTICAL OR PRODUCT REVIEW (P). THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: USA.
 Class. Code: A0130C.
 Subject: plasma. plasma-applications. plasma-devices.
 Identifiers: electron source. ion source. electron beams. environmental issues. plasma phenomena. waves. plasma diagnostics. space plasma diagnostics. magnetic fusion. plasma sources. ion beams. intense beam microwaves. microwave-plasma interactions. plasma focus. ultrafast Z pinches. plasma processing. electrical gas discharges. fast opening switches. MHD. launchers. X-ray lasers. computational plasma science. solid-state plasmas. energy issues. vacuum electronics. lighting. gaseous electronics. ball lightning. spherical plasmas.
 Abstract: The following topics were dealt with: plasma phenomena and waves; plasma diagnostics; space plasma diagnostics; magnetic fusion; electron, ion, and plasma sources; intense electron and ion beams; intense beam microwaves; fast-wave M/W devices; microwave-plasma interactions; plasma focus; ultrafast Z pinches; plasma processing; electrical gas discharges; fast opening switches; MHD; launchers; X-ray lasers; computational plasma science; solid-state plasmas and switches; environmental and energy issues; vacuum electronics; plasmas for lighting; gaseous electronics; and

ball lightning and other spherical plasmas.
 UW Load Date: 9305.

----- End of Citation -----

Citation: 43 of 96

Accession No.: 4394538.
 Author: Ignatovich-V-K.
 Author Affil.: JINR, Dubna, Russia.
 Title: Electromagnetic model of ball lightning.
 Source: Laser Physics. vol.2, no.6. pp. 991-6. Nov. 1992.
 References: 19 refs.
 ISSN: 1054-660X.
 Language: eng.
 Year: 1992.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: USA.
 Class. Code: A9260P. A4255. A9260D.
 Subject: atmospheric-movements. laser-theory. lightning. plasma.
 shock-waves.
 Identifiers: frozen shock wave. plasma. ball lightning. point explosion.
 laser radiation. ponderomotive forces. surface tension. gas
 pressure. lifetime. photon shell. tunnel transitions.
 potential barrier. electrostriction. orbital forces.
 thermal energy. captured gas. electrical energy. spherical
 capacitor. photon layer.
 Abstract: A model of ball lightning in the form of a 'frozen' shock wave
 from a point explosion which is blocked by laser radiation
 along its front is proposed. Under the high density of
 photons, ponderomotive forces of surface tension
 overcompensate the gas pressure. The lifetime of the photon
 shell of the ball is determined by the probability of tunnel
 transitions of photons through the potential barrier formed by
 the combined action of electrostriction and orbital forces.
 The energy of the lightning consists of the thermal energy of
 the captured gas, the energy of photons confined in the
 spherical layer, and the electrical energy of the spherical
 capacitor with charge appearing during the explosion.
 Discharge of the capacitor is prevented by the photon layer.
 The feasibility of laboratory generation of ball lightning is
 discussed.

UW Load Date: 9305.

----- End of Citation -----

Citation: 44 of 96

Accession No.: 4385999.
 Author: Yakovlenko-S-I.
 Author Affil.: Gen. Phys. Inst., Acad. of Sci., Moscow, Russia.
 Title: On the possibility of fireball modeling using a laser.
 Source: Laser Physics. vol.2, no.2. pp. 196-7. April 1992.
 References: 7 refs.
 ISSN: 1054-660X.
 Language: eng.
 Year: 1992.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: USA.
 Class. Code: A5250J.
 Subject: plasma-production-and-heating-by-laser-beam. plasma-theory.
 Identifiers: nonideal plasma. recombination. ball lightning. fireball
 modeling. clot. operating medium. quantum energy.
 ionization threshold. theoretical investigations.
 Abstract: The author proposes to form a clot of non-ideal plasma by
 ionizing the operating medium (vapor) with a laser having a
 quantum energy close to the ionization threshold. According
 to the latest theoretical investigations the plasma should
 recombine in an anomalously long time.
 UW Load Date: 9305.

