"Black Hole" as Transparent Hole at the bottom of Double-Spiral-Funnel-Vortex

Israel Fried*

Abstract

This article uses my old Oron Sea Theory (OST) from the 80' and 90' (not officially published), for explaining recent revealed phenomena at the Active Galaxy Nucleus (AGN). OST assumes the existence of a universal relativistic active medium below the scale level of elementary particles and photons, composing of relativistic tiny particles (orons). OST assumes, as an axiom, that all the phenomena which exist in one scale level of space and time exist as well in all the other scale levels. In this article introduced the concept **double-spiral funnel-vortex** ("bodyno"). Bodyno is transparent unless it captures observable matter. Bodynos are assumed to exist in any medium at any scale level of time and space. Tornado serves as a model to bodyno. As in Tornado, the skeleton of bodyno constructed of two spiral arms that gets the shape of a funnel containing a "quiet eye". This skeleton has a "cover" constructed from sub-bodynos, etc. OST suggests mathematical representation for bodyno that enable to get the five basic field potentials: Gravity fields are due to sink rate of orons per the area of the "quiet eye" at the bottom of the funnel, by decomposition of elementary particles to unobservable orons. Strong fields are due to strong streams close to the funnel's bottom. Electric fields are due to rotational streams about the bodyno main axis. Magnetic fields are due to rotational streams along that main axis. Weak fields are due to weak streams within the "quiet eye". Using this model of transparent bodyno enables to explain the main phenomena at the AGN as due to rapid motions of bodyno-gas-clumps along the two spirals of the bodyno-galaxy, close to its funnel narrow base. This mechanism may explain the "colorful zigzag" phenomenon, the Gamma ray bursts (GRB) and the "afterglow" phenomena, etc. The "Black hole" regarded as a **Transparent Hole** at the bottom of the "quiet eye". The "event horizon" regarded as the limit of the bottom of the "quiet eye". The "Accretion disk" regarded as the rotating matter in the bodyno spirals around the limit of the "quiet eye". The jet phenomenon from the "event horizon" explained as due to decompositions of elementary particles to orons at the limit of the "quiet eye" that exit from it as jets, yielding the magnetic field. In addition I discuss an option for existing of **Negative Particle,** in addition to existing of anti-particle. Particle is sink-bodyno with specific rotational direction. Its anti-particle is the same sink-bodyno but with opposite rotational direction. The Negative Particle is the source-bodyno partner.

---

*Independent Space Physicist
 site :http://ifried22.tripod.com/
 e-mail: ifried22@gmail.com

1.   Introduction

The great dilemma of what is going on within a "Black Hole" and what was before the "Big Bang" have led to serious questions about the reality of time, as one may be impressed from the notions of Stephen Hawking and others dealing with cosmology. As explained in my site (see above), in 1969 I raised the idea that time and space are not physically exist. By this I meant that time and space do not influence phenomena in Nature, and Nature's phenomena do not influence time and space. However, since the Human mind used to think, directly or indirectly, in terms of space and time there is a great obstacle for science to treat Nature phenomena without using the concepts of space and time. This obstacle have led to theories that include singularities, as in Einstein's General Relativity, to duality as in Quantum theories and to the above dilemmas regarding the "Black Hole" and the "Big Bang", in addition to many paradoxes in physics and other fields.

In 1983 I found a scientific way to overcome this obstacle of using the concepts of time and space in our conscious. I suggested postulating an axiom of indistinguishable of Nature's phenomena regarding time and space. This idea was broaden in my article from 1998 "Physical theory of Non-Existence of Time and Space" [1]. I show there how indistinguishable in space and time leads to the conservation laws of physics. I regard space as "composed", in our conscious, of distance and direction.   Indistinguishable in distance and time leads to the conservation law of linear momentum. Indistinguishable in direction and time leads to the conservation law of angular momentum. Indistinguishable in scales and time leads to the conservation law of energy. That means the same phenomena we see in an ordinary fluid exist as well in all the other scale levels of space and time, including the scale level of elementary particles and bellow, as well as the scale level of the known Universe and above. The notion of scaling became very popular in science at last decades. Recall that the Euler equations, which describe the dynamics in a fluid without viscosity and external forces (which both are added to get the Navier Stokes equations), are invariant to the following transformations (see p. 256 in Tsinober [2]): a) translation in space and time. b) full group of rotation including rotations and reflections. c) Galilean transformation. d) time reversal. e)

scaling transformation.   The Navier Stokes equations are invariant under transformations a-c while there are limits on transformation e, the scaling.

Several consequences of the axiom of indistinguishable the scales of space and time given in my article from 1990 ″The Oron Sea Theory -The Medium under Elementary Particles and Photons" [3] (in the following: **OST-90**). You may download the full article from this page in my site (http://ifried22.tripod.com/id39.html).

OST-90 contains new ways to determine basic notions as "body", "distance", "direction", "time", "energy", etc. It also suggests new interpretations to the four basic forces of Nature: gravity, electromagnetism, strong and weak forces. Let us quote Sec. 2 1 of OST-90. [In the following citations I insert the note "(in OST-90)", where needed, to avoid confusion].

> ″ OST assumes that all the phenomena in nature may be explained as the result of the behavior of many very small particles, herein called "orons", moving randomly in a huge sea of orons, herein called the "oron sea". (The meaning of "oron" in Hebrew is small light.) OST assumes theoretically that in this "oron sea" are all the phenomena one may find in ordinary molecular fluid. The following are the consequences of this simple assumption. We are looking for correspondences between all that we know in physics and that assumption, using analogies and parameters from different branches. We assume that those orons are very small, almost massless, and have very high free flight velocities. We define orons as particles whose free flight velocities v_f are in the range $c-\delta \le v_f \le c$, while c is the theoretical velocity of light in a vacuum, and $0 \le \delta \le 1.5$ cm/s. In order to appreciate what oron sea means, let us assume, for example, that an electron is composed of 10^{24} orons. For the sake of simplicity we also assume that the rest mass of orons is 10^{24} times smaller than the rest mass of an electron. Thus, in this case the rest masses m_0 of orons are in the range $0 \le m_0 \le 9*10^{-52}$ gr. If in this case, the average distance between two orons in an electron is more than twice their dimensions r_0, we may treat them as having dimensions in the range $0 \le r_0 \le 2*10^{-21}$ cm. Thus, we may regard orons as relativistic tiny particles. As mentioned above, we

assume the oron sea fills the entire universe. If we also assume that, as in some ordinary molecular fluids, the free flight distances of orons are less than 100 times their dimensions, then the densities in the oron sea, in this case, are more than 10^{56} orons per cm^3. This example shows that in oron sea we may have to deal with unordinary orders of magnitudes. According to the relativistic theory, since for orons $v_f \approx c$, they may change their mass and dimensions by many factors while their velocities change by very small amounts. Thus, in the oron sea there are orons of differing dimensions and masses. Let us determine the relativistic factor $\gamma = [1-(v/c)^2]^{0.5}$, while v is a linear velocity to be determined in Sec. 3.1 (in OST-90). For orons, in the first approximation, $\gamma \approx (2\delta/c)^{0.5}$. Thus, in the oron sea $0 \leq \gamma < 10^{-5}$. If we mark the rest mass and dimension of an oron, by m_0, r_0, respectively, then its mass and dimension during motion, are obtained from the relativistic equations $m=m_0/\gamma$ and $r=r_0/\gamma$. We therefore see that in the oron sea there are probably orons with different sizes, masses and velocities. This may remind us of the situation in ordinary sea. One may regard the oron sea as a relativistic active ether. Latterly, (in OST-90) we show how such an ether is consistent with the Michelson-Morley experiment and how it may resolve the problems which led Einstein to develop the Theory of Relativity. We explain, using OST, why this theory is correct and why Quantum Theory has its own justification as well. OST assumes that one may consider the universe as consisting of a ladder of seas at successive levels of dimensions. At each level there are basic particles which are composed of the many basic particles of the lower level. One possible ladder is the following: universes, clusters, galaxies, stars, bulks of hot gases, molecules, elementary particles, A-orons, B-orons, C-orons, D-orons, etc. The last seas will be explained latter (in OST-90). The general idea of OST is that one may receive all the phenomena in one sea by a mere magnification of intervals of space and time of a lower sea. For instance, OST assumes that one may receive all the phenomena measured in elementary particles by looking towards the cosmology through a "reversed telescope", i.e., a telescope which reduces the pictures of galaxies, instead of magnifying them, by a specific factor. In

addition the rates of events, i.e. time intervals, should be reduced by about the same factor. The correspondence between OST and fluid dynamics is as follows: streams of orons are the carriers of energy; velocity distributions of orons are field potentials; collisions between streams of orons are responsible for some kinds of forces; waves in the oron sea are electromagnetic and other kinds of waves; different kinds of vortices of orons are photons and other elementary particles, and huge multi-vortices are macro-bodies. We shall see in this article (in OST-90) that the gravitational field is due to a sink in a non-rotational streams of orons; the electromagnetic field is due to rotational streams of orons; the strong field is due to helical streams of orons; and the weak field is due to holes, or vacuums, in the oron sea due to closed rotational streams of orons. In cosmology we find several major types of galaxies. OST assumes that the same kinds of vortices give different kinds of elementary particles. As we assume at this stage of the research, the electron family is expected to be a globular vortex of orons, as much as the shape of a globular galaxy. The neutrino family is expected to be a ring vortex of orons. The quark family is expected to be a funnel spiral vortex of orons. A proton is expected to be a combination of three funnel vortices, one twisted around the other as in a plait, giving a funnel shape as in a composite tornado. A photon is assumed to be a pair of cylindrical vortices of orons, while the cylinders are in opposite rotational directions. The quantum numbers of elementary particles as well as the composition rules, will be explained in the next article using simple arguments. OST is a very simple theory. It is so simple that it also gives us the opportunity to understand the most basic concepts of human thinking: body, character, space, time, velocity, energy, force, etc. "

This was a citation from the Sec. General Scope in OST-90. That article includes chapters on Elementary Particles, Cosmology and other subjects. I may add here that one may regard the Oron Sea as a combination of the active ether of René Descartes, from the 16th century, with the **relativistic idea** of Einstein from 1905.

It is remarkable to note that any vortex is actually solenoidal, or an aggregate of solenoids. To see this notice that the vorticity $\omega(\mathbf{r}, t)$ defined as the curl of the velocity field $\mathbf{u}(\mathbf{r}, t)$, i.e. $\omega \equiv \text{curl } \mathbf{u}$. Thus, $\text{div } \omega = 0$. This last equation shows that ω is solenoidal, as can be seen e.g. at p. 1 of Saffman 1995 [15]. We used to regard such expression as $\text{div } \mathbf{V} = 0$, while $\mathbf{V}$ here is a general vector field, as manifesting that within a specific considered volume there is no quantity connected to that vector field. For instance, the expression $\text{div } \mathbf{E} = 0$, while $\mathbf{E}$ is the electric field, means there is no electric charge q within a specific considered volume, while one of Maxwell equations is $\text{div } \mathbf{E} = 4\pi q$. Thus, from that remark of Saffman we may conclude at the volumes where $\text{div } \mathbf{E} = 0$ the field $\mathbf{E}$ is solenoidal. Another Maxwell's equation is $\text{div } \mathbf{B} = 0$, while $\mathbf{B}$ is the magnetic field, everywhere. This is since there is no monopole magnet. Thus the field $\mathbf{B}$ is everywhere solenoidal.

