LOGIC AND EXPERIMENTAL ADDITION

TO A SET OF EQUATIONS OF A MAXWELL.

ABOUT CIRCULATION OF A VECTOR OF A MAGNETIC INTENSITY.

The unsufficiency of the theorem about circulation of a vector of a magnetic intensity in the electric circuits which are powering up an empty closed conductor is shown.

Fig. 1

It is impossible to create separate, unenclosed part of a conductor, with flow of the direct current - it disturbs a conservation law of a charge (Fig. 1). Therefore it seems obvious, that is impossible to create a fixed magnetic field (MF) by means of a separate part of a direct current [1, page 163]. The prime logic of this conclusion - there is no object for reviewing. Thus, the concepts « separate, unenclosed part of a conductor » and « a separate part of a direct current » are equated. On the basis of this logic the known experimental facts are interpreted and the conclusions in the theory of an electromagnetism are made.

Let's test completeness of this logic.

Let's consider only electric circuits of a direct current.

Nomenclature:

1) A conductor - skew field, in which the charge particles are moving (electrical current), if inside a conductor the electric field strength E is distinct from zero. [1, page 26].

2) The law of inverse guadrates. It is the law on central fields created by centres of force (gravitation masses, electrical charges, magnetic poles) under the law of inverse proportionality to guadrate of distance. It is spoken about identical exposition of such fields [1, page 19], [1, page 46]. It is known, that the some skew field were inside of an gravitating empty orb, gravitational force does not test.

3) In space **around** an arbitrary current, always is a MF [1, page 161].

4) The closed conductor - skew field which ensures course of a current on the closed linear circuit [1, page 164, 167]. Usually this is a single-path circuit. Ones make the circuit of a linear, metal conductor. The current flowing in a closed conductor, creates MF in all space **around** it (see item 3).

5) Biot-Savart relation in the vector shape: [1, page 163]; $\mathbf{H} = \frac{I}{cR^3}\left[d\mathbf{s}\mathbf{R}\right]$

I - current intensity in a conductor; *d***s** - element of a linear conductor; **R** - distance from a current element *Id***s** which create a MF, up to a point, where strength of **H** of it MF is observed.

6) The empty closed conductor (ECC) - conductive body which has been carried out as a continuous closed surface, completely enveloping some volume [2, page 65]. Usually it is a surface, which is formed at gyration of a rectangle (cylindrical) or circles (spherical) around of their symmetry axes. Crosspoints of a surface and symmetry axis - poles. The current, which flows on a ECC between poles, does not create a MF in volume, which it circulates. The same but more precisely - the vector sum of magnetic fields created by all elements of a current, in any point inside of a ECC is equal to a zero. This property of ECC follows from Biot-Savart relations and «of inverse guadrates» (see item 2, item 5). Otherwise it is necessary to assume, that the intensity of MF, created by a current element, varies under the law distinct from law of inverse proportionality to guadrate of distance, but it contradicts experience.

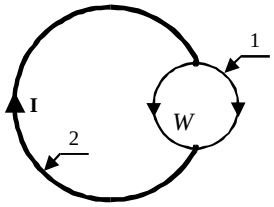


Fig. 2

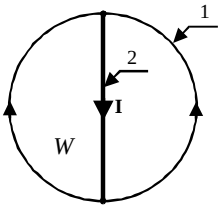


Fig. 3

So, in the closed electric circuit there can be conductors of two types:

1) Conductors which **create** a MF **<u>everywhere</u>;**

2) **Not creating** a MF **<u>in some volume.</u>**

A minimum number of both types necessary for making a closed electric circuit - two (Fig. 2, Fig. 3).

In figures are designated: 1 - ECC; 2- a linear conductors; I - a current flowing in a circuit; W - a volume enveloped of ECC.

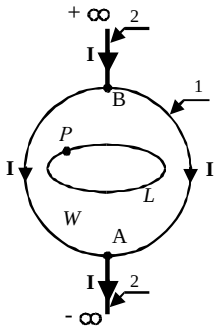


Fig. 4

Let's analyze a circuit shown in a Fig. 2.

Let's designate of a pole of a ECC as A and B (Fig. 4). A linear conductors 2, we shall present as semi-infinite rectilinear cuts - ∞A and + ∞A. The created circuit with a current has a rotational symmetry. Here MF force lines have an only azimuth (tangential) component. It is circles with centre on an axes of a system. Let's consider a point *P*. A point *P* belongs to a contour *L*. The contour *L* is in volume *W* and coincides with a guessed force line. The ECC envelops volume *W*.