---- End of Citation ----

Citation: 45 of 96

Accession No.: 4376365.
 Author: Yasui-K.
 Author Affil.: Dept. of Phys., Waseda Univ., Tokyo, Japan.
 Title: Plasma fireballs fed by microwaves.
 Source: Physics Letters A. vol.173, no.6. pp. 451-5. 22 Feb. 1993.
 References: 9 refs.
 ISSN: 0375-9601.
 CODEN: PYLAAG.
 Language: eng.
 Year: 1993.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Num. Indexing: frequency 2.45E+09 Hz.
 Report No.: CCCC: 0375-9601/93/\$06.00.
 Pub. Country: Netherlands.
 Class. Code: A5250G. A5225L. A9260P. A5250D.
 Subject: lightning. plasma-density. plasma-production.
 plasma-radiofrequency-heating. plasma-temperature.
 Identifiers: density. temperature. heating. UHF. plasma fireballs.
 microwave interference. 2.45 GHz.
 Abstract: Ohtsuki and Ofuruton (1991) reported the production of plasma
 fireballs by microwave interference in air. The experimental
 conditions were as follows: 2.45 GHz, 5 kW (at maximum)
 microwaves were guided through a rectangular waveguide into a
 cylindrical cavity. The cavity was 161 mm in diameter and 370
 mm in length. A plasma fireball usually appeared when the
 microwave oscillator was turned on. Its lifetime varied from
 1 s to a few minutes. This experiment is also important in

connection with ball lightning. For example, Kapitza suggested that ball lightning is produced by microwave interference in air. The present author has investigated theoretically the experimental results and established a model to calculate their physical quantities.

UW Load Date: 9305.

---- End of Citation ----

Citation: 46 of 96

Accession No.: 4367262.
 Author: Gaidukov-N-I.
 Title: Motion of ball lightning in time-dependent air currents.
 Source: Zhurnal Tekhnicheskoi Fiziki. vol.62, no.6. June 1992.
 References: 10 refs.
 Trans. Title: Soviet Physics - Technical Physics. vol.37, no.6. pp. 729-31. June 1992.
 ISSN: 0044-4642. 0038-5662.
 CODEN: ZTEFA3. SPTPA3.
 Language: eng.
 Year: 1992.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0038-5662/92/060729-03\$03.00.
 Pub. Country: Russia. USA.
 Class. Code: A9260P.
 Subject: lightning.
 Identifiers: ball lightning. time-dependent air currents. equations of motion. external flows.
 Abstract: The model used for stationary air flows also gives a satisfactory description of the motion of ball lightning in time-dependent air flows. The only difference is that in the time-dependent case, the equations of motion for the lightning contain additional terms characterizing the rate of change of the parameters of the flows. This means that the model treats all the features of external flows relevant to the motion of ball lightning.

UW Load Date: 9305.

---- End of Citation ----

Citation: 47 of 96

Accession No.: 4367248.
 Author: Sall-S-A.
 Title: On the nature of radiation emission from ball lightning.
 Source: Zhurnal Tekhnicheskoi Fiziki. vol.62, no.6. June 1992.
 References: 20 refs.
 Trans. Title: Soviet Physics - Technical Physics. vol.37, no.6. pp. 685-8. June 1992.
 ISSN: 0044-4642. 0038-5662.

CODEN: ZTEFA3. SPTPA3.
 Language: eng.
 Year: 1992.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0038-5662/92/060685-04\$03.00.
 Pub. Country: Russia. USA.
 Class. Code: A9260P. A5280H.
 Subject: corona. heat-of-transformation. light-scattering.
 lightning.
 Identifiers: light scattering. radiation emission. ball lightning. heat
 of condensation. water vapor. streamer corona discharge.
 heat regeneration. color diversity. polarity. water-droplet
 aerosol.
 Abstract: It is hypothesized that conversion of the heat of condensation
 of water vapor into the radiation of a streamer corona
 discharge takes place in the volume of ball lightning. The
 efficiency of this process is high due to heat regeneration.
 It is shown that the color diversity of ball lightning could
 be connected with the polarity of the streamer corona and with
 scattering of light by a water-droplet aerosol. Correlations
 between the color and other properties of ball lightning are
 analyzed.
 UW Load Date: 9305.
 ----- End of Citation -----