Let us regard an example from gravitational field. $\text{div } \mathbf{g} = 0$ means there is no matter within a specific considered volume, while the equation for including matter is $\text{div } \mathbf{g} = -4\pi G\rho$, when ρ here is matter density. Thus $\text{div } \mathbf{g} = 0$ means that at free space, i.e. without masses, the gravitational field is solenoidal. All those remarks supports OST's point of view regarding funnel vortices as spirals. It is also remarkable to note that one may describe the gravitational field by velocity field $\mathbf{v}(\mathbf{r}, t)$ rather than by acceleration field $\mathbf{g}(\mathbf{r}, t)$, as pointed out by Cahill 2005 [16]. As shown there, the accelerating field, $\mathbf{g}(\mathbf{r}, t)$ accepted phenomenology by the Euler form from $\mathbf{v}(\mathbf{r}, t)$.

Now, let us imply on this gravitational velocity field, $\mathbf{v}(\mathbf{r}, t)$, the same procedures used in fluids, i.e. defining vorticity by $\omega' \equiv \text{curl } \mathbf{v}$ and imagine a sink vortex in that field. This sink vortex is the "body" in OST that has a mass proportional to the sink rate of the funnel vortex, as discussed later. Thus, one might feel free to use analogies from fluids onto the Oron Sea.

In OST-90 and the former article, OST-89, which is also given in my site mentioned above, I sketched the funnel vortex with one spiral arm only, as in Fig. 1 of both articles. However later on I became to the conclusion that it is more reasonable to describe a funnel-vortex with **two** spiral arms, as seen very clearly in most spiral galaxies. Thus, instead of Fig. 1 of OST-89 and OST-90 I use an **Updated Fig. 1** with two arms. See this figure in this page in my site. (http://ifried22.tripod.com/id39.html).

Imagine two equal spiral arms in a funnel-vortex, with the same characteristics, e.g. the same rotational direction, the same paces between complete loops of the spirals, etc. Now let the two spirals be within each other, as two funnel springs that screw into each other, but with a **phase difference of 180^0**. This construction is expected to be in equilibrium stability of the streams within the funnel vortex. This equilibrium stability is due to the attraction force between two parallel streams that move generally in the same direction, as explained in OST-90 (see Fig. 2 there). It seems to me that this **double-spiral funnel-vortex** is one of the most fundamental constructions in Nature. Since such double-spiral funnel-vortex, is regarded in OST, from this article, as a **basic body in any sea level**, it deserve a name by itself. I call it here **"bodyno".** The general sketch of bodyno is given in Fig. 1. In the following we shall see that this sketch is actually the skeleton of the bodyno, while the complete bodyno includes attached vortices as a cover to the skeleton. I may assume that this cover is created due to the motion of bodynos in the Oron Sea. As we know in fluids, the linear motion of a body in fluid creates a wake of vortices of interchanging rotational directions, while bow vortices connected them. This is the familiar Karman "vortex-street". When the body in fluid is also rotating, in addition to its linear motion, the vortices at its wake bent according to rotational direction. OST assume the same mechanism in the Oron Sea. Thus, at the wake of motional bodyno in the Oron Sea there is a "vortex street" of various bodynos, that at certain condition may be bent relative to the direction of linear motion. Those bodynos are regarded here as the cover to the skeleton of the bodyno.

I assume that the tornado is an example of a bodyno in fluids. As may be seen in some satellite photographs, Hurricanes have two spiral arms in the clouds while at the center there is a "quiet eye". Tornadoes, which are kinds of hurricanes, have substantial funnels, usually observed from the ground. When such funnel reach the ground people feel the "quiet eye" after and before the strong wings. There are many images of Hurricanes and Tornadoes in the INTERNET, e.g. in the Image search of Google. For instance see Hurricane Ivan there. See also the two spiral arms of the Hurricane Frane 1996 in the second page of P. K. Newton, "The N-Vortex Problem" 2001, [8]). Thus, we regard tornado as "bodyno-tornado" which serves for explaining basic bodies in elementary particles, as well as in cosmology. There are many examples of tornadoes that exhibit more than one funnel. One may regard it as a one

big funnel vortex with multiple narrow funnel bases ("tails"), or as aggregate of several funnel vortices, each with one "tail". If a bodyno has a spin, about an axis vertical to its main axis, it may become into a shape of ellipsoid vortex while the "tails" are bent into the ellipsoid center. Recent images of galaxies show the option of more than one bright core at their center. The double core of Andromeda galaxy is an example.

In fluids we never see a single vortex. There is always at least one smaller or bigger vortex connected to it. The connection might be external or internal, or both. According to the principles of OST, it is expected that also in the cosmos there is no single free galaxy. Due to recent measurements it became clear that most of the galaxies, which thought to be singles, are actually connected to other galaxies. I may speculate here that many of those galaxies that yet seem as singles will be found in the future to be connected to other galaxies, either external or internal. The rest may hint to the existence of adjacent transparent bodyno-galaxy, as will be explained in the following.

2.   Mathematical representation of Bodyno

In OST-90 I suggested an intuitive mathematical representation (based on my understanding of elementary-particles, fluids and cosmology) of a **one** funnel-spiral vortex. This is supposed to hold for any medium, fluid sea (including liquids and gasses), star sea, elementary-particles sea (quark-gluon-plasma), the A-Oron sea, etc. It is interesting that even nowadays, after the images revealing of many galaxy centers, including the spiral motions of hot gas "around a black hole" as accepted by others, I have not met a mathematical representation for a funnel-spiral vortex by others. Even for Tornado and funnels in liquids, such as in bath drain, I have not met a mathematical representation. Thus, I may continue using my intuitive mathematical representation since it has so many advantages, as we see in OST-90. In the following I bring a citation of Sec. 3.7 of OST-90 that gives the mathematical representation of **one** spiral funnel vortex and discusses some of its advantages. [As before, I insert in the citation the "(in OST-90)" where needed to avoid confusion].

" 3.7) Funnel Spiral Vortex

One of the best examples we have found of a macro representative of several basic elementary particles, is a funnel spiral vortex, such as a tornado in a thunderstorm[4] (in OST-90). In OST we recognize a funnel spiral vortex as an elementary particle or as cosmological particles, i.e. galaxies, or as basic particles in any other sea. In Fig. 1 (in OST-90) we see a general schema of a funnel vortex. As we will show latter, funnel spiral vortices of different kinds have all the characters we are used to regarding to an electron, a proton and other elementary particles. In Fig. 1 (in OST-90) the spiral lines represent the spiral streams of the funnel vortex of orons in an oron sea. The dotted lines represent other streams regarding that spiraling vortex. The letters in this figure represent field potentials due to those streams: G, E, M, S and W represent, respectively: gravitational, electric, magnetic, strong and weak field potentials, to be discussed in chapters 5, 6 and 7 (in OST-90). In these chapters we discuss possible consequences of our assumption regarding the specific shapes of elementary particle.

We wish to obtain a mathematical representation of a funnel spiral vortex which explains the characteristics of an elementary particle as we will show in the following chapters. Imagine a funnel shaped of one spiral. Suppose the longitudinal axis of this spiral is along the Z axis of an orthogonal system XYZ, while the +Z is in the direction of the narrow side of the funnel. The center of the wide side of the funnel is at the origin of the system. Let us further imagine a small bead in the spiral at point (X_0, Y_0, Z_0). Let this have an initial velocity (V_{x0}, V_{y0}, V_{z0}). Let us mark by θ the angle of that particle, in a plane parallel to the XY plane, relative to the initial position. We look for the position of the bead while it goes along the spiral. We look for a representation which includes the rotational as well as the ir-rotational characteristics of the vortex.

We feel intuitively that the following general equations may represent the position of that small particle within the spiral:

(3.11) $X = Ae^{-(\beta\phi+\delta n)}\cos\theta$

(3.12) $Y = Ae^{-(\beta\phi+\delta n)}\sin\theta$

(3.13) $Z = Be^{-(\mu R-b\theta)}$

While A and B are parameters which may depend on time if the narrow side of the vortex is in linear or other kind of motion, relative to the origin, ϕ and n are function determined by $\phi = k_z/N$, $n = n_r/N$, while k_z is the z component of k of Sec. 3.4 (in OST-90) dealing with angular velocity, n_r is the "radial net direction" of Sec. 5.3 (in OST-90) dealing with gravitation. N is shown there to be proportional to $1/R^2$. The rotational parameters are β and b. The irrotational parameters are δ and μ. These four parameters may be of any sign, as well as zero. They may be found from initial conditions and by the arguments in the rest of the article. For a right handed spiral the sign of β is the same as the sign of θ.

For the sake of simplicity we regard A as independent on time. We determine R as the distance of the bead from the Z axis: $R^2 = X^2 + Y^2$. From (3.11) and (3.12) (in OST-90) one finds

(3.14) $R = Ae^{-(\beta\phi+\delta n)}$.

Let us define the circular velocity: $V_\theta = R(d\theta/dt)$. We assume there is a constant of the rotational motion, K_0, so that

(3.15) $V_\theta = \pm K_0/R$,

while the sign in this equation is as the sign of θ. This equation is obtained if :

(3.16) $d\theta / dt = \pm K_0/R^2$.

 The left side of this equation is Ω_z which is determined in (3.7). It is proportional to ϕ.   From the reasoning given in Sec.5.3 (in OST-90) one may deduce $dn/dt=g/R^2$, while g is a constant of the irrotational motion. By analogy we assume $d\phi / dt = w/R^2$, while w is a constant of the rotational motion. From this assumption and (3.16) we conclude ϕ is a linear function of θ.   When θ increases we expect ϕ increases as well. If β is not equal 0, then R decreases while θ and Z increase .

Thus, in (3.11)-(3.14) there is an analog representation of the rotational functions as of the irrotational functions. If there is only rotational motions, then $\delta=\mu=0$.   The parameter β indicates the behavior of the funnel as a sink (source) at a rotational sea. If there is only irrotational motion, then $\beta=b=0$. In this case the parameter δ indicates the behavior of the funnel as a sink (source) at an irrotational sea. If a sink, we have the gravitational phenomenon. If a source, we have a continually expansion phenomenon, as in the core of some galaxies.

The orthogonal velocity to Z axis, V_r, is determined here by $V_r=dR/dt$. The velocity in the Z direction is determined by $V_z=dZ/dt$. From (3.13)-(3.16) we get:

 (3.17) $V_r = \pm \beta w/R \pm \delta g/R$

 (3.18) $V_z=[(dB/dt) \pm (Bw\beta\mu / R) \pm (Bg\delta\mu / R) \pm (BKb/R^2)]e^{-(\mu R-b\theta)}$.

In Sec. 6.2 we will show that the first term of (3.17) is due to the rotational velocity of orons. It resembles the electric potential. The parameter β seems to be proportional to the electric charge of the particle (funnel vortex). The parameter w seems to be connected with the constant in Coulomb law. The second term of (3.17) is

due to the gravitation potential of the particle. It is a result of the behavior of the vortex as a sink of irrotational streams, as we discuss in Sec. 5.3 (in OST-90). The fourth term in (3.18) may be connected with the magnetic field around a funnel vortex, as we will discuss in Sec. 6.3 (in OST-90). The third term in (3.18) may be connected with the Yukawa potential. It is due to the irrotational strong streams of orons at the vicinity of the narrow side of the funnel. We will discuss this potential at Chapter 7 (in OST-90).