Let's discover circulation of a vector of magnetic intensity on a contour *L*. Definition: « If the curve *L* is closed (it is marked by a circle at the sign of an integral), the line integral of a vector **a** along *L* is termed as circulation of a vector **a** lengthways *L*: $C(\mathbf{a}) = \oint_L \mathbf{a}d\mathbf{s} = \oint_L a_s ds$ (23 *) » [1, page 469]. Further, a element of a contour *L* we shall mean *dl*, and current element *ds*. As in our case the vector **H** is always parallel to *d***l**, so: $C(\mathbf{H}) = \oint_L \mathbf{H}d\mathbf{l} = \oint_L Hdl$

According to a principle of superposition for a circuit with a current: «... The field strength **H** of the closed current *I* in an arbitrary point *P* is equal to the sum of fields created by each of its elements, i.e. is equal: (42.4) » [1, page 164]. $\mathbf{H} = \frac{I}{c}\oint \frac{[d\mathbf{s}\mathbf{R}]}{R^3}$

It is obvious, that in a considered circuit *the circulation of a vector of a magnetic intensity on a closed contour L, not enveloping of currents,* is **not equal to a zero**, and the **guessed** force line has appeared **actual**. It contradicts the theorem of circulation of a vector of strength of MF, in which is spoken that: «... The circulation of a vector of a magnetic intensity on a curve which is not enveloping of currents, is equal to a zero... » [1, page 178].

Whence this conflict? Let's try to understand.

The Stokes theorem.

« The circulation of an arbitrary vector **a** *on a closed curve L is equal to a stream of a curl of this vector through a surface S, basing on a curve L*

$$C = \oint_L a_l dl = \int_S rot_n \mathbf{a} dS$$ » [1, page 472].

The formula was deduced: « $rot\mathbf{H} = \frac{4\pi}{c}\mathbf{j}$ (47.3) » [1, page 177].

The theorem of the Stokes - only mathematical. There are no word in it theorem about a stream of charges through a surface *S* - charges, which create a stream of a curl. Nevertheless, ones says: « On the basis of the theorem of the Stokes and equation (47.3) we can write: $\oint_L H_l dl = \int_S rot_n H dS = \frac{4\pi}{c}\int_S j_n dS$ (47.4) » [1. pages 177]. It is obvious, that there is a direct substitution of a curl of a vector by a current vector, which forms this curl. It is consequence of that «obvious» logic of reasonings.

It is possible to make a conclusion, that the equation (47.3), in this case, untruely and requires theoretical finishing, and «... A complete set of the differential equations of a magnetic field of direct currents... » [1. page 182] is not complete, as well as set of equations of the Maxwell (not always $rot\mathbf{H} = \frac{4\pi}{c}\mathbf{j}$). It has taken place because the linear circuits with a current were considered only. More precisely theorem of circulation of a vector of strength of MF, created by an arbitrary current should look so: « **The circulation of a vector of strength of MF of an arbitrary current on an arbitrary closed curve *L* is equal to the algebraic sum of circulations of elements of this current on this curve** ».

Nevertheless, the theorem of circulation of a vector of strength of MF became scientific dogma. Because of it other systems of current further were not considered.

Briefly we shall iterate logic of a conclusion.

1) Or there are two types of conductors (1 - which create a MF in all space;

2 - which create a MF in all space excluding a part of space, which they envelop;)- or a Biot-Savart relation and law of inverse guadrates are untrue.

2) Or there are a closed electric circuits of a direct current, where the circulation of a vector of a magnetic intensity on a closed curve *L*, not enveloping of currents, is not equal to a zero - or the principle of superposition is untrue.

Let's consider consequences of these reasonings.

At first, it is necessary to eliminate perpetuity out the formulas and to create a real physical system.

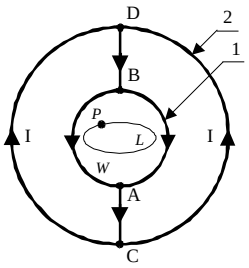


Fig. 5

Let's create a rotationally symmetric closed circuit (Fig. 5) consisting of two linear conductors AC, BD and two spherical ECC 1 and 2, inserted one in another and not touching each other. The linear conductor BD joins the upper poles of ECC 1 and 2. The linear conductor AC joins the lower poles of ECC 1 and 2. The arrows show a direction of currents in a circuit. Now formula (42.4) will look so: $\mathbf{H} = \frac{I}{c}\left(\int_C^A \frac{[d\mathbf{s}\mathbf{R}]}{R^3} + \int_B^D \frac{[d\mathbf{s}\mathbf{R}]}{R^3}\right)$, and the circulation of a vector of strength MF on a circuit L will be: $C(\mathbf{H}) = \frac{I}{c}\oint_L\left(\int_C^A \frac{[d\mathbf{s}\mathbf{R}]}{R^3} + \int_B^D \frac{[d\mathbf{s}\mathbf{R}]}{R^3}\right)dl$, as ECC 2 too does not create a MF in volume W (see item 6). It is obvious, that a MF in a volume a W is a sum of a MF of **separate parts of a circuit - AC and BD**.

Such MF has the following singularities (Fig. 6, 7, 8):

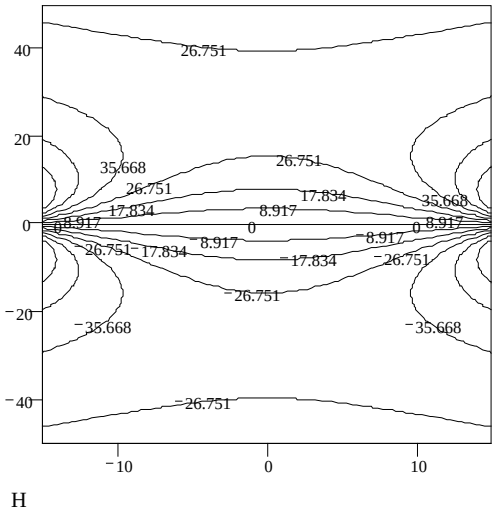


Fig. 6

Structure of a magnetic field in a plane containing a symmetry axis as the graph of the Cantor.
The surfaces of a level of equal strength MF are shown.