Citation: 48 of 96

Accession No.: 4358028.
 Author: Gaidukov-N-I.
 Author Affil.: Pedagogical Inst., Orekhovo-Zuevo, Russia.
 Title: Hydrodynamic model for the streaming of ball lightning through
 a narrow opening in a flat barrier.
 Source: Zhurnal Tekhnicheskoi Fiziki. vol.62, no.2. pp. 27-33. Feb.
 1992.
 References: 15 refs.
 Trans. Title: Soviet Physics - Technical Physics. vol.37, no.2. pp.
 127-30. Feb. 1992.
 ISSN: 0044-4642. 0038-5662.
 CODEN: ZTEFA3. SPTPA3.
 Language: eng.
 Year: 1992.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0038-5662/92/020127-04\$03.00.
 Pub. Country: Russia. USA.
 Class. Code: A9260P.
 Subject: hydrodynamics. lightning.

Identifiers: hydrodynamic model. wall. hole. aperture. streaming. ball lightning. narrow opening. flat barrier. annular air flow. high-velocity air flows. deformed lightning.

Abstract: Streaming of ball lightning in an annular air flow through a small opening in a flat barrier is analyzed on the basis of observations of large lightning balls in high-velocity air flows and the motion of deformed lightning passing through such openings.

UW Load Date: 9303.

---- End of Citation ----

Citation: 49 of 96

Accession No.: 4347365.

Author: Smirnov-B-M.

Author Affil.: Inst. of High Temp., Russian Acad. of Sci., Moscow, Russia.

Title: Observational properties of ball lightning.

Source: Uspekhi Fizicheskii Nauk. vol.162, no.8. pp. 43-81. Aug. 1992.

References: 110 refs.

Trans. Title: Soviet Physics - Uspekhi. vol.35, no.8. pp. 650-70. Aug. 1992.

ISSN: 0042-1294. 0038-5670.

CODEN: UFNAAG. SOPUAP.

Language: eng.

Year: 1992.

Pub. Type: journal-article (J).

Treatment: BIBLIOGRAPHY (B). THEORETICAL OR MATHEMATICAL (T).

Report No.: CCCC: 0038-5670/92/080650-21\$03.00.

Pub. Country: Russia. USA.

Class. Code: A9260P.

Subject: lightning.

Identifiers: ball lightning. data banks. formation. evolution.

Abstract: Information from data banks involved in collecting results of observations of ball lightning is presented. The methods of treatment of these data are analyzed, comparisons of data from different data banks are made, and accuracy of determination of various parameters is evaluated. The resultant data and their distributions over the main parameters of ball lightning are described. A brief analysis of laboratory analogs of ball lightning is given, and also of the processes of formation and evolution of ball lightning in nature and in the laboratory.

UW Load Date: 9303.

---- End of Citation ----

Citation: 50 of 96

Accession No.: 4343771.

Author: Gaidukov-N-I.

Title: Equations of motion of ball lightning in a rocket airstream.

Source: Izvestiya Akademii Nauk SSSR, Mekhanika Zhidkosti i Gaza. vol.27, no.1. pp. 174-7. Jan.-Feb. 1992.

References: 12 refs.

Trans. Title: Fluid Dynamics. vol.27, no.1. pp. 132-4. Jan.-Feb. 1992.

ISSN: 0568-5281. 0015-4628.

CODEN: IMZGAB. FLDYAH.

Language: eng.

Year: 1992.

Pub. Type: journal-article (J).

Treatment: THEORETICAL OR MATHEMATICAL (T).

Report No.: CCCC: 0015-4628/92/2701-0132\$12.50.

Pub. Country: Russia. USA.

Class. Code: A8670G. A9260P.