The total linear velocity of the bead is determined by $V=\sqrt{(V_\theta+{}^2V_r{}^2+V_z{}^2)}$. In OST this velocity has an upper limit determined by the free flight velocity, v_f, of the components of the particle (the bead in this example). Therefore, there is a minimum distance from the Z axis, R_{min}, where the particles compose the vortex exist, before being broken to their components. This R_{min} is the radius of the quiet eye of the funnel vortex. These components may create a weak spiral funnel vortex inside this eye. The mathematical representation of this weak funnel vortex may be the same as in (3.11)-(3.13) but with other parameters. Thus, in this domain there is expected to be the weak potential, as we discuss in chapter 7. Since R depends on θ , through ϕ , the term in the exponent of (3.14) may change sign, as θ reaches a specific value. Equations (3.11)-(3.13) are general .One may use these to treat all the kinds of vortices. If $\beta = 0$ we have a cylindrical vortex, or a ring vortex. If the ring rotates about X or Y axis, we have a spherical vortex with a hole in its center. If a funnel vortex rotates about the X or Y axis, there could be peculiar shapes, some of which are seen in cosmology. If θ is taken as negative, we may change also the sign of β , in order to get a spiral vortex with the opposite rotational direction. This gives the anti-particle, as we will explain in chapter 7 (in OST-90). When there are more than one spiral in the funnel vortex, each spiral may have its own parameters. In this case the situation is more complicated, since

now the spirals may interact in a verity of ways. A multiple tornado

is an example to such a situation".

So far the citation from OST-90 of Sec. 3.7 about my suggestion for a mathematical representation to **one** funnel spiral vortex, and some of its advantages. The broadening to **double-spiral** funnel-vortex, i.e. to **"bodyno",** is straight forward by multiplication of the above equations to set 1 and set 2, while in set 2 the rotational parameter θ is in phase of 180^0 with respect to that of set 1, with the incorporation of the requested changes in the other parameters due to this phase change.

Notice that my mathematical representation of the spiral-funnel in those cited equations (3.11) - (3.13) is different than the mathematical representation of "Conical helical line" given e.g. in the entry "helical line" in the Encyclopedia of Mathematics". The main difference is that in my representation the radius R is included in the exponent of the Z, (3.13). This enables to get the Yukawa potential in V_z (3.18) there.

There is an open issue regarding the reason to the spiral construction in galaxies. According to OST the galaxies, as well as the vortices in fluids, are imbedded in the medium seas surround them. As explained in OST-90, the sink processes of irrotational and rotational streams are the cause for creating the spiral vortex. The funnel spiral shape is created due to the influences of those two actions. The **spiral** shape is created while the linear motion along Z is influenced by the sinking of **rotational** streams in the appropriate sea, as represented by the term $e^{+b\theta}$ in the above expressions of Z. The **funnel** shape is created while the rotational motion is influenced by the sink of **irrotational** streams in the appropriate sea, as represented by the term $e^{-\delta n}$ in the above expressions of R.

The velocities within the double-spiral funnel-vortex (bodyno) are generally given in the above cited equations. It is clear from those equations that the higher velocities are in the vicinity of the narrow base of the funnel. The recent reveals regarding the rapid gas motions in the vicinity of what is regarded by others as "black hole", strongly support OST as we shell see in the following.

As mention in OST-90, each basic body (bodyno here) composes of many bodynos of lower scale levels. The "quiet eye" of a bodyno is the location where the constructions of the bodynos from the next lower level decompose to the bodynos of the next to next lower level or lower. Thus, in each bodyno we may consider "quiet eye" with respect to specific bodynos of lower level. For instance, a bodyno-galaxy has a "quiet eye" of radius R_1 at the narrow base of the funnel, with regard to bodyno-stars. Within this radius there are no bodyno-stars, but there might be bodyno-gas-clumps composing a bodyno-star. In a radius $R_2 < R_1$ there is a "quiet eye" with respect to bodyno-gas-clumps. In radius $R_3 < R_2$ there is a "quiet eye" with respect to bodyno-tornado, and so on. We shall see in the following how those different "quiet eyes" enable to explain the various kinds of radiation from the galaxy core, such as gamma rays, X rays, radio rays, etc, and their delay times.

3.   Transparency of bodynos

I regard a tornado as a bodyno (double-spiral funnel-vortex) and call it bodyno-tornado. As we know ,**tornado is transparent** as much as the air is transparent for our eyes. The air is "observable" to our eyes while light rays scatter from the small dust-grains that shine at dark room with a shutter crack through which the light ray enter. The motions of those star-like dust-grains are a marvelous phenomenon that we may observe at home without the need of any machine. By moving the air you may see all kinds of vortices, including miniature tornadoes. According to OST point of view, the atmosphere composes of transparent **air-bodynos**. Their influence on observable matter is what we regard as rain clouds, dust vortexes, etc. As far as I understand the issue, the changes in weather occur due to motions of transparent air-bodynos chains with interchanging rotational directions of the air-bodynos, while the size of the air-bodynos change as well. The strength of the air-bodyno increases while its width decreases. I plane to write a special article on those air-bodynos and their influences on the weather.

The huge tornadoes are also transparent. We observe then mainly by the dust and debris, if there are no water drops carried by the turbulent air. Thus ,**bodyno-tornado** is transparent. So does any bodyno at any sea level, including the **bodyno-galaxy**. We may regard galaxies as a transparent bodynos in the Oron Sea that in some cases are observed via the observable stars, dust, debris and gases that we

may detect by special facilities. We may also regard the **bodyno-universe** as transparent, while there are some observable cluster galaxies.

Before jumping to the sections on evidences in cosmology I may note here several general notes regarding vortices of any kind in fluid. As we know, the Navier-Stokes equations do not have a closed analytical solution, except for several special cases. See e.g. an overview of turbulence properties in p. 26 of A. Tsinober 2001 [2]. "Turbulent flows are **three-dimensional** and rotational with continuous self-production of vorticity and strain. [... strongly nonlinear, nonintegrable, nonlocal and non-Gaussian" and other interesting properties listed in that p. 26 of Tsinober 2001 [2]. [Gaussian is regarded to a function of exponent in the form $\exp(-R^2)$]. As far as I see the issue, using the concepts mentioned in OST-90, the main difficult to treat turbulence is that any of them composes of many bodynos of various kinds and different scales of space and time. As far as I understand, the **viscosity** that enters as a parameter into the Navier-Stokes equations is due to interactions between streams of orons, either rotational or irrotational, as described in OST-90. Since they are different kinds of interactions between the streams, e.g. between two linear streams; between two rotational streams; between linear stream and rotational stream; etc. there should be various kinds of viscosity. Thus, the viscosity parameter is an average over the bulk of fluid. But, as I see it, in reality the viscosity should be determined at each location within the fluid. Thus, an optional solution to the unsolved Navier-Stokes equations is by writing the viscosity parameter to as a sum of those kinds of viscosity.

As we know, any linear stream contains rotational streams **even at laminar flow**. The small vortices associated with linear stream at laminar flow increase in shape and strength while the relative velocity of the linear streams increases. Vortices exist at **any** relative linear velocity. Thus, **linear streams involve rotational streams**. On the other hand, **rotational streams involve linear streams**. For example: the linear streams towards a sink vortex. You may start with a linear stream in any scale level, even bodyno-galaxy in the A-oron sea, and you get linear and rotational streams in the scale levels of bodyno-tornado and bodyno-quark in the A-oron sea, and vice versa.

That means the structure of the bodyno described above, i.e. a double-spiral funnel-vortex, is only of the bodyno's skeleton. To each part of this skeleton attached many small streams of various kinds, rotational and irrotational, that might connect between the spiral skeleton branches, as sub-branches in a biological leaf. You may see this phenomenon in funnel vortices in your bath-drain as well as in pictures of tornadoes from satellites and of modern images of galaxies such as the Galaxy NGC-4414. Those sub-branches may sometimes hide parts from the spirals of a bodyno. However, careful inspection by different facilities may reveal this **basic structure of a bodyno as double-spiral funnel-vortex, as a skeleton, with sub-branches and sub-sub branches, etc. as the cover**.

Thus, the bodyno itself is very complicated turbulence. If we consider aggregations of many bodynos of various scales of space and time, we get the many faces of turbulence as mentioned in Appendix A of Tsinober 2001 [2] titled "What is Turbulence?". Thus, in my opinion, the best we can do while treating turbulence is using analogies between phenomena in various scale levels of space and time, as OST suggests. This is instead of trying to find an analytical closed solution to turbulence, which is as looking after a closed analytical solution to a human body or to the entire Nature.

I may note here that a source vortex is also in a bodyno shape. We may consider sink-bodyno as well as source-bodyno. As far as I understand the issue, a sink-bodyno with a specific rotational direction, in a sea of one scale level, may create a source-bodyno with opposite rotational direction (as seen from the wide funnel sides of both bodynos) in the same scale level or in another scale level, higher or lower level. And vise versa, a source-bodyno with a specific rotational direction, in a sea of one scale level, may create a sink-bodyno with opposite rotational direction in the same or another scale level. I regard those creations of source-bodynos and sink-bodynos as the key to understanding turbulence. For instance, in the specific structure of the "vortex-street" the "bows" vortices that connect the interchanging spirals (sink-bodynos) might be regarded as due to source-bodynos at the same scale level as that of the sink-bodynos we observe. Actually the sink and source bodynos are transparent. Sink-bodynos concentrate matter and source-bodynos distribute matter. As I understand the issue, the rain clouds are due to concentration

of observable matter by sink-air-bodynos. The clouds we see might be what left **after** the sink-air bodyno has gone. You may see it very clearly in a bath drain with a soup. The sink-water bodyno might have gone, but the soup clumps may continue to suspend over the water.   This option for creation of source-bodynos and sink-bodynos might explain also the climate changes as well as the behavior of two interacting fluids with different viscosity, which we may regard as of two different scale levels. The jets from the active galaxy nucleus (AGN) might be regarded as source-bodynos in a lower scale sea level than the sea level of the sink-bodyno galaxy, as we shall see in the following.

In OST-89 and OST-90 I regard the sink funnel-vortex (here – sink-bodyno), with a specific rotational direction, as a particle while the same sink-bodyno with opposite rotational direction is its anti-particle. On 8 Mars 2007 I heard a lecture in Weizmann Institute for Science, Rehovot, Israel, of Prof. Yakir Aharonov, from Tel Aviv University, Israel, about a new bizarre option in quantum for existing of negative particle which has all the quantum numbers of a particle but with negative signs. This includes all the quantum numbers appear in anti-particle, with an addition of negative inertial mass and negative gravitational mass. Thus, if the particle is an electron, this new kind is NOT a positron, since positron has the same positive sign for the inertial and gravitational mass, as fro the electron. So far there is no explanation to this bizarred negative particle, unless one uses imaginary bodies, as can be seen in Sec. 16.6 of Aharonov and Rohrlich (2005) [14].   However, OST may explain this "negative particle" very simply as a real entity. Recall that in OST we look for analog phenomena. In fluids, a source-vortex has opposite signs for the quantum numbers of its partner sink-vortex. Since in OST we regard a particle as a sink-bodyno in the Oron Sea, its negative partner particle is a **source-bodyno** in the Oron Sea. Recall that in OST I assume that sink rate per unit area is the reason to the gravity phenomenon, i.e. attracting other particles by irrotational streams. Thus, anti-gravity is repulsion of other particles by irrotational streams. This can be done by a source-vortex.   The jet from the accretion disk of a galaxy is a kind of such source-bodyno, as we discuss in the following.