The direction of vector of strength is perpendicularly planes of page.

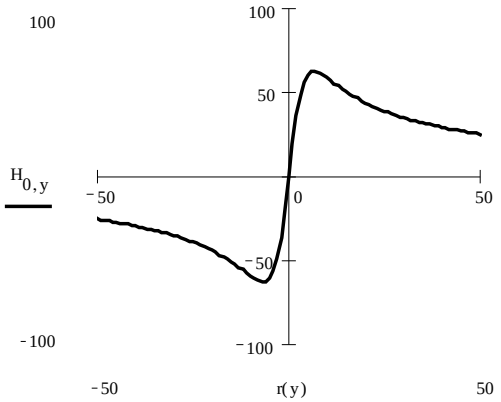


Fig. 7

Association of strength of MF from distance up to an axes of a system in a plane Z = 0.

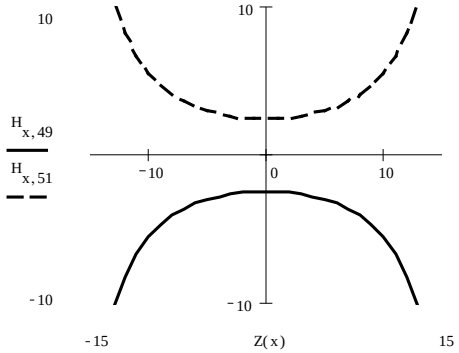


Fig. 8

Association of strength of MF from coordinate Z along a direct, parallel axes Z
and located from an axes at distance ± dR

1) Line of a zero field strength (LZF);

2) Minimum of strength on three coordinates at centre of a system (excluding LZF);

3) The lapse rate such, that a field strength increases on a direction from centre of curvature of force lines.

Thus, for a research and application the new class of stationary values of magnetic fields - fields created by separate cuts of a direct current is entered.

In a nature such a MF exists in any current channel, where the current bypasses some hindrance. In such channel with a current **I** (Fig. 9) always is possible to find a tube of a current **i** (down to separate mobile charged corpuscles - MCC) which diameter **d** is less than a size **D** of hindrance. Such MF exists in space between two MCC, which move on one line and one side (Fig. 10).

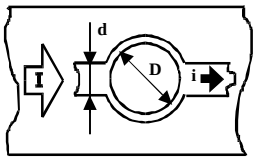


Fig. 9

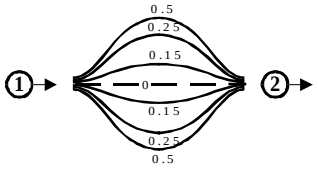


Fig. 10

The research of behaviour of free radicals in **variable** MF of such configuration is of interest. Formation of spiral polymeric structures here is possible.

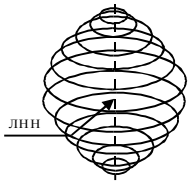


Fig. 11

The configuration of MF (Fig. 11) is similar to a field in «mirror machine» [3], but with «the reflecting relation» more than 100. Because of an explicit likeness, such MF was named «a magnetic cocoon». The configuration of MF in «a magnetic cocoon» corresponds to a requirement of a minimum of a field strength [4]. It allows to create for a long time expected trap for plasma and industrial controllable thermonuclear reactor with a magnetic plasma confinement [5].

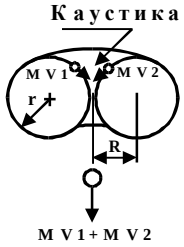


Fig. 12

According to calculations, a MCC in « a magnetic cocoon » will create toroidal formation with a poloidal vector of a corpuscles velocity and R → r - caustic (Fig. 12). At increase MF, the Larmor radius of MCC

will diminish - the plasma will be pinched comprehensively. The effect is named « a spherical pinch ». It is possible to create toroidal formation where the density of charges in a toroidal stratum will be much higher, than in metals. The refraction coefficient of a gamma-rays will rise - probably making of effective gamma-rays optics.

In a caustic there will be collisions of corpuscles and to flow reactions of kernel synthesis of hydrogen cycle, carbon cycle and other cycles. The toroidal formation can change a size under influence of exterior forces. It will change MF in a system - it is possible to create the detector of these forces.

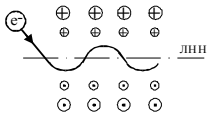


Fig. 13

If MCC flys under an angle in MF of such configuration, they will be reflected from «of magnetic walls» (Fig. 13). It is equivalent to a system of MF in undulator. It is systems which use in a relativistic electronics engineering for making a generators of radiation (the laser on mobile electrons) [6, page 486].