Subject: lightning. plasma. rockets.
 Identifiers: ball lightning. rocket airstream. laws of motion. flying bodies. hydrodynamic interaction. kinematic equation of motion.
 Abstract: It is possible to investigate the laws of motion of ball lightning in the airstreams created by various flying bodies. The author considers the hydrodynamic interaction between ball lightning and a rocket traveling along a certain trajectory under its own engine power, which can be simulated in the first approximation by a moving point source of variable intensity. Since the lightning undergoes hydrodynamic interaction with a source moving relative to the stationary air medium, it is possible to assume that the stationary source and the lightning moving relative to it are located in a translational airstream variable in magnitude and direction, whose velocity components ϵ_x , ϵ_y , and ϵ_z are determined by the kinematic equation of motion of the rocket.
 UW Load Date: 9303.
 ----- End of Citation -----

Citation: 51 of 96

Accession No.: 4318272.
 Author: Lunev-V-I.
 Author Affil.: Tomsk Polytech. Inst., Russia.
 Title: Luminous balls in Siberia and the Far East: phenomenology, experiment, hypotheses.
 Source: Izvestiya Vysshikh Uchebnykh Zavedenii, Fizika. vol.35, no.3. pp. 65-86. March 1992.
 References: 88 refs.
 Trans. Title: Soviet Physics Journal. vol.35, no.3. pp. 256-74. March 1992.
 ISSN: 0021-3411. 0038-5697.
 CODEN: IVUFAC. SOPJAQ.
 Language: eng.
 Year: 1992.
 Pub. Type: journal-article (J).
 Treatment: BIBLIOGRAPHY (B). EXPERIMENTAL (X).
 Report No.: CCCC: 0038-5697/92/3503-0256\$12.50.
 Pub. Country: Russia. USA.
 Class. Code: A9260P. A9330D. A9650K.
 Subject: lightning. meteors. plasma.
 Identifiers: Russia. USSR. Soviet Far East. AD 1980. AD 1984 to 1986. plasma. meteors. ball lightning. bolides. plasmoids. surface layer. atmosphere. luminous balls. experimental simulation. ultraviolet radiation. radio-frequency radiation. laser radiation. geodynamic stress. thermal stimulation. radio-wave excitation. electrical discharge.
 Abstract: The paper generalizes the result of studies at the Laboratory for Natural-Technogenetic Electromagnetic Systems at the Tomsk

Polytechnic Institute and members of the Tomsk Group for Studies of Anomalous Phenomena in the Environment, which were carried out from 1983 to 1989. 'Luminous balls', are taken to mean quasispherical formations in the atmosphere that radiate in the optical range of electromagnetic wavelengths and are identified as ball lightning, bolides, plasmoids, and exotic objects. A 100-year historical retrospective review is made of a series of phenomena observed by people in Siberia and the Far East in the surface layer of the atmosphere in the form of luminous balls, including events of 1908, 1984, 1985, and 1986, which have become known throughout the world. A description is given of attempts at experimental simulation of luminous balls under natural and laboratory conditions by means of various initiating factors: ultraviolet radiation, radio-frequency radiation, laser radiation, geodynamic stress, thermal stimulation, radio-wave excitation, and electrical discharge. Hypotheses explaining some of the properties of luminous balls are formulated and discussed.

UW Load Date: 9302.

----- End of Citation -----

Citation: 52 of 96

Accession No.: 4309590.
 Author: Maiorov-S-A. Tkachev-A-N. Yakovlenko-S-I.
 Author Affil.: Inst. of Basic Phys., Acad. of Sci., Russia.
 Title: Nonergodic Coulomb plasma and a possible explanation of the nature of ball lightning.
 Source: Sbornik Kratkie Soobshcheniya po Fizike, AN SSSR, Fizicheskii Institut im. P.N. Lebedeva. no.10. pp. 22-4. 1991.
 References: 5 refs.
 Trans. Title: Soviet Physics - Lebedev Institute Reports. no.10. pp. 19-21. 1991.
 ISSN: 0364-2321.
 CODEN: SPLRD6.
 Language: eng.
 Year: 1991. 1991.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0364-2321/91/\$20.00.
 Pub. Country: Russia. USA.
 Class. Code: A5220H. A9260P. A5220F. A5225D.
 Subject: ion-recombination. lightning. plasma-collision-processes. plasma-kinetic-theory.
 Identifiers: ball lightning. nonergodic classical Coulomb plasmas. recombination.
 Abstract: It is shown that recent studies of nonergodic classical

Coulomb plasmas suggest that it is possible to explain the absence (or anomalous delay) of recombination in the plasma of ball lightning.

