THE FUNDAMENTAL PROPERTIES OF TOROIDAL CURRENT STRUCTURES.

We show the existence of an external magnetic field and internal structure the magnetic field in toroidal structures with a poloidal current.

Eugene Aleksandrovich Grigor'ev, *Russia, 198412, St.-Petersburg, Lomonosov, Krasnogo Flota st., 5-20.*

In January 2000, made a scientific discovery - the first time in electrodynamics numerically calculated and experimentally measured external magnetic field (MF) conductive toroidal structures with a poloidal current (Fig.1). Earlier, in classical electrodynamics, it was considered impossible. The history of the discovery and its implications can be found on the websites http://thermonuclear.narod.ru and http://thermonuclear.ru Arrows labelled **i**, shows the vectors of the elements of the current. The Torah was considered with a ratio R / r ≈ 1 and R / r ≈ 2. The calculation results are displayed in graphs Cantor. The lines on the charts show the cross section of surfaces of equal tension of the MF. The graphs – in relative units
The direction of the intensity vector, MF is perpendicular to the image plane, as lines of force MF are purely azimuthal (or tangential or tangent to the circle that lies in the XY-plane and centered on the Z-axis) component.
Initially, MF was calculated within the Torah.
The torus with the relation R / r ≈ 1 (Fig.1).

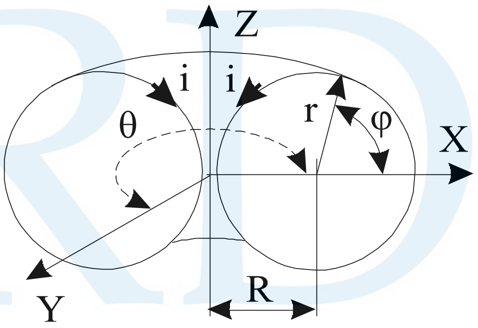

Fig.1

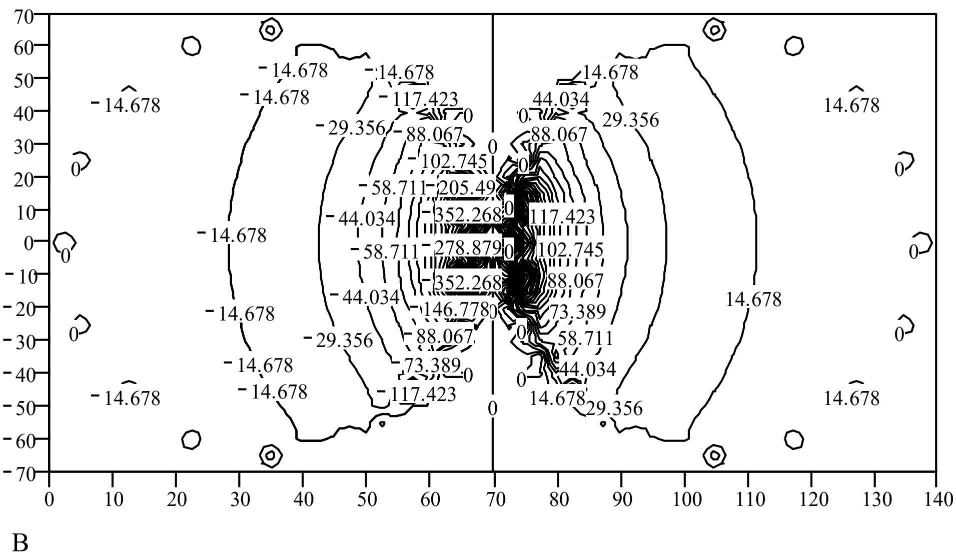

Fig.2

The torus with the relation R / r ≈ 2 (Fig.3).