The experiments of Eugene Podkletnov (see « Science and life », No1, 1999, page 100) on gyration of a superconducting disk in a constant MF are known. The diminution of a weight of subjects above a disk recorded in them. The high-temperature plasma, as well as superconductor, is an ideal diamagnet. It allows to hope for deriving some gravitation effects (may be also time-space) by gyration of relativistic plasma in MF. Making an generator and detector of gravitation waves of a high frequency is rather possible.

On a basis of MF of such configuration
many years ago the next devices **could and should be created**:

THE UNIVERSAL MAGNETIC LENS belongs to electronic optic technology. Can be used as dispersing lens. Also may be used for a heightening of a resolution capability of electron-optical systems at 5-10 times at the expense of elimination of aberrations.

THE REGULATED MAGNETIC UNDULATOR belongs to area of accelerators technology. The period of a undulator can smoothly be regulated (from a share of millimetre up to centimetres). It can be utilised for making generators of an electromagnetic radiation (lasers on mobile electrons) and as an controllable radiantes of electromagnetic oscillations in wide (UHF - GAMMA) a frequency band and an output power.

THE DEVICE FOR A PLASMA CONFINEMENT belongs to area of plasma technology. It can be utilised for making plasma devices both independent, controllable ecological pure and safe sources of a power from 0.01 to 10 MW.

The device shown on a Fig. 5, can be easily transformed into two coaxial toruses, (see Fig. 14). The properties of toroidal structures of current will be surveyed later.

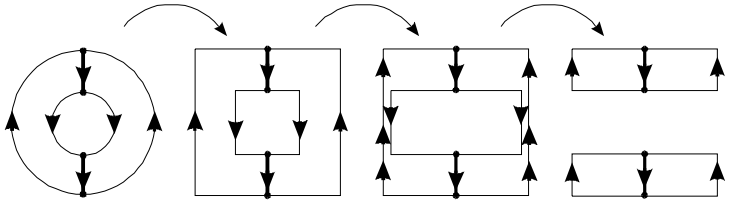


Fig.14

Now we shall consider an electric circuit shown on a Fig. 3.

The theorem of circulation of a vector of a magnetic intensity says: «... Circulation of a vector of a magnetic intensity on a curve... enveloping currents, is equal multiplied on $4\pi/c$ the sum of forces of these currents (taken with suitable signs). » [1, page 178]. From the theorem follows, that the circulation is fixed and does not depend on geometry of a circuit.

Let's test a position of the theorem.

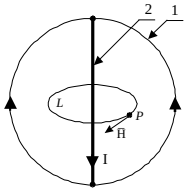
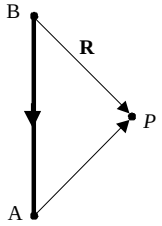


Fig. 15

Let's create a rotationally symmetric closed circuit (Fig. 15) consisting from spherical empty closed conductor (ECC) 1 and linear conductor 2. The linear conductor join a poles of ECC. The arrows show a direction of currents in a circuit. Because of a symmetry the force lines of MF have only azimuth component. They are circles with centre on an axes of a system. Let's consider a point *P* which belongs to a contour *L*. The contour *L* coincides with a force line. Let's discover circulation of a vector of strength of MF on a contour *L*. The circulation of a vector **H** along a closed curve *L* is defined by expression $C(\mathbf{H}) = \oint_L \mathbf{H} d\mathbf{l}$. In our case **H** is parallel $d\mathbf{l}$ and $C(\mathbf{H}) = \oint_L H dl$.

To be convinced of validity of the theorem, it is necessary and enough to prove, that the strength MF in a point *P* is constant at a changing of sizes of a system (both a contour of an integration *L*, and current **I** in a linear conductor are fixed). ECC 1 does not create MF in volume, which it envelops (see item 6). Therefore, according to a principle of superposition, it is possible to consider only linear conductor AB (Fig. 16).



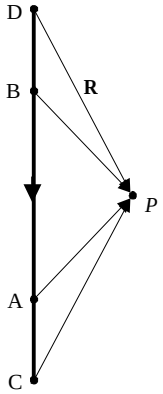


Fig. 16 Fig. 17

By the same principle, the strength **H** of MF of a current *I* in an arbitrary point *P* is equal to the sum of fields of its elements - $\mathbf{H} = I\int_A^B \frac{[d\mathbf{s}\mathbf{R}]}{R^3}$; *I* - current intensity in a conductor; *d***s** - element of a circuit; *Id***s** - current element; **R** - distance from a current element up to a point *P*.

Let's increase sizes of a system (Fig. 17).

The strength of MF in a point *P* becomes: $\mathbf{H} = I(\int_A^B \frac{[d\mathbf{s}\mathbf{R}]}{R^3} + \int_B^D \frac{[d\mathbf{s}\mathbf{R}]}{R^3} + \int_C^A \frac{[d\mathbf{s}\mathbf{R}]}{R^3})$. ECC 1 still does not create MF in volume, which it envelops (see item 6), and the strength MF in a point *P* varies, that contradicts a position of the theorem. And that was necessary to show.

List of the literature.

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5) S. V. Putvinskij, // UFN, Nov. 1998, vol. 168, ¹11, p.1235; «Can the future world energy system be free of nuclear fusion».