---- End of Citation ----

Citation: 53 of 96

Accession No.: 4290591.
 Author: Maiorov-S-A. Tkachev-A-N. Yakovlenko-S-I.
 Author Affil.: Inst. of Gen. Phys., Acad. of Sci., Russia.
 Title: Certain properties of an electrically insulated Coulomb plasma. Numerical simulation of microfields and thermodynamic properties. The problem of ball lightning.
 Source: Izvestiya Vysshikh Uchebnykh Zavedenii, Fizika. vol.35, no.2. pp. 10-23. Feb. 1992.
 References: 24 refs.
 Trans. Title: Soviet Physics Journal. vol.35, no.2. pp. 108-19. Feb. 1992.
 ISSN: 0021-3411. 0038-5697.
 CODEN: IVUFAC. SOPJAJ.
 Language: eng.
 Year: 1992. 1992.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0038-5697/92/3502-0108\$12.50.
 Pub. Country: Russia. USA.
 Class. Code: A5265. A5225K. A9260P.
 Subject: Debye-Huckel-theory. lightning. plasma-simulation.
 Identifiers: quasi steady state. many body dynamics. numerical simulation. electrically insulated Coulomb plasma. thermodynamic properties. relaxation time. Debye screening. electron transit time. Debye-Huckel theory. microfields. electron turning distance. quasi-binary theory. ball lightning. recombination.

Abstract: Many-body dynamics is used to study the (quasi-)steady state of a classical Coulomb plasma. The shortest relaxation time in such a plasma, for both the Debye screening and the thermodynamic properties, is the electron transit time over the average distance between ions. The steady-state energy of the Coulomb interaction of the particles and the steady-state potential near a fixed charge can be described well by the Debye-Huckel theory, even if there is less than a single particle in a Debye sphere, on the average. Distributions of instantaneous values of the microfields in the plasma are derived. The results calculated for the electron turning distance are compared with the results of the quasi-binary theory. An attempt is made to link the anomalously long lifetime of the plasma of ball lightning to a retardation of the recombination of a classical Coulomb plasma in the absence of a stochastic external agent.

---- End of Citation ----

Citation: 54 of 96

Accession No.: 4268795.
 Author: Smirnov-B-M.
 Author Affil.: Inst. of High Temp., Moscow, Russia.
 Title: Propagation of thermal waves along a fractal filament.

Source: Zhurnal Tekhnicheskoi Fiziki. vol.61, no.12. pp. 82-7. Dec. 1991.

References: 16 refs.

Trans. Title: Soviet Physics - Technical Physics. vol.36, no.12. pp. 1376-9. Dec. 1991.

ISSN: 0044-4642. 0038-5662.

CODEN: ZTEFA3. SPTPA3.

Language: eng.

Year: 1991. 1991.

Pub. Type: journal-article (J).

Treatment: THEORETICAL OR MATHEMATICAL (T).

Report No.: CCCC: 0038-5662/91/121376-04\$03.00.

Pub. Country: Russia. USA.

Class. Code: A0340K. A0560. A4410.

Subject: disperse-systems. elastic-waves. fractals. heat-conduction. porous-materials. transport-processes. wave-propagation.

Identifiers: heat conduction. elastic wave. fractal filament. aerogels. fractal filaments. specific area. internal surface. propagation. thermal structural compression wave. ball lightning.

Abstract: The author considers the structural compression of aerogels and fractal filaments, which results in a decrease in the specific area of the internal surface. The author considers the mechanisms of this process and obtains an expression for its rate. The author analyzes the propagation of a thermal structural compression wave along a fractal filament and obtains estimates for its parameters. This process is important in the physics of ball lightning.