4.   Cosmology in OST-90

Since I treat in this article a specific subject from Cosmology, let us quote here Sec. 5.1 from Chapter 5 on Cosmology in OST-90 [3]. [As before, I insert in the citation the "(in OST-90)" where needed to avoid confusion].

:

″ 5.1   General Scope

According to the point of view of OST all the phenomena in cosmology are similar to phenomena in fluids. The only differences occur in the scales of space and time. The medium in cosmology is the "star sea". Stars are the basic particles of this medium. Their size is of order $10^{11\pm2}$ cm, which means 24±2 orders of magnitude greater than the size of a proton. In Sec. 2.4 (in OST-90) we regard the mean time between mutual collisions of the basic particles of a specific medium, as the unit time of that medium. For a molecular sea the unit time is of the order of magnitude of 10^{-10} sc. If at the core of a galaxy the mean time between collisions of stars is of the order of $10^{7\pm2}$ years, then the unit time of star sea is also obtained by the same magnification factor, 24±2 order of magnitude. Thus, we may expect, in the cosmos, all the phenomena one may see in a molecular fluid. We only have to magnify the intervals of distance as well as the intervals of time. For instance, the different kinds of galaxies seem similar to the different kinds of vortices in a fluid. Regarding OST, most of the galaxies are shaped of funnel spiral vortices. We see them at different angles of view and different rotational axis. (See pictures of the galaxies at the Atlas of Galaxies (10) (in OST-90). There are also ring galaxies which are a special case of funnel spiral vortex, as we see in Sec. 3.7 (in OST-90). Were we to look down upon our home galaxy, it probably would appear as a pair of funnel spiral vortices, with opposite rotational directions. The wide sides of these funnels are close to each other. The sun is on a spiral of one funnel vortex of this pair. From (3.13) (in OST-90) one may explain the "core" of our galaxy, as the two narrow sides, of these funnels, which move in opposite directions. One moves toward +Z direction; the other toward -Z direction. The black strip along the Milky-Way is probably a space

between these vortices, not necessarily a "cold dust". According to this idea, we suggest to calculate the distances between our sun and other stars in the Milky-Way using the assumption that they are on the spirals of these two funnel vortices. The velocity of each star may be computed by its position along the spiral, so that the angular velocity, about the longitudinal axis of the galaxy, is constant. One may find out the parameters of these vortices as describe in Sec. 3.7 (in OST-90). From (3.18) (in OST-90) we see that one of the intrinsic characteristics of a spiral funnel vortex is that each particle, moving on the spiral, sees all the other particles as moving away. Thus, all the stars surrounding the sun seem to be expanding, even if all of them are going downstream toward the narrow sides of the funnels. According to the Hubble phenomenon, in which galaxies seem to be moving away, (one from the other), it seems reasonable to suggest the possibility that all galaxies seen today are moving on a spiral of a funnel vortex, which we may call "universe vortex". There should be at least one more universe vortex, with opposite rotational direction to the one which we belong to. Some of the peculiar galaxies resemble other mutual rotational interactions between two or more vortices, as in ordinary fluids, i.e., galaxy M51 and its neighbor. Both could be funnel vortices, seen at specific angles, which may fit for a mutual rotational interaction of opposite rotational directions. The "black hole" phenomenon at the center of a galaxy could be explained as a bottom of the eye of a funnel vortex in a star sea, as much as the eye of a tornado. Only at a specific angle can one see the bottom of the eye. On the arms of some spiral galaxies, i.e. M51, one sees small clusters of stars. This phenomenon may resemble electrons in orbits around the nucleus of an atom. This situation raises the possibility that even in hydrogen atom the electron may move in a specific orbit, orthogonal to the axis of the proton vortex in the Oron Sea. The galaxy in Andromeda group of stars is seen as an ellipse with a dense core. It is suggested by OST that we regard this galaxy and others like it, as funnel spiral vortices, with a circular shape, not elliptical; while its longitudinal axis is at some angle with respect to us. Thus, we see how one may use all the phenomena of fluids in cosmology, merely

by magnifying the scales of space and time by a factor of $10^{+24\pm2}$ or some other factor yet to be discovered. "

There is more on cosmology in that article OST-90 [3]. All this was predicted **before** the implying of the Hubble Space Telescope (HST). Recent revealing by HST and other modern facilities strongly supports OST, as discussed in the following.

5.   Recent evidences for the funnel shapes and behavior of galaxies

[Note: most of the following images in the links, which not work in PDF file and others, may be found in the site of NASA, usually in their site Picture of the Day (POD)].

As predicted by OST-90 [3], many galaxies revealed recently as **funnel spirals** that interact with others according to OST rules. For instance the Whirlpool Galaxy (M51) (see in the site of NASA) mentioned in the above citation from OST-90. Its recent images show very clearly the spiral arms of the big funnel-galaxy (NGC 5914) and its connection to the smaller galaxy (NGC 5915) by one of the arms of the big one.

Detailed images show the funnel shapes of the entire galaxies as well as images of their cores. In an image taken by HST in 2001 of the **heart of M51** (see in the site of NASA) we see clearly the bending of a spiral arm into the picture. Moreover, we see in the excellent images of the big galaxy NGC 5914, that it constructed of double spirals in the entire galaxy as well as in its heart. In addition we see the sub-branches attached to the spirals. Thus, we may regard here the big galaxy of M51 as a **bodyno-galaxy NGC 5914.**

In addition we see clearly in those images of M51 that the small funnel galaxy spiraling in **opposite** rotational direction to that of the big funnel galaxy. Those two features, the funnel shapes and the opposite rotational direction, are confirmation of OST assumptions cited above. This supports very strongly the general concept of OST.   There are many other **bodyno-galaxies** revealed lastly by the wonderful images of the Hubble Space Telescope (HST) and other facilities.   Here are some

examples. The Pinwheel Galaxy (M101) (see in the site of NASA) with the splitting two spiral arms to sub-arms, some detached away; The nearby barred NGC-1365 Galaxy (see in the site of NASA) seen as Bodyno-galaxy at inclined angle to line sight. The Andromeda Galaxy M31 (see in the site of NASA) seems as a Bodyno-galaxy in a clear funnel shape.   In Galaxy NGC-4414 (see in the site of NASA) the cover hides the structure of the outer spiral arms but we see clearly at the inside the double-spiral funnel vortex. Thus this is **bodyno-galaxy-NGC-4414.** The Tadpole Galaxy (UGC 10214) (see in the site of NASA) seem to be a bodyno-galaxy while one of its spiral arm became wavy straight due to, what I assume, acceleration of this galaxy relative to the A-oron Sea. This is as much as a the wavy straight tail of an accelerating Tadpole in water sea.

Ring galaxies are also exhibiting characteristics of double-spirals and funnel-vortices, i.e. they are "Ring-bodynos". For instance the Cartwheel Galaxy (see in the site of NASA) is a Ring-bodyno while there are clear sub-brunches connecting the spirals. Another example is the Ring Galaxy AM-0644-741 (see in the site of NASA) that seems as a bodyno for which the lower part detached from the upper part, while both parts are seen at inclined angle to sight line. On the other hand, the Hoag Galaxy (see in the site of NASA) is observed from above the wide base of the bodyno. Thus it looks so symmetrical.

Interacting galaxies also support OST ideas. For instance the Pipeline Galaxy (see in the site of NASA),   which one arm of the big bodyno-galaxy pulls up the smaller bodyno-galaxy. Notice the "propeller-like" at the center of the big galaxy, which hints to the rapid rotation of the entire bodyno. It seems to me the two galaxies here have opposite rotational directions. The Polar Galaxy (NGC4650A) (see in the site of NASA) seems as two bodyno-galaxies connected via their wide bases.

Full discussion, in view of OST, regarding those galaxies and many others, including their marvelous images, will be given in my site mentioned above. In addition, there are excellent sites of NASA, HubbleSite and others that gives many images of galaxies, which careful inspection may prove their bodyno shape, the opposite rotational directions of interacting galaxies and other features predicted by OST. One of the most fascinating images is the "Cosmic Tornado" (see in the site of NASA)

revealed by NASA's Spitzer Space Telescope recently It is clear that this giant Cosmic Tornado has helical structure. The accepted explanation is that this structure is due to "shock waves where a powerful protostellar jet hits neighboring gas and dust". My explanation is that this is due to a huge **transparent** bodyno-galaxy in the A-oron Sea that captured observable gas and dust in its spiraling funnel vortex.

We sometime see image of a Hurricane from satellite and before reading the caption we may mistakenly regard it as an image of a galaxy. Or vise versa. You may wonder how is that the same images of cosmological constructions appear as much as images of Earth's fluids constructions. My simple answer is that both, the fluid on Earth and the cosmological constellations are embedded in the same medium - the A-Oron Sea. It seems reasonable that using the same mechanism on the same medium leads to the same constructions, up to scales. As far as I understand, this is one of the basic principles of Chaos theory, which yields the fractals. We may think of a bodyno as a fractal in the A-oron Sea with any scales of space and time. Thus the same constructions of bodynos and their combinations appear in the usual fluids, in the cosmos as well as in the level of elementary particles (Quark Gluon Plasma), as predicted by OST-90. This hypothesis explains many phenomena in all the scales of space and time. In this article I wish to broaden mainly on the behavior at the galaxy cores, including the "black hole" phenomenon.

## 6.	"Black Hole" in OST

In OST-90 I describe two main processes leading to sink phenomenon of irrotational streams in any sea level. The first process is combination of basic bodies of the specific sea level to yield bodies of higher scale level. This is the way for creation of Neutron Star. The second process is decomposition of basic bodies to bodies of **lower** scale levels. This is the way for creation of the phenomenon called "Black Hole".

Thus, as explained in OST-90, the "black hole" phenomenon at the center of a galaxy may be explained as due to a sink process, by decomposition, at the narrow base of the spiral funnel vortex in the Star Sea. Within a **"bodyno", i.e. double-spiral funnel-vortex**, there might be, at certain conditions, a "quiet eye", as much as in tornado. Only at a specific angle and conditions, can one see the narrow base, and

or the "quiet eye" of the bodyno. The limit of the bodyno narrow base is the place where its components decompose to their basic components. For instance, the basic components of a bodyno-galaxy are the stars. The basic components of a star are bodyno-gas-clumps that about $10^{11\pm2}$ of them might create a star. The sun, with mass about 2×10^{33} gr, might be composed of say 10^{11} bodyno-gas-clumps of mass 2×10^{22} gr each. Each of those bodyno-gas-clumps might be composed of say 10^{11} bodyno-tornadoes. Each bodyno-tornado might be composed of 10^{11} bodyno gas-molecules, each of 2 gr.   And so on till we get to bodyno-elementary- particles, and thereafter to bodyno-A-orons, bodyno-B-orons, bodyno-C-orons, etc.

The decomposition of a bodyno to its smaller components might be by collisions between bodynos and or when the bodyno reaches velocity that is equal or greater the free flight velocity, v_f, of its components. The decomposition by collisions is governed by linear motions. . The second process is governed by rotational motions. According to OST, two long spirals of stars generally construct a galaxy. Collisions between parts of the spirals at the vicinity of the narrow funnel base or at higher places, might lead to their decomposition to stars. Motion along the spiral, with reducing of rotational radius and increasing the angular velocity, may lead to decomposition of a part of the spiral when the rotational velocity reaches the free flight velocity of the stars.