6) "The Physical encyclopaedic dictionary", chapter the editor A. M. Prokhorov, Moscou, " The Soviet Encyclopedia ", 1983.

FUNDAMENTAL PROPERTIES OF TOROIDAL STRUCTURES WITH CURRENT.

The existence of an exterior magnetic field and structure of an interior magnetic field in toroidal structures with a poloidal current is shown.

The numerical calculations of a magnetic field (MF) of toroidal structures with a poloidal current (Fig. 1) are made. The Biot-Savart relation in the vector shape was used. The arrows designated as **i,** shows vectors of current elements.

The toruses with the relation R : r ≈ 1 and R : r ≈ 2 were considered.

The outcomes of calculations are deduced as the graphs of the Cantor. The lines on the graphs display surfaces of a level of equal magnetic intensity. Direction of a vector of a magnetic intensity - perpendicularly to a plane of the image, because the force lines of MF have only azimuthal (or tangential) component.

In the beginning was calculated a MF inside a torus.

Torus with the relation R : r ≈ 1(see. Fig. 1).

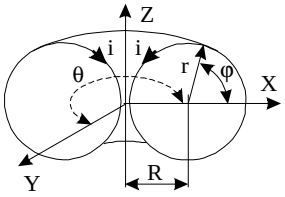


Fig.1

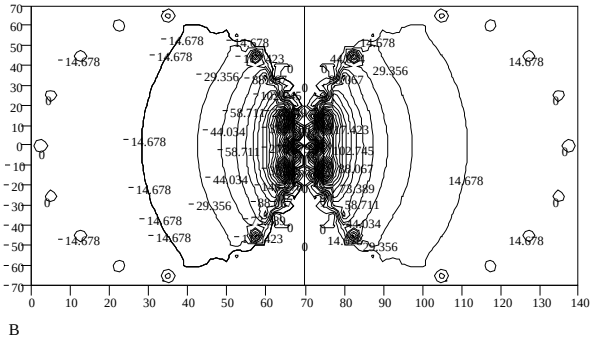


Fig.2

Torus with the relation R : r ≈ 2 (Fig. 3).

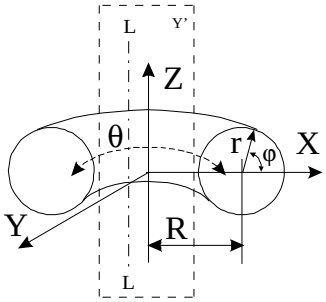


Fig. 3

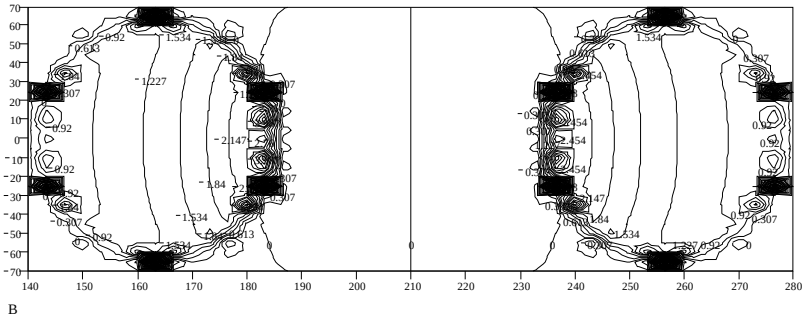


Fig. 4

On the graphs (Fig. 2, the Fig. 4) is visible, that the structure of MF inside a torus does not correspond to structure of MF of an infinite direct conductor with a current, as was considered till now in the classical theory of an electromagnetism. This structure of MF corresponds to a field created by a separate current element, located in centre of a torus on its principal axis and directional along this axes. The graph of it a MF is shown on a Fig. 5.

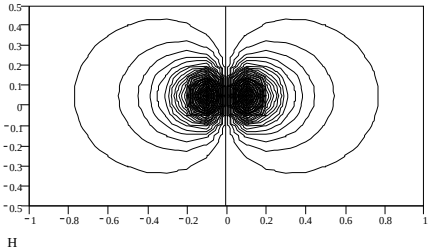


Fig. 5

After that it was calculated MF outside of a torus in a plane XZ (y=0) in its part Y' (see. Fig. 3).

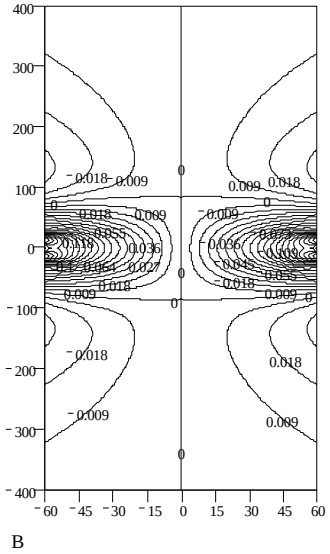


Fig. 6

Strength of MF in a plane Y ' (y=0) as the graph of the Cantor.

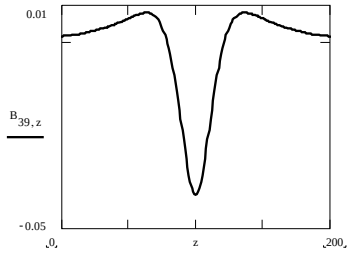


Fig. 7

Strength of MF along direct **L** - **L**; [y = 0, x = const, B = f (z)].