----- End of Citation -----

Citation: 55 of 96

Accession No.: 4268767.

Author: Gaidukov-N-I.

Author Affil.: Orekhovo-Zuevskii Pedagogical Inst., Russia.

Title: Hydrodynamic model of the passage of ball lightning through a narrow slot in a flat screen.

Source: Zhurnal Tekhnicheskoi Fiziki. vol.61, no.11. pp. 49-56. Nov. 1991.

References: 19 refs.

Trans. Title: Soviet Physics - Technical Physics. vol.36, no.11. pp. 1223-7. Nov. 1991.

ISSN: 0044-4642. 0038-5662.

CODEN: ZTEFA3. SPTPA3.

Language: eng.

Year: 1991. 1991.

Pub. Type: journal-article (J).

Treatment: THEORETICAL OR MATHEMATICAL (T).

Report No.: CCCC: 0038-5662/91/111223-05\$03.00.
 Pub. Country: Russia. USA.
 Class. Code: A9260P.
 Subject: lightning.
 Identifiers: hydrodynamic model. equations of motion. ball lightning.
 narrow slot. flat screen. air currents.
 Abstract: The fundamental equations describing the motion of ball lightning in air currents through a narrow slot in a screen are constructed. This is done for specially selected models by using the results of numerous observations of ball lightning motion in air currents through wide and narrow slots in a flat screen. It is shown that the attraction of ball lightning to the screen slot in the presence of air drafts of arbitrary direction and its subsequent passage through the slot are purely hydrodynamical effects.
 ---- End of Citation ----

Citation: 56 of 96

Accession No.: 4258445.
 Author: Endean-V-G.
 Author Affil.: Sch. of Eng. & Comput. Sci., Durham Univ., UK.
 Title: Electromagnetic field energy containment.
 Source: IEE Proceedings A (Science, Measurement and Technology).
 vol.139, no.4. pp. 137-40. July 1992.
 References: 9 refs.
 ISSN: 0960-7641.
 CODEN: IPATEI.
 Language: eng.
 Year: 1992.
 Pub. Type: journal-article (J).
 Treatment: APPLICATION (A). THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0960-7641/92/\$3.00+0.00.
 Pub. Country: UK.
 Class. Code: A5260. A5255. A4190. A9260P. A8640. B5180W. B8470.
 Subject: electromagnetic-fields. energy-storage-devices. lightning.
 plasma. plasma-confinement. relativistic-plasmas.
 Identifiers: electromagnetic virial relation. cylindrical geometry. field
 energy containment. tensile strength. virial constraint.
 energy storage devices. dipolar rotating electric field
 model. ball lightning.
 Abstract: An electromagnetic virial relation in cylindrical geometry is derived which shows that limits on field energy containment imposed by the tensile strength of containment structures can be circumvented. The result is illustrated by two possible machines for which there is a much weakened theoretical virial constraint on the containment of field energy and which should

be practically realisable with low dissipation. Not only do these machines represent potentially very useful high energy storage devices given development of appropriate technology, but also, one of them provides helpful insights into the dipolar rotating electric field model of ball lightning with confinement of electromagnetic field energy by atmospheric pressure.

---- End of Citation ----

Citation: 57 of 96

Accession No.: 4220741.
 Author: Arnhoff-G.
 Title: Is there yet an explanation of ball lightning?.
 Source: European Transactions on Electrical Power Engineering. vol.2, no.3. pp. 137-42. May-June 1992.
 References: 8 refs.
 ISSN: 0939-3072.
 CODEN: ETEEB8.
 Language: eng.
 Year: 1992.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: Germany.
 Class. Code: A9260P.
 Subject: lighting.
 Identifiers: spherical radiation field. field strength distribution. self-restricted radiation field. ball lightning. Helmholtz equation. thunderstorms.
 Abstract: A singular solution of the Helmholtz equation is described, which delivers a spherical field of radiation. This field is surrounded by an infinite number of ball sockets. These spherical areas are separated by surfaces, which, by special arrangement of the field strengths, cannot be penetrated by their own radiation. A further aspect of this field is, that it does not expand with time. On the surface of the central sphere, being a characteristic of the Helmholtz equation, another solution, which is decreasing continually toward great distances, may be attached. So one receives a field of radiation, which could be used for the explanation of ball lightning. According to this theory, ball lightning is a self-restricted field of radiation. Numerical results of the distribution of field strengths for a particular example are given and for the energy of ball lightning to be expected during thunderstorms.
 ---- End of Citation ----