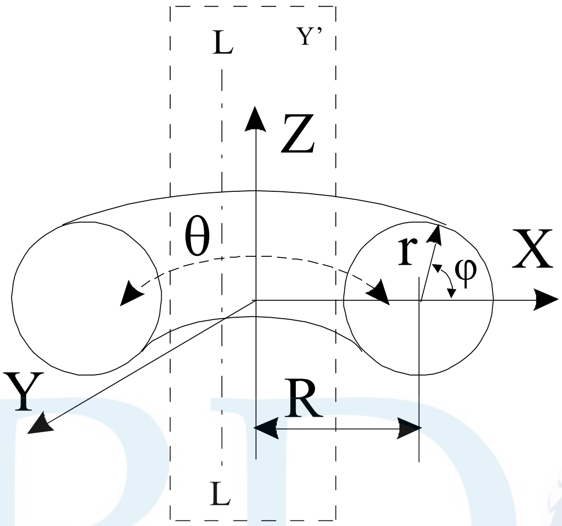

Fig. 3

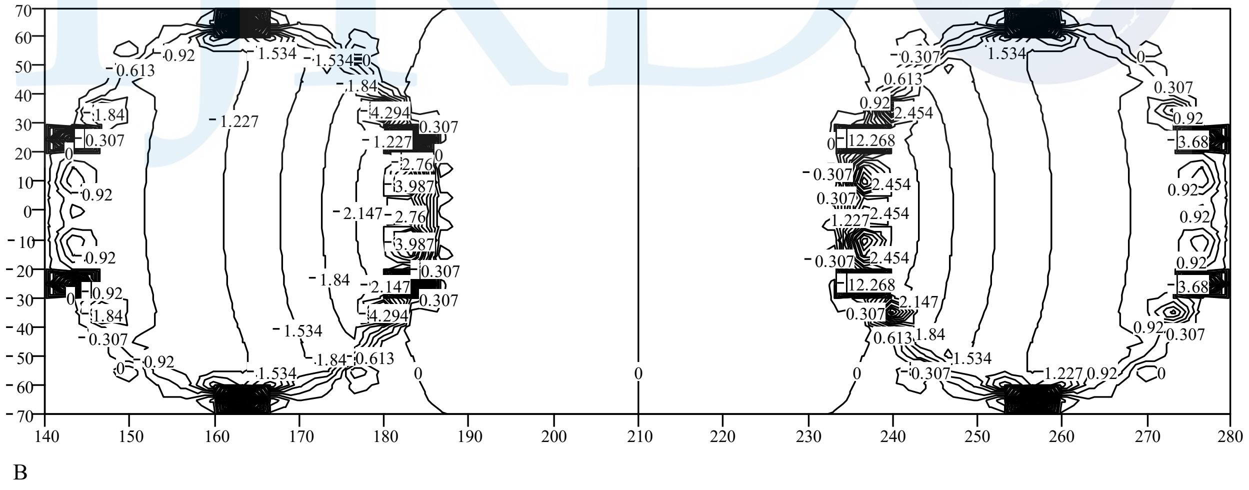

Fig. 4

In the graphs (Fig.2, Fig.4) shows that the structure of the MP inside the Torah does not correspond to the structure of MP infinite direct conductor with a current was believed to be still in the classical theory of electromagnetism. This structure conform to the field, created by a separate current element, located in the center of the torus to its major axis and directed along this axis. The schedule of this MP is shown in Fig. 5.

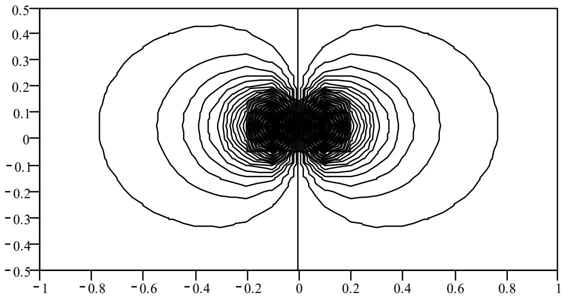

Fig. 5

Then, we calculated the external MF outside the torus in the XZ plane, in its part Y`(see Fig.3).

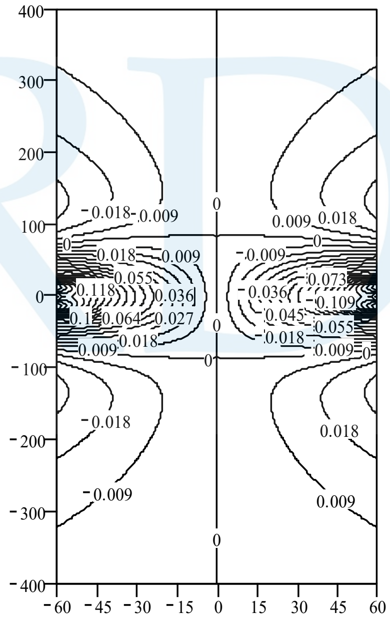

Fig. 6

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

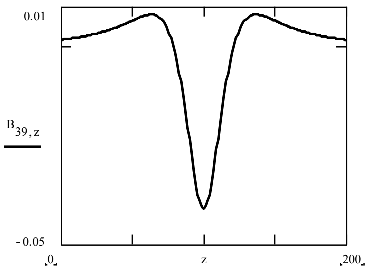

Fig. 7

The tension of the MF along the line L - L; [y = 0, x = const, B = f(z)].

On the chart (Fig.6) shows that external MF Thor exists. The graph in Fig.7 detects the feature of this MF three extremum and a double zero. Similar to the MF measured experimentally. From Fig.7 shows that the axial convergence of the two tori in the beginning there is their pushing away, and after overcoming a potential barrier, the attraction. The system enters a state with the minimum flux (minimum-energy) and becomes stable.