On the graph (Fig. 6) it is visible, that a MF outside of a torus is real. The graph in a Fig. 7 determines a singularity of it MF - three maximums and two a zeros. From a Fig. 7 it is visible, that at axial coming together of two toruses in the beginning there is their repulsion, and after overcoming a potential hill - both pulling. The system goes into a state with a minimum magnetic flux (minimum energy) and becomes inconvertible. The relation of MF inside and outside of a torus - approximately 137 accordingly, is curious. The experimental measurings at a torus have confirmed existence calculated structure of MF outside of a torus and calculated structure of MF inside of a torus.

The calculation MF, created by a system from two coaxial toruses (Fig. 8) displays, that it has a minimum on three coordinates at centre of a system (Fig. 9). It displays hopelessness of a plasma confinement by interior MF in the closed traps with a toroidal configuration MF such as «Tokamak» and «Stellarator» - confinement probably only by exterior MF of a system of toruses of an arbitrary configuration

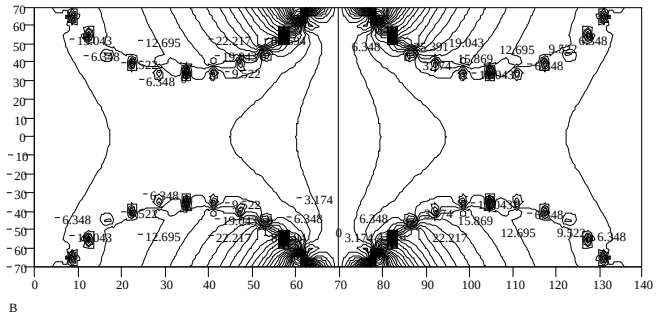


Fig. 8 Fig. 9

The previous calculations were made for continuous surfaces of current. Now we shall make calculation for a torus consisting of separate rectangular coils with a current (a segmented torus) (a Fig. 10, Fig. 11). It is done for considering of a possibility of reproduction MF of a continuous torus by a field of segmented (real) toruses. The graphs - in relative units

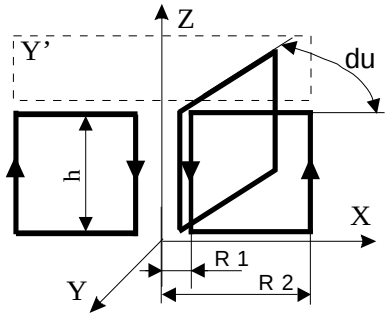
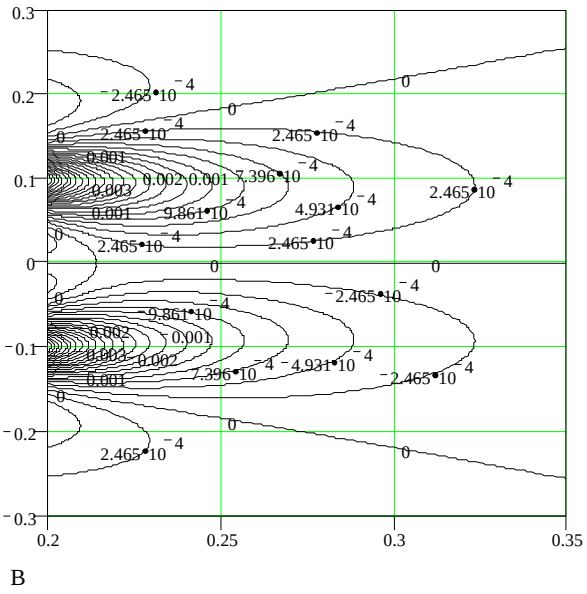


Fig. 10



Structure of a magnetic field of a segmented torus in a plane Y ' (XZ) as the graph of the Cantor.
The cuts of surfaces of a level of equal strength of MF are shown.
Direction of a vector of a magnetic intensity - perpendicularly to a plane of the image