Citation: 58 of 96

Accession No.: 4188188.
 Author: Kulakov-A-V. Rumyantsev-A-A.
 Author Affil.: State Tech. Univ., Leningrad, Russia.
 Title: Ball lightning as a quantum condensate.
 Source: Doklady Akademii Nauk SSSR. vol.320, no.4-6. pp. 1103-6.
 Oct. 1991.
 References: 6 refs.
 Trans. Title: Soviet Physics - Doklady. vol.36, no.10. pp. 701-2. Oct.
 1991.
 ISSN: 0002-3264. 0038-5689.
 CODEN: DANKAS. SPHDA9.
 Language: eng.
 Year: 1991. 1991.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0038-5689/91/100701-02\$02.00.
 Pub. Country: Russia. USA.
 Class. Code: A9260P.
 Subject: lightning.
 Identifiers: quantum condensate. ball lightning. nondegenerate plasma.
 plasma temperature. de Broglie wavelength. thermal
 electrons. inter-ion distance. intercenter interference
 overlap. electron wave functions. plasma condensate.
 surface tension forces. electromagnetic plasma reactions.
 Abstract: A physical mechanism for the formation of ball lightning is
 proposed, which is based on long-range quantum forces arising
 in a relatively dense, low-temperature, but nondegenerate
 plasma. If, as the plasma temperature decreases, the de
 Broglie wavelength of the thermal electrons is several times
 smaller than the inter-ion distance, a factor due to the
 intercenter interference overlap of the electron wave
 functions becomes significant. The quantum forces generated
 by this overlap lead to collective 'coupling' of the
 particles, at which the system energy decreases (the excess is
 radiated). As a result, a plasma condensate is formed,
 displaying the properties of a liquid, including, in
 particular, surface tension forces. At the same time, the
 electromagnetic plasma reactions are maintained in the
 condensate.
 ----- End of Citation -----

Citation: 59 of 96

Accession No.: 4177987.
 Author: Yakovlenko-S-I.
 Author Affil.: Inst. of Gen. Phys., Acad. of Sci., Moscow, USSR.
 Title: Possibility of simulating ball lightning with a laser.

Source: Kvantovaya Elektronika, Moskva. vol.19, no.1. pp. 5-6. Jan. 1992.

References: 7 refs.

Trans. Title: Soviet Journal of Quantum Electronics. vol.22, no.1. pp. 1-2. Jan. 1992.

ISSN: 0368-7147. 0049-1748.

CODEN: KVEKA3. SJQEAF.

Language: eng.

Year: 1992. 1992.

Pub. Type: journal-article (J).

Treatment: THEORETICAL OR MATHEMATICAL (T).

Report No.: CCCC: 0049-1748/92/010001-02\$06.00.

Pub. Country: Russia. USA.

Class. Code: A5250J. A9260P.

Subject: lightning. photoionisation. plasma-production-and-heating-by-laser-beam.

Identifiers: laser beam simulated ball lightning. anomalously slow plasma recombination. nonideal plasma bunch. working medium. vapor. photon energy. ionization energy.

Abstract: A proposal is made to form a nonideal plasma bunch by ionizing a working medium (a vapor) with a laser having a photon energy close to the ionization energy. Recent theoretical investigations indicate that such a plasma should recombine anomalously slowly.

---- End of Citation ----

Citation: 60 of 96

Accession No.: 4172883.

Author: Kadomtsev-B-B.

Author Affil.: IV Kurchatov Inst. of Atomic Energy, Moscow, USSR.