Thus in a galaxy we may regard the following limits in the funnel narrow base of the bodyno-galaxy: The limit the spirals of the bodyno-galaxy decompose to bodyno-stars. The limit bodyno-stars decompose to bodyno-gas-clumps. The limit bodyno-gas-clumps decompose to bodyno-tornadoes. The limit Bodyno-tornado decomposes to bodyno-gas-molecules. The limit bodyno-gas-molecule decomposes to bodyno-elementary-particles (including photons). The limit bodyno-elementary-particles decompose to bodyno-A-orons. This last limit is what other call **"event horizon"**. Inside the limit of the "event horizon" the bodyno-A-orons might decompose to bodyno-B-orons, etc.

Since we yet cannot observe A-orons and lower scale orons, the processes within the "event horizon" cannot be detected by human facilities. Thus the domain inside

the" event horizon" is regarded by accepted theories as "black hole". However, according to OST this is not a "massive black hole" of the accepted theories, but a **real hole** in the narrow base of the bodyno galaxy "quiet eye". This attitude regards not only to bodyno-galaxies but also to all the other scales of bodyno's mentioned above. Recall the idea of S. Hawking about "**Mini black holes**" which are much smaller than the radius of an atom. Thus, OST explanation of the "black hole" as the narrow base of the bodyno's "quiet eye" holds for all sizes of "black holes".

Thus, the new viewpoint of OST is that every bodyno (double-spiral funnel-vortex) in the Oron Sea is created from many smaller bodynos of orons. Each of those smaller bodynos is created from many yet smaller bodynos of orons, and so on. In addition, at the narrow base of each bodyno there is a **"Transparent Hole"** (the "quiet eye") (that other might call "black hole") through which matter from around the bodyno is sunk into. According to OST, this sink process of irrotational streams in the Oron Sea creates the attractive phenomenon, which used to be regarded as the gravity field around a massive matter. The sink rate per unit area of irrotational oron streams (gravity in OST) of a body is the vector sum of the sink rates per unit area of all the bodies composing it, **observable and non-observable**. This picture is true in fluids while regarding the influence of many vortices on their surrounding, which can be described as the influence of a one big vortex. Here I only make a translation from the "language of fluids" to the "language of the Oron Sea".

Since we are talking about a double-spiral funnel-vortex (bodyno), which is a dynamical "body", it is plausible that its narrow base is not at rest but makes some precession about the main axis of the funnel. The outputs from the narrow base are the streams of B-orons, while the A-orons are decomposed to B-orons within the limit of the "quiet eye" ("event horizon"). The jet of B-orons from the narrow base of the "quiet cone" ("quiet eye") are recognized by OST-90 as the magnetic fields of the bodyno. Thus the precession of the narrow base of the funnel may lead to precession of its magnetic poles. The example of precession of Earth magnetic poles might be due to the dynamics of a huge bodyno of matter within Earth. Since the sink via the same "quiet eye" (core) is the responsible to the gravitational phenomenon, it is plausible that the precession of the "quiet eye" might lead to **gravitational waves**. However, since the matter sunk into the funnel-vortex is from all directions, the

changes in the position of the core may influence only very little the gravitational fields (non-rotational streams of orons) around the funnel-vortex. It is plausible that this decrease the amplitude as one goes farther from the core. This might explain why it is so difficult to observe gravitational waves. They propagate with reduction amplitudes not only due to geometry, i.e. as light intensity decrease with distance as $1/R^2$, but also due to the inherent process of the sink.

7.   Milky Way center

Since we can observe at least what is going on within our galaxy, let us discuss the situation at the center of the Milky Way. The Solar System is within the Milky Way galaxy, at about the third distance (on straight line) from the center of the galaxy to its edge. Using modern equipment, such as the Chandra X-Ray Observatory satellite, as much as the HST and other facilities, astronomers can observe directly, with greater details than ever, the location where the "Black Hole" of the Milky Way is expected to be. For instance, the image (see in the site of NASA) from the Milky Way's center, at a span of 2 light years only, points by two arrows to the place where the assumed "Black Hole" in our galaxy is. I will discuss in the following what we actually see in such images, according to OST. Here I wish to emphasize that from this image it is clear that the shape of our galaxy is a funnel. If the Milky Way was flat, as the accepted theories say, we would not be able to view the center of our galaxy. To clarify this notion you may try the following simple experiment. Take a piece of a flat cartoon paper and make a hole at its center. Now look on the side edge of this cartoon, so that your eyes are in the same plane of the cartoon. You can not observe the hole. Only when you look at inclined angle to the cartoon plane you may observe the hole. Now, instead of a continues cartoon paper take a grid of small colored balls and make a hole at its center that its radius is greater than the distance between the balls. Here again, when you look horizontally at the grid plane you can not say there is a hole. This is not only because the balls between your eye and the hole may hide the hole, but also because the light from the colored balls behind the hole pass through the hole. If you do this experience with transparent balls, it does not help you to detect the hole while looking horizontally. Only incline angle to the plane of the grid may tell you there is a hole. Now, suppose you wish to put a black ball in the hole of the balls grid in order to observe it from horizontal point of view. In

this case you may see this black ball at a certain transparency of the balls. Is this the same as the "Black Hole" in the Milky Way?. The answer is certainly negative. First, the stars in the Milky Way are not transparent. Second, as you may see in the site of Max-Planck Institute   there was detected, on 9 May 2003, by high resolution Near Infra Red (NIR) camera

> "a powerful flare at the location of the black hole. Within a few minutes, the flux of faint source increased by a factor of 5-6 and fainted again after about 30 min. The flare have happened within a few milli-arcseconds of the position of Sgr A*. The short rise-and-decay times told us that the source of the flare was located within less than 10 Schwarzchild radii of the black hole… the mechanism of the INR flares is uncertain and its explanation is our main goal."

So far the citation from the Max-Planck institute site. We shall consider in the following OST explanation to this flare as well as to other bursts in the vicinity of galactic centers. Here I wish to point out that we observe the location of the Milky Way center, in so great resolution that can be done only if we look at this center from **inclined angle,** not from horizontal view point, as assumed by those who regard the Milky Way as a flat plane with a bulb at its center. In addition, the flare itself is very close to the place where the "black hole" is supposed to be, less than 10 Schwarzchild radii, but we do not see the "black hole" itself. Since, according to OST, this is a transparent hole at the lower base of the funnel of the Milky-way bodyno-galaxy. The flare is in the vicinity of the bottom of the "quiet eye" of this bodyno-galaxy, as will be explained broadly later.

 Let us discuss the image of the **young stars** near the central hole of the Milky Way that was image by the orbiting NASA's Chandra X-Ray Observatory, as one may see in the article "Stars live fast at edge of black hole" [4]. According to that article, 50-100 massive stars, each 30-50 sun masses, born less than a light-year away from the Milky Way's central black hole and orbit about the black hole like the planets orbit the Sun. As explained there, the dust in this area prevents observing those stars by optical telescopes, but the orbiting Chandra detected them by the X-rays they emit. These findings contradict theories saying that massive stars have arrived form other

places in the galaxy and migrate toward the black hole, while here we see the young stars born close to the Black Hole. This is the accepted explanation to that amazing X-ray photograph. However, OST may explain this photograph differently.

First, the young stars moving around the black hole might be rotating within the "quiet cone" ("quiet eye") of the funnel-vortex galaxy of the Milky Way. Second, according to that article, there are small stars in addition to big ones, as we can see in the photograph. The reason to saying that those are small stars is that their X-ray light is weaker than those of the big stars. However, there is an option that these "small stars" are actually big stars that are farther away from the focus of the camera. If so, this photograph reveal that the **black hole is not a massive body,** as the accepted theories assume, but it is a "transparent hole" via which one may observe the distant stars **behind** the hole.

If the big stars will became "black holes" as accepted according to that article, than, according to OST, we get the analog phenomenon of multi-tornado, where some small tornadoes rotate about the central big tornado, as measured according to the article on Multiple Tornado from 2001 [5]. There are many nice photographs of multiple tornadoes in the INTERNET, e.g. in. the Image search of Google.

8.   Colorful Zigzag from Galaxy M84 Nucleus

Another bizarre phenomenon in the vicinity of a galactic center is the **"colorful zigzag"** as seen in the site of NASA . This "colorful zigzag" phenomenon is regarded by others as indication to the existence of a massive black hole at the center. There are two photographs in that image of the "colorful zigzag". The left photograph was taken by HST using WFPC2, which shows a black strip that passes nearby the bright center of Galaxy M84. The right photograph shows the colorful zigzag discovered by the HST's Imaging Spectrograph, STIS.   Let us understand what exactly we see in this photograph. According to the Doppler effect, the wavelength of light emerge from a body moving towards the camera is shortened, thus there is a blue-shift. When the body moves away from the camera there is a red-shift. However if the body moves perpendicular to the camera, i.e. not approaching neither getting away, there is no shift. If the spectrograph is calibrated so that the color of the perpendicular motion is

regarded as green, the approaching body seems blue and the running away body seems red. Thus, the "colorful zigzag" of M84 is regarded by others as if a ionized gas surrounds very rapidly the black hole of M84, that grip it very strongly in the orbit.

At first thought it seems reasonable that the ionized gas really surrounding the "massive black hole". But in second thought we may notice that the stream of gas that made the dark strip passing nearby the center in the left photograph of the "colorful zigzag" image **does not** go behind the "massive black hole". Otherwise we would not see part of its course in the right photograph, as much as we do not see Jupiter's moon while it is behind the planet. However, the upper and lower green lines in the right photograph are **connected** to the blue lines and to the red lines, **without a gap**. Thus, this zigzag cannot be due to curling of the stream around some "massive black hole". If so, what we see here.

My interpretation, according to the OST concept, is that the "colorful zigzag" is due to motion of streams inside the cone of Galaxy M84 funnel-vortex, nearby its "quiet eye". At the left photograph we are looking into this cone from inclined angle to its main axis, the rotational axis. The very bright light we see at the center is due to the inside walls of the "quiet eye", not a gas disk screening the "massive black hole".

If we adopt this point of view, that the small stream nearby the center in the **left** photograph is bent towards the "quiet eye", there are two possibilities for the rotational direction of the entire funnel galaxy M84. If the small stream flow from upside downwards than the rotational direction of the entire cone is anti-clockwise, as we see it in this image. If instead, the small stream flow from down upwards than the rotational direction is clockwise. However we may get a hint to one of those possibilities. Notice in the right photograph the additional blue marks left to the zigzag, and the additional red marks right to the zigzag. These marks might be due to motions of the inside walls of the cone. If so, according to Doppler effect, the left bank of the cone moves in our direction, while the right bank moves away from us. This may happen when the funnel rotational axis is tilt at a specific angle with respect to the camera axis, and the rotational direction is anti-clockwise, as you may confirm by using your right hand as a screw, i.e. the right thumb pointing to the left or to the

right marks the rotational direction. Thus, we may conclude from the "colorful zigzag" phenomenon in this case of Galaxy 84 that the rotational direction of Galaxy M84 is anti-clockwise in the position of the galaxy as deduced from that photograph of the "colorful zigzag".