The calculation of the external MF generated by the system of two coaxial tori and between them (Fig.8) shows that it has a minimum on three coordinates at the center of the system (Fig.9). All this shows the futility of plasma confinement domestic MF in the closed traps with a toroidal configuration of MF-type “Tokamak” and “Stellarator” - retention is only possible in an open plasma trap external MF system, two coaxial toruses of arbitrary configuration. Similar to the MF measured experimentally.

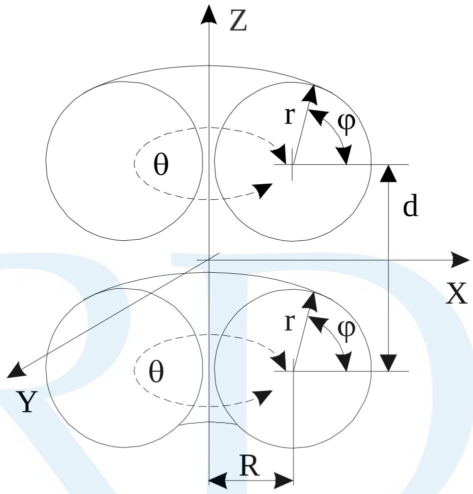

Fig. 8

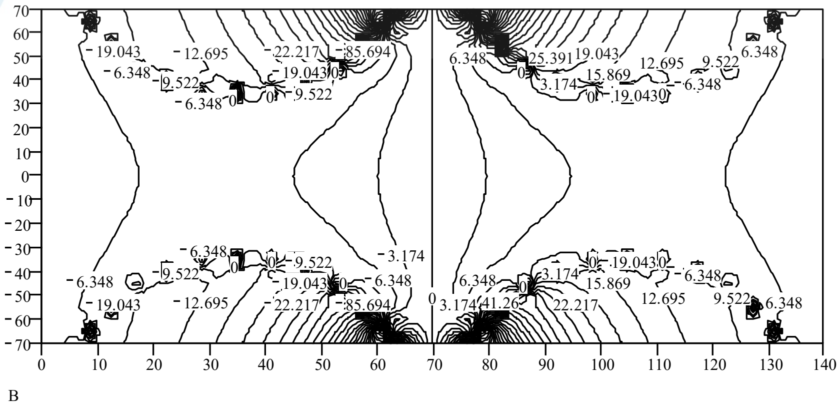

Fig. 9

The previous calculations were made for continuous current carrying surfaces. Now let's make calculation for a torus consisting of separate rectangular coils with a current (a segmented torus) Fig.10, Fig.11. This is done to check the ability to play MF solid torus field is segmented (real) torus. Similar to the MF measured experimentally.

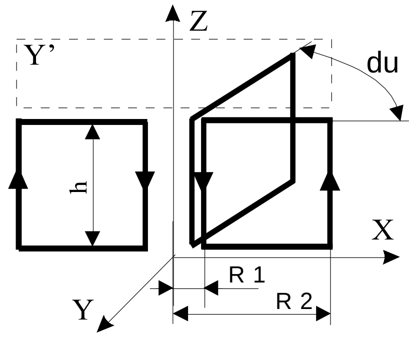

Fig. 10

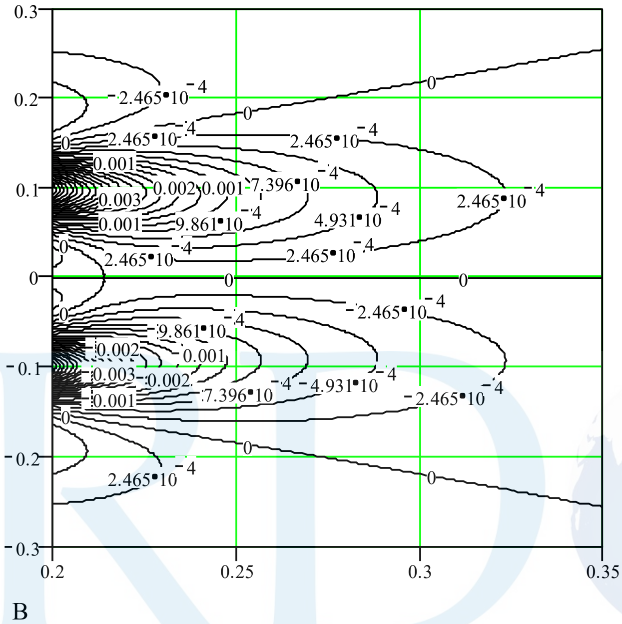

Fig.11

The structure of the external magnetic field of a segmented torus in the plane Y' (XZ) in the form of a graph of the Cantor.

Shows cross section of level surfaces of equal tension of the MF.

The intensity vector is directed perpendicular to the plane of the drawing.