Title: Ball lightning as a phenomenon of self-organization.

Source: Journal of the Moscow Physical Society. vol.1, no.4. pp. 335-40. Nov. 1991.

References: 4 refs.

ISSN: 0960-0175.

CODEN: JMPSEC.

Language: eng.

Year: 1991.

Pub. Type: journal-article (J).

Treatment: THEORETICAL OR MATHEMATICAL (T).

Report No.: CCCC: 0960-0175/91/040335+06\$03.50.

Pub. Country: UK.

Class. Code: A9260P.

Subject: lightning.

Identifiers: magnetic field generation. self-organization. model. ball lightning. electric field generation. dust plasma self-organization. gas accumulator. self-consistent fields.

Abstract: A model of ball lightning is proposed in which both magnetic and electric field generation is considered as a kind of dust plasma self-organization, and the ball lightning matter represents a sort of gas accumulator that can generate self-consistent fields.

---- End of Citation ----

Citation: 61 of 96

Accession No.: 4164611.
 Author: Jennison-R-C.
 Author Affil.: Electron. Lab., Kent Univ., Canterbury, UK.
 Title: Relativistic phase-locked cavity model of ball lightning.
 Source: Published by: Sunderland Polytechnic. Sunderland, UK. 1990.
 Conf. Title: British Society for the Philosophy of Science: Physical Interpretations of Relativity Theory II. Proceedings. London, UK. pp. 359-67 vol.3. 3-8 Sept. 1990.
 Language: eng.
 Year: 1990.
 Pub. Type: conference-proceeding (C).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Pub. Country: UK.
 Class. Code: A9260P. A4110F.
 Subject: cavity-resonators. lightning.
 Identifiers: ball lightning. relativistic phase-locked cavities. vector potential.
 Abstract: The general principles of relativistic phase-locked cavities are introduced and this is followed by a general summary of the properties of ball lightning. Particular significance is attached to the events recorded by Cahil on video film. It is demonstrated that Cahill's ball lightning closely resembles the structure of the fourth eigenvalue of a relativistic phase-locked cavity and it is noted that the entity should be surrounded by a vector potential which could enable it to detect and avoid obstacles in its path.
 ----- End of Citation -----

Citation: 62 of 96

Accession No.: 4101330.
 Author: Grigorev-A-I. Shiryaeva-S-O. Grigoreva-I-D. Lazaryants-A-E. Mukhina-E-I.
 Author Affil.: Yaroslavl' State Univ., USSR.
 Title: The possibility of ball lightning splitting in two.
 Source: Zhurnal Tekhnicheskoi Fiziki. vol.61, no.4. pp. 25-31. April 1991.
 References: 14 refs.
 Trans. Title: Soviet Physics - Technical Physics. vol.36, no.4. pp. 385-9. April 1991.
 ISSN: 0044-4642. 0038-5662.
 CODEN: ZTEFA3. SPTPA3.
 Language: eng.
 Year: 1991. 1991.
 Pub. Type: journal-article (J).
 Treatment: THEORETICAL OR MATHEMATICAL (T).
 Report No.: CCCC: 0038-5662/91/040385-05\$03.00.
 Pub. Country: USSR. USA.
 Class. Code: A9260P.
 Subject: electric-charge. electrical-conductivity. electrohydrodynamics. jets. lightning.
 Identifiers: volume distribution. ball-lightning splitting. electric charge. surface distribution. electrohydrodynamic instability. jets. electrical conductivity.
 Abstract: If the electric charge of ball lightning is in a surface distribution, the ball could not split in two as the result of an electrohydrodynamic instability. On the other hand, it would be capable of ejecting its material in jets. If the

charge is instead distributed over the volume, the opposite would be true: ball lightning could not send out jets, but it could split in two. Since both responses of this natural phenomenon to an external agent are mentioned in the reports of eyewitnesses, it can be concluded that the electrical conductivity of the material making up ball lightning is poor. In this case, the ball lightning could undergo a splitting in the initial stage of its existence, while in the final stage it could send out jets.

---- End of Citation ----