In view of this new explanation to the "colorful zigzag" phenomenon, let us try to understand the evidences as reported in the article of Bower et al 1997 [6] about the behavior of the ionized gas in the nuclear of the elliptic (E1) galaxy M84 with active nucleus that hosts the radio source 3C 272.1. My interpretations to the measurements mentioned in that article are as follows:

a) The measurements are from a part of the conic funnel-vortex Galaxy M84, close to the narrow base of the funnel-vortex. In this conic part the big bodies, from the far parts of the arms of this funnel-vortex galaxy, already decomposed to molecules, atoms and ionized gas. The HST recognize more easily the electromagnetic waves (EM) arrives from the ionized gas. As mentioned in that article, the rotation **gradient** of this ionized gas is greater than 100 km/s per arcsec. This supports my concept that we actually see a funnel-vortex. The tangential velocity of the loops, in a funnel-vortex, is increased while the radius of the spiral loop reduced. This increasing in the tangent velocity is due to conservation of angular momentum.

That article mentions three spatial components in the vicinity of the center: nuclear gas disk, ionized cone and outer filaments. The **nuclear gas disk** is of diameter about 1" (82 pc) (1 pc = 3.262 ly = 3.086×10^{16} m). The major axis of this gas disk is inclined by position angle (P.A) of about 58^0 (to the position of the HST camera). The tangent velocity of this gas disk is measured, by the above "colorful zigzag" phenomenon, to be 1000 km/s. The **"ionization cone"** is between that gas disk and the outer filaments. The **outer filaments** are tilted by 25^0 with respect to the major axis of the central gas disk. The rotational velocity of those filaments is about 100 km/s. This velocity is 1/10 the velocity of the gas disk. Thus, I assume here the radius of the filaments is

greater by about 10 times than the radius of the gas disk. Since the gas disk is about 82 pc, the radius of the filaments is about 820 pc. Since the gradient in the velocity in the funnel-vortex increase by more than 100 km/s per arcsec, we may conclude that the height of the funnel, from the periphery of the gas disk to the "outer filaments" is less than 9", i.e. 9x82= 738 pc. Thus we have a schematic shape of the ionized gas in the low part of the funnel-vortex of galaxy M84: Its wide base is about 820 pc; its narrow base about 82 pc; its height less than 720 pc.   All those data may enable to determine several parameters of the above cited equations (3.11) - (3.18) for this case of the bodyno-Galaxy M84, but not all, e.g. the parameter δ.

b) As mentioned in that article the radio signal is almost vertical to the "outer filaments" loop. Thus, I assume here the following: The double-spiral funnel-vortex (bodyno) is of A-orons in the A-Oron Sea. As explained in OST-90, the electric field is produced as rotational oron streams, surrounding the bodyno, that rotate about the funnel's main axis, i.e. those streams are in the vertical plane to the main axis. As long as no observable body is captured by this A-oron-bodyno, this vortex is transparent, as much as the transparency of air bodyno (wind) that we see it only when, say, sand is swirling with it upwards as an observed funnel-vortex. When many small observable funnel-vortices are captured by this transparent A-oron-bodyno, they move in the spirals. Thus, we see this as a visible spiral galaxy. The observable bodies themselves are made of transparent A-oron-bodynos, which gathered observable matter like dust, gasses etc. Thus, the small bodies produce electric fields that are perpendicular to their rotational axis. Now, imagine that many such bodies move, as a chain, along a spiral of a bodyno-galaxy. Thus they create during their motion electromagnetic waves (EM). This is due to the motion of an electric field, which surrounded the body on the spiral, within the electric field of the big transparent bodyno.

Now, imagine that a chain of small bodynos, with interchanged rotational directions, move along a spiral of the transparent bodyno-galaxy. Let their velocity be 100 km/s. Suppose there are 10 such small vortices in each 1 m of the spiral. Since the velocity is 100 km/s, than at a specific point of the spiral, in the sight line to Earth, there are one million small bodynos per second. Since each bodyno produce an EM pulse we get on Earth (or close to it in the space orbits) EM pulses in a frequency of 1 Mc, i.e. radio frequency. The intensity in EM, from each small bodyno might be high due to the fast motion of each. In addition, there are many loops of the spirals, mainly close to the center, that all together may give very strong radio pulse that we can collect by Earth facilities.

For example, let us assume that near the center of the galaxy there are almost parallel loops of width 0.1 m. Thus, in 1" (82 pc) we have 2.53×10^{19} loops. Let us assume the antenna sees only part of each loop, say a segment of central angle 1". This is 2.53×10^{17} m. In each 1 m there are 1 million small bodynos, i.e. the radio antenna sees 2.53×10^{23} bodynos in each loop segment. Thus, the total bodynos seen simultaneously by the antenna is 6.4×10^{42}. Suppose only 10% produce constructive superposition. Thus we get intensity of a one bodyno multiply by 6.4×10^{41}. Thus we get large number of EM source that might produce total intensity that can be detected by the radio antennae in spite of the great distance from the galaxy, 50 million ly in the case of M84. All these might explain the observation that the radio pulses are from direction almost perpendicular to the outer filaments main axis.

c) In that article the mass of the super-massive "black Hole" at the center of M84 was calculated, under a simple assumption, as M=1.5×10^{9} sun mass, i.e. 3.0×10^{39} kg. **.** In OST we regard the gravitational mass as due to the sink rate per unit area of the bodyno (double-spiral funnel-vortex). We computed above the width of the narrow base of M84 bodyno is about 82 pc. This is the diameter of the nuclear gas disk around the "event horizon", which is accepted by others to be the limit of the

"Black Hole" and we in OST regard it as the limit where the usual matter decompose to A-orons. For demonstration of the idea, let us assume here the diameter of this "event horizon" is 1/100 of the diameter of the nuclear gas disk, i.e. 0.82 pc. That means an area of 4.7×10^{32} m^2. Thus, the sink rate per unit area of the narrow base of M84 bodyno is equivalent to M/S = 6.4×10^6 kg/m^2-s. Thus through each 1 m^2 the gas is consumed, i.e. decomposed to A-orons, at the rate of 6.4×10^6 kg/s. As mentioned above, the tangent velocity of that gas disk was measured, by the "colorful zigzag" phenomenon, to be 1000 km/s. This is at the radius 41 pc from the center. From the above cited equation (3.15) the tangent velocity V_{v} of the gas increase as the inverse of the radius. Thus, the velocity at the "event horizon", with the assumed radius of 0.41 pc, is 1×10^8 m/s, which is about c/3, while c is the velocity of light in vacuum. Let us suppose that at this velocity the gas molecules decompose to their components, i.e. elementary particles, and thereafter those components decompose to A-orons. This consumption of that amount of gas is equivalent to a gas of mass 6.4×10^6 kg at a cylinder of base 1 m^2 and length 10^8 m that is consumed via the cylinder base in a one second. This yields an evaluation of the gas density, at about the "event horizon", to be 6.4×10^{-5} g/cm^3.   This value might be realistic for a specific gas at certain conditions of temperature and pressure. For comparison, the density of Hydrogen, H_2, at 400 K and 1 bar is 0.030 mol/L (see CRC Handbook of Chemistry and Physics 78th edition 1997-1998), which is 6.0×10^{-5} g/cm^3, i.e. very close to the gross evaluation above. Thus, the explanation of OST, regarding the behavior of the gas at the vicinity of the core, may be considered.

9.   Transparent Hole

From all those considerations I came here to the conclusion that instead of talking about a "Black Hole" it is more reasonable to talk about a **"Transparent Hole".** The reason is that in OST we regard the narrow base of a bodyno, or more precisely, of the "quiet eye" of the funnel-vortex, as the place where the bodies composing the funnel-vortex decompose to orons.   Since A-orons are transparent to human facilities, this bottom of the "quiet eye" is transparent. The meaning of transparency here is that if you could look directly via this hole you might see a far observable body. This is as much as if you look via the bottom of an oil funnel. However if you look at the bottom of the funnel from inclined angle, you may see the opposite bank

of the pipe close to the bottom. This is what I think happens with the ″colorful zigzag″ discussed above.

It might be clear that, as in fluids, if the strength of the bodyno is not high enough, there might not develop a "quiet eye". In this case the narrow base of the funnel-vortex may include interacting observable objects, such as molecules, elementary particles, photons, etc. Thus there are expected different kinds of radiation from the narrow base of the bodyno. This may explain the concept of Stephen Hawking that there might be radiation from "weak massive black hole".   His "massive black hole" is my narrow base of the funnel-vortex, or according to the new term here, "Transparent Hole".

10.   Jet from "massive black hole" in Galaxy M87

The Wide Field Planetary Camera 2 (WFPC2) in the HST photographed an image from 23 May 1994 in the Hubble site of Gas disk in the nucleus of Galaxy M87 (see in the HubbleSite). The same image nucleus of M87 galaxy appears also in Plates 3 and 4 of the book by Ian Robson 1996 [7]. As mentioned in p. 172 of that book the gas disk around the core is a distinct mini-spiral-arm of elliptical shape with dimensions 140 pc by 40 pc, which inclined to the sight of line by about 42^0. The orientation of the disk inclination is consistence with the observed radio and optical jet emitted close to the normal to the disk, i.e. within at least 10^0. In Plate 4 of that book we see the spectroscopic data of the spiral configuration of the gas disk at the center. From this data it is clear that the mini-gas-spirals rotate in the **same** rotational direction as the spiral arms. The rapid rotation of the mini-spiral gas has led others to believe that this gas rotates about a supper-massive black hole that contains gravitational potential equals to about 2×10^9 Sun mass. This data was accepted by using the rotational velocity of the gas and its orbital radius about the center. This is the accepted explanation regarding the image from the core of M87. However, OST may give much simpler explanation to this phenomenon.

In view of OST, it is reasonable to deduce that this mini-spiral gas is close to the narrow base of the bodyno-galaxy M87. In addition, the jet from what is regarded by

others as the "massive black hole", is inclined to the line of sight by around 42^0. Thus, according to OST, we cannot observe the **narrow base** of the "quiet eye" of the bodyno-galaxy M87. Thus, the bright light at the center comes from the inclined "quiet eye", not from the narrow base itself, which others regard as the place of the "massive black hole".

We assume here that what we see in that image of gas disk, at the nucleus of Galaxy M87, is not the circulation around a "massive black hole" but around the conic "quiet eye", at a level somewhat higher than the lower (narrow) base of the "quiet eye". Thus, we may appreciate here that this value, 2×10^9 sun mass, is the **sink strength** of the funnel-vortex's **"quiet eye"** at the level of the cone where the gas is seen. This does not include the sink strength of the entire narrow base, i.e. including the "accretion disk" as called by others, which is wider than that of the "quiet eye" nesting within it. To clarify this point we may use again the tornado as an analog. The swirling winds around the Tornado's "quiet eye", at a specific height level, say a width 100 m at height 300 m, are only small part of the total width of swirling winds of the tornado at the same height level, 300 m, but width, say, 10 km.