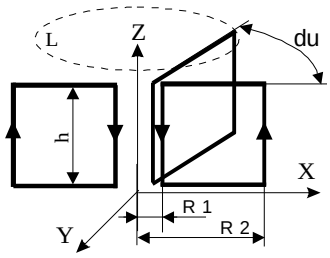
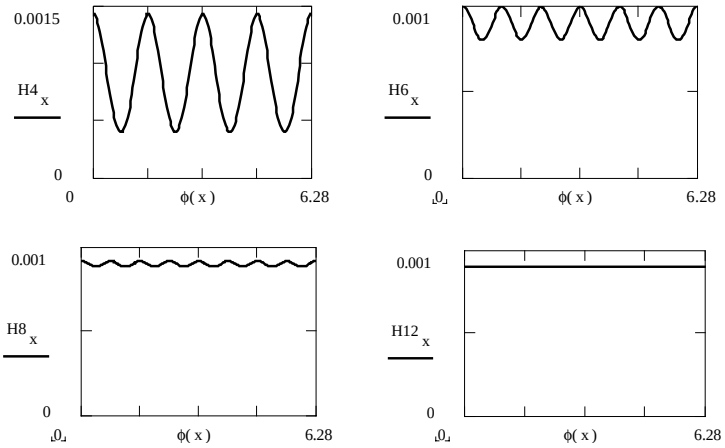
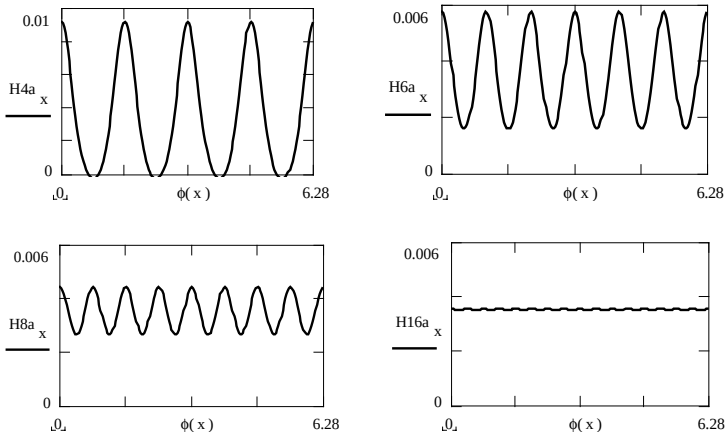


Fig. 11



The graphs of association of strength of MF (**H)** on a contour L (Z=0.1) from an angle φ.
The number of coils N_W is equal to 4, 6, 8 and 12 accordingly. Ampere-turns are constant.



The graphs of association of strength of MF (**H)** on a contour L (Z=0.05) from an angle φ.
The number of coils N_W is equal to 4, 6, 8 and 12 accordingly. Ampere-turns are constant.

From these two series of the graphs it is visible, that the force line of MF above the segmented torus is a rotationally symmetric circle with undulating axial component. In accordance with magnification of number of coils and distance from a torus a line more and more comes nearer to the shape of a force line of MF, created by continuous toroidal current surface - ideal circle. The coil can be structural and consist of several conductors.

<u>The graphs relating to a eight-coils segmented torus, are confirmed by experimental measurings!</u>

These measurings have confirmed an existence of calculated exterior and interior structure of MF in toroidal formations with a poloidal current.

In experiment the arbitrary closed contour which is not enveloping of currents but in which the circulation of a vector of a magnetic intensity is not equal to a zero is found.

Thermonuclear Reactor of Eugene Grigor'ev (TREG).

The possible principle of construction of an industrial thermonuclear reactor is shown.

The urgency of a problem of using an energy of controllable thermonuclear synthesis is known. This problem till now is not solved because of impossibility of a long-time plasma confinement with temperature more than 100 000 000 degrees. The lack of a magnetic field (MF) with the closed configuration and minimum of strength hinders this. That reduces to plasma instability. Such MF can be created by a system of two coaxial toruses (Fig. 1).

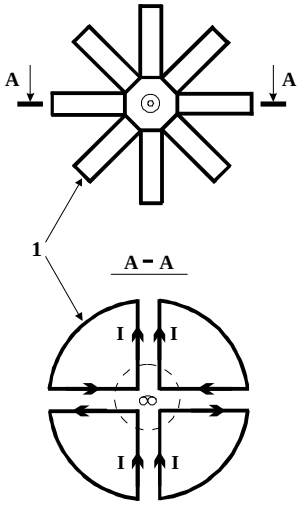


Fig.1

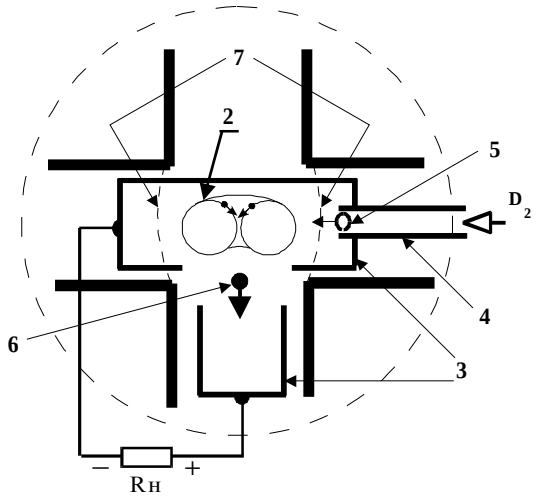


Fig.2

On a Fig. 2 the zone of a thermonuclear reaction (ZTR) is shown. On figures by digits are designated: 1) the cut of the segmented toroidal coils; 2) toroidal plasma formation; 3) collectors of charged corpuscles; 4) injector of fuel; 5) neutral corpuscle of fuel flying in ZTR; 6) charged corpuscle - result of a reaction; 7) the surface of maximum strength of MF is schematically.

The device works so. Ones pass a current through a coils 1. Then in the ZTR through an injector 4 give gaseous t/n fuel. By electrical discharge in ZTR create initial toroidal plasma formation.

After augment a current in a coils. Thus the plasma will be compressed comprehensively and is heated (spherical pinch). When the reaction will begin, ones diminish magnitude of MF up to a working value. Ones regulate a position of an injector depending on a velocity of corpuscles of fuel.