According to OST, the brilliant jet seen in that image of M87 center is connected to the magnetic field produced by the funnel-vortex. We discussed above the magnetic force as due to jet of orons from the narrow base of the bodyno "quiet eye". It is clear that any vortex is rotational. Recall that according to OST, a basic particle in a specific level is a bodyno composed of basic particles (bodynos) of the lower levels. Thus, the magnetism is an essential part of any basic particle. We are familiar with the magneton of electron, of proton, of neutron, etc. In cosmology we see magnetic fields emits from the narrow base of the funnel-galaxy, which is called by others "black holes" and by me "transparent hole". Stephen Hawking wrote in chapter 6 of his popular book "A Brief History of Time" that :

> "As the matter spirals into the black hole, it would make the black hole
> rotate in the same direction, causing it to develop a magnetic field
> rather like that of the earth. Very high-energy particles would be
> generated near the black hole by the in-falling matter. The magnetic

field would be so strong that it could focus these particles into jets ejected outward along the axis of rotation of the black hole, that is, in the directions of its north and south poles. Such jets are indeed observed in a number of galaxies and quasars"

A nice illustration of this phenomenon is given in [the image]() of "the source of an extragalactic jet spewed by the black hole at the heart of M87, an accretion disk (red-yellow) surrounds the black hole, and its magnetic field lines twist tightly to channel the outpouring subatomic particles into a narrow jet. The jet opens widely near the black hole, then is shaped into a narrower beam within a light-year of the black hole. Credit: NASA and Ann Field (Space Telescope Science Institute)" .   According to OST, this image is an example to a source-bodyno in a lower scale level (optionally the A-oron Sea) than the scale level of the sink-bodyno galaxy.

Thus, according to Hawking the rotation of the "black hole" is attributed to the falling spiraling matter into it. However according to OST the galaxy is a bodyno. It is clear that its narrow base rotates at the same direction of the spirals. The difference between OST and the point of view of Hawking and others regards the creation of the galaxy. They assume the galaxy was formed by accretion of matter around a small dense nucleus relative to its surrounding. Thus, due to gravitation, matter from the surrounding accumulated in this small nucleus and the galaxy grew. The disadvantage of this explanation is that it assumes the a-priory existence of gravitational field. This was done by scientist since Newton, including Einstein that assumed the space-time changes around a massive body due to its gravitational filed. Therefore the rotation of matter is not a-priory, but due to influence of other rotating bodies, like the spiral matter in that case of Hawking.

On the other hand, OST assumes that gravitational field is actually due to a sink in the Oron Sea. OST assumes that the bodyno-galaxy was born by two linear streams of stars in the Star Sea, with opposite rotational directions about their long axis. Those two linear streams curl up about each other, as in a plait. Their "heads" collide and yield decomposition of the stars to their components, i.e. gas-clumps and lower

basic particles. Thus there created an "hole" in the Star Sea. This became a sink in the Star Sea that grew more and more with the continuation of the "head-on" collisions between the stars in the streams, and from the surrounding, as explained in OST-90.   Thus, the gravitational field, as well as the rotational motion of the center, are inherent in the process of the creation of the galaxy. The jets of orons, and upper level particles, from the narrow base of a bodyno-galaxy, as well as in any other bodyno, is also inherent in the process of creating the bodyno.

11.   Rotating Black Hole

Roy Kerr solved mathematically in 1963 the General Relativity equations of Einstein for rotating black holes. The solution shows that instead of the singularity point in the Schwarzschild non-rotating Black Hole, there is an expansion of the point so that the rotating black hole gets the shape of a torus with a real hole at the center**. The speculations suggest that through such hole one may travel from our Universe to other universes. Latter on the accepted theories described this solution as if the "massive black hole" includes a real hole at its center, while the limit of the black hole is called the "Event Horizon" of the black hole. The radius of this "Event Horizon" is the Schwarzschild radius, $R = 2GM/c^2$, while G is the gravitational constant and c the speed of light in vacuum. Around this "Event Horizon" there is an "Accretion Disk" which contains gas that rotates very rapidly in the rotational direction of the "Black Hole". (See Ch. 7 in [7]). In 2003 there was a measurement from the center of our galaxy, Milky Way, and it was revealed that matter very close to the center, only several light hours from the center, was rotating in a frequency of 17 days per rotation. Let us see how this phenomenon supports very much OST.

That description may be translated to OST "language" as follows: The "rotating black hole" is actually the "quiet eye" at the narrow base of the bodyno-galaxy. The "event horizon" is the limit of this "quiet eye". This is the limit where elementary particles, including photons, decompose to A-orons. Let us mark it "A-quiet eye". According to OST, this might happen while those elementary particles reach a velocity that is equal or greater to the free flight velocity of the A-orons, $V_{fA.}$ This is very close to c, as explained above. Within this "A-quiet eye" the A-orons construct a bodyno, i.e. double-spiral funnel-vortex, A-bodyno. This A-bodyno rotates at the same direction of the entire bodyno-galaxy, due to conservation of angular momentum (i.e.

indistinguishable in direction, as explained above). The A-orons (which are also bodynos) approach the center along two spiral of the A-bodyno. Thus, their velocities increase according to the above cited equations (3.17) - (3.18), with optionally different parameter than those of the bodyno-galaxy. Thus, at a certain moment the A-orons reach a velocity equal or greater to the free flight velocity of their composers, B-orons, V_{fB}, while $V_{fA} < V_{fB} < c$. Thus the A-orons decompose to B-orons. This is the limit of the "quiet eye" of the A-bodyno, to be called "B-quiet-eye". The domain inside the "B-quiet eye" is an hole with respect to the A-orons Sea. On the other hand, the domain inside the "A-quiet eye" is a hole with respect to the elementary particles and photons. Thus, this "A-quiet eye" is, as regarded by others, a "Black Hole". Thus we got a qualitative explanation to the hole at the center of the rotating Black Hole, as found in Kerr solution. That hole at the center is the domain within the "B-quiet eye" where there exist only B-orons and their composers, C-orons, etc. Thus, the "story" may repeat itself, so that there is "hole inside hole inside hole, etc.", all with respect to whom we consider.

Around the "A-quiet eye" there is the "Accretion Disk". This is the domain between the limit of this "A-quiet eye" and the limit of the narrow base of the bodyno-galaxy. The bodyno is rotating off course. Thus, the rotational direction of matter close to the "A-quiet eye" is the same as that of the limit of the "A-quiet eye". It is also clear that the rotational velocity increases as we go from the wide base of the bodyno-galaxy to its narrow base. Thus, the rotational velocity is maximal at the narrow base. The results of those increasing velocities are X-rays, Gamma rays and other kinds of radiation, as we see in the following.

12.   X-rays radiation and Gamma rays bursts

The phenomena of X-rays radiation and Gamma ray bursts (GRB) are yet a challenge to the theoretical astrophysics.   See e.g. the article of Eli Waxman, "High energy particles from ɣ ray bursts" 2001 [9], where he discusses Gamma ray bursts of energy 0.1 - 1 MeV photons lasting for a few seconds, while after those GRBs appear delayed radiation ("afterglow") of X-ray to radio radiation. The accepted explanation to those phenomena, of Gamma ray bursts and afterglow delayed softer wavelength radiation, is that is due to "dissipation of kinetic energy of a relativistically

expanding wind, a 'fireball', whose primal cause is not yet known", as explained in that article .

OST may explain the phenomena of X-rays radiation and Gamma ray bursts (GRB) by simple arguments. According to OST, stars move along the two main spiral arms of a bodyno-galaxy, to be called here "spiral-arm-A" and "spiral-arm-B". See above about the assumed equations of each spiral in the bodyno. Since the two spiral-arms curl up to create a funnel shape, the distances of the stars from the main axis of the funnel reduce while they approach the narrow base of the funnel-vortex. Thus the radii of the loop reduce. According to the above cited velocity equations (3.17) - (3.18), this reduction in radius is accompanied by increasing the linear and rotational components in the velocity of the stars. Let us follow a one star on the spiral arm-A. Let us regard a star at about the plane of the **wide** base of the funnel-vortex galaxy. Let this position be the starting point and suppose the star is spherical there. As the star moves downwards along the spiral arm-A, its tangential velocity, at the local segment, increase. In addition the star gains a rotational velocity (spin) about this local segment, like a rotating bead that moves along a spiraling string. Let the mass of this star, at the starting point be M_0. According to OST we may assume this star is composed of say 10^{11} clumps of gases, which are the basic compositors of the star in the Gas-clump Sea. We can see a very nice example of how our Sun is created of gas clumps, in a picture with high resolution from NASA's site "Astronomy Picture of the Day" (APOD) from 5 October 2005. The granules we see at the rim of the sun are gas clumps, while each clump is a funnel-vortex of gases by itself, as I understand from this picture.

Let us mark the averaged free flight velocity of the gas clumps in the Clump Sea by $v_{f(clump)}$. According to OST, the mass of that star increases with velocity according to

   (1) $M = M_0/\sqrt{[1-(v/v_{f(clump)})^2]}$.

What those it means in our case? According to OST, the gravitational mass of a body is due to a sink process of orons within this body, while we regard a body as one or more funnel-vortices. The same is regarding to this star. While this spherical

star glides along the spiral-arm-A, its center of mass might move gradually towards the direction of the motion. This might be due to the sink process of the galaxy-vortex in the **Oron** Sea.   Eventually the shape of the star became as a bodyno, while its narrow base is downwards in a direction along the spiral-arm-A. This is a bodyno-star. The gravitational mass of such bodyno-star is according to the expression in (1). Let us imagine two bodyno-stars, one glides along spiral-arm-A and the other glides on spiral-arm-B. Their velocities increase more and more while they march downwards the spirals. Thus their gravitational mass increase according to (1) and they attract each other more strongly. This increase in attraction strength is **in addition** to the influence of the distance according to Newton's gravitational law. Thus, those bodyno-stars might eventually collide, even if they started the race on different spiral arms. Collisions between bodyno-stars might yield various kinds of radiation. Some are probably detected in our facilities. However, this is not the end of the story.

If a bodyno-star did not dispersed during that race, due to such collision or other reasons, it may continue to glide downwards in the spiral arm with increasing velocity. When it reaches the averaged free flight velocity of its components, the bodyno-gas-clump, in the Gas-clump Sea, $v_{f(clump)}$, this bodyno-star becomes a stream of bodyno-gas-clumps, as generally explained in OST-90. Those bodyno-gas-clumps may continue to glide along the curling spiral arm-A with increasing speed.

Now let us look at the broaden picture of many "beads" of bodyno-gas-clumps move along the two spiral arms, A and B, and approaching the narrow base of the bodyno-galaxy. Imagine the first bodyno-gas-clumps, one from spiral arm-A and the other from spiral arm-B approach very close to each other so that their funnel sides collide during the motion downwards the spirals. Thus, the molecules of gases interact among themselves and electrons are torn from their molecules. This might result in X-ray radiation that we may detect on Earth and onboard satellites. We may regard this event as a friction between the two bodyno-gas-clumps. Meantime the bodyno-gas-clumps approach the narrow base as ionized gas, their speed downwards in the spirals is very high while the bare atoms at the narrow base of bodyno-gas-clump have much higher velocities. This situation can be seen e.g. in the center of M87

galaxy, discussed above, while the ionized gas seems to rotate very rapidly about what others regard as "Black Hole" and I regard as "Transparent Hole".

As explained above, there are bodynos of various kinds at the wake of a moving bodyno, as much as the bent "vortex-street" at the wake of rotational body that move linearly relative to the fluid. This wake "serves" as a "drag" on the motion of the bodyno in the Oron Sea and increases it total mass, as much as in fluids. Thus, I assume that due to increasing of velocity, the mass of the bodyno-gas-clumps increase according to (1), while instead of $v_{f(clump)}$ in (1) we put $v_{f(oron)}$, since the orons are the components of the atoms. Thus, eventually the narrow basses of the two bodyno-gas-clumps collide ("head on collision"), which leads to interaction between high energetic nucleons (protons and neutrons). Thus there might be high energy interactions as much as in the powerful accelerators on Earth laboratories, such as in CERN, DESY, etc. Due to those interactions there are expected various kinds of **elementary particles** (mesons, baryons, leptons, neutrinos, etc), according to the list in the "Review of Particles Physics", July 2006 [10]. Since the life-time of most elementary particles are very short, most of them may not reach our facilities. (If a probe will be sent into the center of our galaxy, it might measure those short lifetime particles, and we might reveal the Higgs bosons and other elementary particles under search in our laboratories nowadays). During the decay of those short lifetime particles, there are accepted, at the bottom of the decay chain, protons, electrons, neutrinos, "soft" photons and of coarse very energetic photons, i.e. Gamma rays.

Part of the protons, from those interactions between two bodyno-gas-clumps, might dispersed into various directions. Others might continue to move towards the narrow base of the bodyno-galaxy, with increasing velocity. As accepted, the nucleons compose of quarks and gluons, which, according to OST, are composes of orons. When those nucleons reach a velocity equal the averaged free velocity of the orons, $v_{f(oron)}$, in the A-Oron Sea, which is very close to the velocity of light in vacuum, c, the nucleons decompose to streams of orons. This might happen, according to OST, on the limit of the "A-quiet eye" narrow base of the bodyno-galaxy. According to OST, inside this limit there are streams of orons **only**. This limit might be what others regard as the "event horizon" of the "black hole". In the language of OST, this is the limit of the "Transparent Hole".

Gamma ray bursts (GRB) might be the result of interaction between two bodyno-gas-clumps, while all kinds of interactions between elementary particles are optional. The short duration of the GRB, in the order of several seconds, might hint about the dimension and internal dynamics of the bodyno-gas-clumps. For instance suppose the spiral arm of the bodyno-gas-clump is of length 20 light second (the distance a light travels in vacuum during one second). Let the motion of the 1/20 arm part, close to the narrow base, moves in velocity c/2. Thus, this part collides ("head on") during 2 second. Therefore the Gamma ray burst from this collision might be of duration 2 second. It is reasonable to assume that the other parts of the bodyno-gas-clump spiral arm moves in velocities that are gradually lower as one goes away of the bodyno-gas-clump narrow base. Assume, for example that each 1/20 part moves in velocity half than the former. The first 1/20 part moves in velocity c/2, as in this example. The second 1/20 part moves in velocity c/4. The third part moves in velocity c/8, etc. Thus the last part of 1 light second moves in velocity $c/2^{20}$. The interaction duration of this last part might be about 2^{20} s = 12.14 days. Thus, when the higher parts of the bodyno-gas-clump, which follow the first 1/20 part, interacts with the parallel part in the second bodyno-gas-clump the interactions are less energetic. Thus, there will be, after the short Gamma ray burst, radiation of softer photons, such as X-rays with duration greater than a few seconds, e.g. minutes, and later on optical rays with yet longer duration, e.g. hours, and thereafter radio wave with yet longer duration, e.g. days. By this optional mechanism we may explain the detection of such soft photons, with longer duration than the duration of the Gamma ray burst. Recent article from Dec. 2006 by A. J. Castro-Tirado et al, titled: "GRB 051028: an intrinsically faint gamma-ray burst at high redshift?" [11], describes the detection of such "afterglow" soft radiation between 2.7 h and ~10 days after the event. Two other recent articles from Feb. 11 2007, one by A. de Ugrate Postigo et al, titled:: "Extensive multiband study of the X-ray rich GRB 050408 - A likely off-axis event with an intense energy injection" [12], the second by M. Capalbi et al, titled: "Long-term monitoring of the X-ray afterglow of GRB 050408 with Swift/XRT" [13], describe an afterglow that observed during 36 days after the event. The first of the two suggest this event is due to event which is off-axis. Those three articles tries to understand the reason to the behavior of the GRB. I may suggest here the optional explanation that those GRB are due to interaction between two bodyno-gas-clumps.

Thus the amount of photons produced during the interaction is relatively lower than in other detected events. It is reasonable that if the center of mass of the system of the two colliding bodyno-gas-clumps is moving relative to us with great velocity, the wavelength of the Gamma rays and other radiation may be changed according to the relativistic Doppler effect. Using OST we get a simple explanation to the Gamma ray burst, to the X-rays and to other soft photons of afterglow phenomena, without the need to use the unexplained concept of "fireball".

13. Dark matter

The issue of "Dark matter" concerns mainly the phenomena in clusters of galaxies and the general medium of the universe. In my broaden article on the cosmological subjects, planned to insert into my site soon, I explain broadly this issue of "Dark matter" and the connected phenomena as gravitational lens, Hubble constant ,etc. Here I may point out that the transparent bodynos of all scale levels may be regarded as "Dark matter". The influences of those transparent bodynos on their surrounding might be what is called by others "Dark energy". It is important to understand that the meaning "transparency" is with regard to the human facilities. We may observe something by transformation of its influence, directly or indirectly, onto our senses. The vision sense used to observe the farther distances since the medium in which light advances is the Oron Sea, which is spread over the entire universe, as assumed by OST. Many phenomena in galaxies, including at the core, may be understood while considering the optional existence of transparent bodynos in everywhere. The characteristics of bodynos, as mentioned above, including their mathematical representation and the meaning of the various streams and potential fields, as depicted in the updated Fig. 1, in (http://ifried22.tripod.com/id39.html) may serve to solve many enigmas with regards to the behavior of galaxies, stars and other observable bodies.

Conclusion

The issues of "Black Hole" and the phenomena in the Active Galaxy Nucleus (AGN) are treated in view of the new/old Oron Sea Theory (OST) [3]. OST assumes the existence of relativistic tiny particles (orons) that composes a universal sea, the Oron Sea, under the elementary particle and photons. OST assumes, as an axiom, that all

the phenomena which exist in fluids occur as well in the Oron Sea and in any other sea level as much as in the cosmos. Here was introduced the concept "bodyno", which is a double-spiral funnel-vortex, and is supposed to be the basic construction in Nature. The bodyno is transparent unless observable bodies are attracted by it. Bodynos are assumed to exist in any medium at any scale level of time and space. Tornado serves as a model to bodyno. As in Tornado, the skeleton of bodyno constructed of two spiral arms that gets the shape of a funnel containing a "quiet eye". This skeleton has a "cover" constructed from sub-bodynos, etc. OST suggests mathematical representation for bodyno that enable to get the five basic field potentials: Gravity fields are due to sink rate of orons per unit area, in the "quiet eye", by decomposition of elementary particles to unobservable A-orons. Strong fields are due to strong streams close to the funnel's bottom. Electric fields are due to rotational streams about the bodyno main axis. Magnetic fields are due to rotational streams along that main axis. Weak fields are due to weak streams within the "quiet eye". Using this concept seems to explain many phenomena in all scale levels of space and time, i.e. from the scale level of the elementary particles (including photons) and below, to the scale level of the entire universe and above.

We saw above how the phenomena in the AGN may be explained as due to rapid motions of bodyno-gas-clumps close to the narrow base of the bodyno-galaxy funnel. We saw above OST interpretation to the "colorful zigzag" phenomenon as well as to the Gamma ray bursts (GRB) and the "afterglow" phenomena. We saw qualitatively how one may accept such GRB and "afterglow" by interactions between bodyno-gas-clumps, from the two spirals, at the vicinity of the funnel's narrow base of the bodyno-galaxy.. All the phenomena in the vicinity of the **undetected "massive black hole"** support the explanation that the "Black hole" is actually a **transparent hole** at the bottom of the bodyno's "quiet eye". Thus, the "event horizon" may be regarded as the limit of the "quiet eye" bottom. The "Accretion disk" may be regarded as rapid motions of matter along the bodyno's spirals, around the limit of this "quiet eye" bottom. The rotation of this matter is naturally with the rotation of the entire bodyno. The jet phenomenon from the "event horizon" is explained by OST as due to decompositions of elementary particles to A-orons at the limit of the "quiet eye" bottom. Inside the "quiet eye" those A-orons might decompose to B-orons and both kinds orons may exit from the "quiet eye" as magnetic field. The "Dark matter" was

explained above as transparent bodynos in the Oron Sea. In addition I discussed briefly the option for existing of Negative Particle, mentioned in Aharonov lecture, in addition to existing of anti-particle. In OST, particle is a sink-bodyno with specific rotational direction. Its anti-particle is the same sink-bodyno but with opposite rotational direction. Its partner Negative Particle is the source-bodyno partner.

In the broaden article on cosmology, planed to be inserted soon into my site http://ifried22.tripod.com/,   I discuss those subjects and many others, in view of OST, such as "Big Bang", "Hubble constant", "Gravitational lens", etc.   All those notions and many more get simple explanations if we are willing to accept the optional existence of the Oron Sea.

Acknowledgment

References

[1] I. Fried, "Physical theory of Non-Existence of Time and Space", 1998 (not sent for publishing. I plane to publish it soon in my site http://ifried22.tripod.com/)

[2] A. Tsinober, "An Informal Introduction to Turbulence", Kluwer Academic Publishers, 2001.

[3] I. Fried, "The Oron Sea Theory -The Medium under Elementary Particles and Photons", was sent for publishing on May 1990 to Physical Review D, and on

July 1990 to Nuclear Physics B (not published). (You may download the article from my site http://ifried22.tripod.com/id39.html

[4] D. Zabarenko, "Stars live fast at edge of black hole", INTERNET site of Science from 14 October 2005.
   http://www.abc.net.au/science/news/stories/2005/1482246.htm

[5]. J. Wurman, "The Multiple-Vortex Structure of Tornado", Weather and Forecasting, Vol. 17 No. 3 pp. 473-505 (2001).

[6] G. A. Bower et al, " STIS Observations of the Nuclear Ionized Gas in the Elliptical Galaxy M84 "   in 1997 HST Calibration Workshop, Space Telescope Science Institute, 1997, S. Casertano, et al., eds.

[7] I. Robson, "Active Galactic Nuclei", Wiley & Sons and Praxis Publishing, 1996.

[8]   P. K. Newton, "The N-Vortex Problem - Analytical Technique", Springer, 2001.

[9] E. Waxman, "High energy particles from γ-ray bursts",
   arXiv:astro-ph/ 0103186 v1 13 Mar 2001.

[10] A. B. Balnantekin (ed. in chief), Review of Particles Physics, in J. Phy. G, Vol. 33, IOP pub, July 2006,

[11] A. J. Castro-Tirado et al, "GRB 051028: an intrinsically faint gamma-ray burst at high redshift? ", Astronomy & Astrophysics **459**, 763-767 (2006).

[12]   A. de Ugrate Postigo et al, "Extensive multiband study of the X-ray rich GRB 050408 - A likely off-axis event with an intense energy injection", Astronomy & Astrophysics **462**, L57-L60 (2007).

[13] M. Capalbi et al, "Long-term monitoring of the X-ray afterglow of GRB 050408 with Swift/XRT", Astronomy & Astrophysics **462**, 913-818 (2007).

[14] Y. Aharonov and D. Rohrlich, "Quantum Paradoxes – Quantum Theory for Perplexed", Wiley-VCH (2005).

[15] P.G. Saffman, Vortex Dynamics, Cambridge University Press, 1995.

[16]   R. T. Cahill, "Black Holes in Elliptical and Spiral Galaxies and in Globular Clusters", Progress in Physics, Vol. 3, 51-56, October 2005.