Ones do it because the neutral corpuscle freely will approach to a maximum of strength of MF 7. Its ionization should take place on necessary distance from a maximum. The kinetic energy of a kernel should be enough for overcoming a potential barrier, but an energy of electron is not enough. Then the kernel will go in a ZTR, but the electron will be discharged on a negative collector 3.

The strength of MF should be selected so that heavy, the polluting admixtures left a ZTR because of their greater Larmor radius of gyration. Positively charged corpuscles - result of a reaction will left a ZTR and go to a positive collector 3. An effective load R_H is powered up between positive and negative collectors 3.

It is better to include coils which create a MF of keeping, immediately to collectors

The energy of corpuscles - result of a reaction is high (more than 1.5 MeV). So it is necessary to make coils of a thin wire - ampere-turns are constant, but the work voltage is higher. At such inserting (parallel R_H), at magnification of a current in an effective load, the MF of keeping and the syntheses intensity will become less. - auto regulating.

It is the basic principles of build-up of an industrial thermonuclear reactor.

PRINCIPLE OF MAKING OF THE POWERFUL LASER ON FREE ELECTRONS.

The possibility of making of the regulated laser on mobile electrons is shown.

Now relativistic electronics engineering is intensively expand. The considerable place in it is occupied by devices, which are termed as lasers on free electrons (LFE). Their principle grounded is in that a mobile charged corpuscles (MCC) is reduced in oscillatory driving across a direction of the driving of it. Thus there is a radiation in a small solid angle forward on a direction of driving MCC. This radiation depends on a longitudinal velocity of MCC, and of a undulator step (see lower). The radiation can be coherent, so it gives name of LFE.

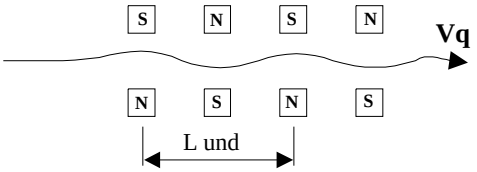


Fig. 1

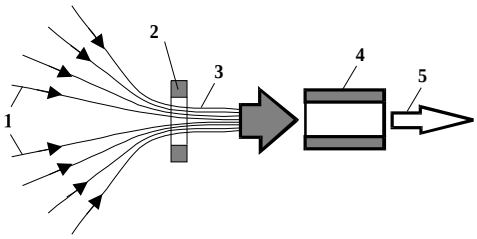


Fig. 2

That the corpuscle had transversal oscillations, the system called by a *undulator* is applied. By a principle of effect on MCC undulators are disjointed on electrical and magnetic. A magnetic system of a here is considered (Fig. 1).

Deficiency of existing undulators is that for making a necessary magnetic field (MF) the stationary values electromagnets with the core are used. It is constructive restricts a step of a undulator - **L**und (period of a change MF in a system).

For making an intensive beam of MCC and magnification of an output power of LFE, the multichannel scheme with addition of separate beams is applied (Fig. 2).

Radiantes of MCC can be: electronic and ion guns, radioactive radiantes of high intensity (Pu, Co, Sr …), ultrarays and streams of MCC from the Sun. It is necessary to remind, that by reaction of controlled thermonuclear fusion the intensive stream of MCC of high energies may be formed (Fig.3).

In a Fig.2 are designated: 1 - primary beams of MCC; 2 - the disperse magnetic lens; 3 - summary beam MCC; 4 - undulator; 5 - output radiation.

Singularities of this scheme are: 1) the application for assembly of beams of a universal magnetic lens in a dispersing condition is allows to minimise the aperture of an output beam of MCC; 2) application of a magnetic undulator with supersmall regulated period, that allows considerably to increase frequency of output radiation. By magnification of an energy of emitted quantum up to 80MeV, it possible a following photonuclear reaction: ${}_{83}Bi^{209}+80MeV\rightarrow{}_{79}Au^{197}+2{}_{2}He^{4}+4n^{O}$. Probably, also, photonuclear decomposition of a radioactive materials.

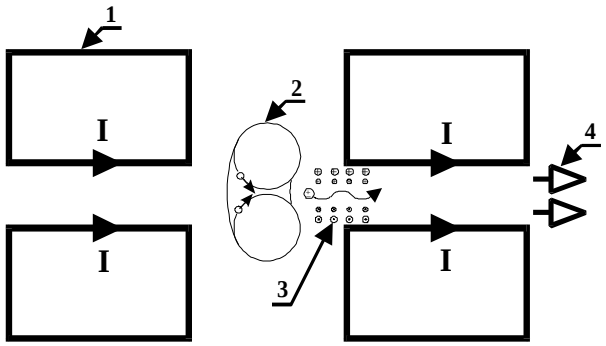


Fig. 3

1) Toroidal square coil with a current **I**;

2) Toroidal plasma formation with MCC;

3) The MF, used as a undulator;

4) Output radiation.

Eugene Alexandrovich Grigor’ev.

189510, Leningrad area, Lomonosov city, street of Krasnogo Flota, 5, 20.

Fax: (812) 428-44-27 E-mail: rys@snoopy.phys.spbu.ru