SECOND APPENDIX

"Prejudices remain hidden inside ourselves and steadily tend to drive us toward wrong paths. The Big Bang is a charming model, but this is not sufficient to compel ourselves to accept it as an ultimate and unquestionable truth."
Tullio Regge[1]

ABOUT HUBBLE'S LAW AND THE BIG BANG
And Core Vortices as Sources and Engines of Galaxies

A - From the borders of the universe

In PART II, Paragraph 4.5, of this essay, I have suggested to consider the omnipresent cosmic microwave background as a *residual radiation* rather than the universe's "relic radiation", this currently considered as the *echo* of the Big Bang. The main reason for my suggestion is connected to the hypothesis that the physical universe is finite and completely surrounded by a true nothingness, *i.e.*, by an infinite and quite empty space, *the void*, in which no physical event is possible. All radiation hitting against such an impenetrable[2] barrier of nothingness can only bounce and re-enter the physical space (the *plenum*) up to reaching all the different and opposite sides of the universe's boundaries, where radiation rebounds again, perennially roaming the space of the physical universe. Conceptually, it is the typical behavior of any radiation entering a *black body*, and the quasi-uniform cosmic microwave background has just the features of a radiation inside a black body, *i.e.*, about 2.9 degrees Kelvin and a wavelength around 1 centimeter. In other words, as to radiation, our physical universe (the *plenum*) works like a black body, be it expanding or not.

In addition to this, it could also be considered that the system of unlimited *red shifts* associated with the galaxy recession brings about a perceived decay of radiation frequencies towards the frequencies of the microwave background.

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[1] Tullio Regge, ***Infinito***, Mondadori Publisher, Milano 1996, pp.11-12

[2] The *void* is obviously impenetrable to light and vibrations, but to possible shreds of plenum.

[For other purposes, a singular suggestion was formulated – more than 150 years ago – by William Rankine (1820-1872), who "proposed that giant reflecting walls in distant space somehow captured and refocused into usable form the energy lost by decaying systems".[3] Obviously, at Rankine's time the problem was not to provide an explanation for the cosmic microwave background, but rather to respect the principle of energy conservation**]**.

Another reason for my suggestion is my doubt concerning the Big Bang theory[4]**.** The stimulus to doubt comes also from the idea that a more appropriate formulation (with relevant implications) of Hubble's Law is possible.

B - Interpreting Hubble's law

Between 1926 and 1929 Hubble[5] observed that galaxies in the universe recede from the Milky Way (and from each other) at a speed that is directly proportional to their mutual distance. Hubble's Law is currently formulated as follows:

[1] $$V_r = HR$$

where V_r is the recession speed, R the mutual distance considered, and H is a constant of proportionality known as *Hubble Constant.*

Taken in this form, Hubble's Law, together with some analytical implications of Einstein's field equations[6], has led most astrophysicists

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[3] Quoted from Alan Lightman (MIT), ***Discovering the Universe: an Introduction***, in "Bubbles, Voids, and Bumps in Time: the New Cosmology", Edited by James Cornell, Cambridge University Press, 1992, Page 19.

[4] **Updating note:** Nowadays (year 2004) more than 200 academic and professional scholars have publicly expressed their serious doubts about the Big Bang theory. See their "Open Letter" in the web: www.cosmlologystatement.org

[5] Edwin Hubble (1889-1953), U.S.A. astronomer. After basic studies in physics, he worked as a lawyer for many years before becoming a professional astronomer.

[6] Solutions of Einstein's field equations imply singularities regarding an initial infinite density of the cosmic matter/energy concentrated in one single point. However, physicist Huseyin Yilmaz, by a refinement of General Relativity, found a way to prove that such singularities are not logically necessary (***New Approach to General Relativity***, Physical Review, vol. III, No. 5, Sept. 1, 1958). Moreover, it must be observed that the Big Bang theory is based on the assumption that the density of matter in the universe is uniform, thus introducing in cosmology the methodological principle that it is licit to fix hypotheses which are in disagree-

and cosmologists to assume that the universe is expanding and that the expansion had to start from a unique point of almost infinite concentration/density of mass/energy, *i.e.*, from a place in which the "mutual distance" between any kind of matter components (if any) was nearly $R_o = 0$. Then, according to most cosmologists, something like a huge explosion (the Big Bang) can explain the initial tremendous force that caused the expansion of the universe.

Other supporters of the Big-Bang theory, however, do now incline to think of the "big-bang" not as of an explosion, but only as of the beginning of the universe's expansion, though I cannot grasp what they mean for "big-bang" or any other "more appropriate" dubbing of the event. In any case, big-bang theories (there is more than one) assume General Relativity as a basic and indispensable reference paradigm. In formulating General Relativity, Einstein believed that the universe described by his theory had to be considered as static, despite mathematical implications of General Relativity put into evidence – in years between 1922 and 1924 – by Russian mathematician Alexander Friedmann (1888-1925): According to Friedmann's calculations, Einstein's *chronotope* is possible of both expansion and contraction. Friedman had to argument with Einstein, who was (wrongly) certain of Friedmann's miscalculation. Paradoxically, to prevent the universe of his equations from undergoing gravitational contraction or collapse, Einstein had previously decided to introduce an arbitrary "cosmological constant" in his gravitational equations, in order to preserve the universe's stability.

Belgian astronomer George Lemaître (1894-1966) was the first theorist of the universe's expansion viewed as originating from a "primeval super-atom". Lemaître availed himself of General Relativity and of Hubble's statistics concerning the observed correlation between distance and mutual recession speed of galaxies. Subsequently, Dutch astronomer Willem De Sitter (1872-1934) also theorized the expansion of the universe,

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ment with the present observations, in the hope that future observations may justify the assumptions made.

Big-Bang theory has been and still is questioned by many physicists, who consider it as a mere metaphysical speculation. Einstein himself considered the extrapolation of an infinite matter density from his equations as a physical non-sense. A basic reference is the book by F. Hoyle, G. Burbidge, J. V. Narlikar, ***A Different Approach to Cosmology: From a Static Universe through the Big Bang towards Reality,*** Cambridge University Press, 2000. One relatively early review of the criticisms of the Big Bang theory can be found, for instance, in the book by Eric J. Lerner, ***The Big Bang Never Happened,*** Times Books, N.Y. 1992

adopting both Hubble's observational data and (*sic!*) Einstein's arbitrary "cosmological constant" that a repented Einstein had later to label as his "greatest blunder".

Through recent decades the theoretical framework of big-bang theories has undergone several changes and *ad-hoc* adjustments because of astronomic observations incompatible with theoretical statements and predictions. The sequence of the adjustments, made or suggested by various authors, has even led the theorists of the universe's expansion to the need for considering Hubble coefficient H (see Equation **[1]** above) no more as a "constant" but as a cosmological parameter that varies with time.

My essay, of which this section is only an unnecessary appendix, is based on my intent to avoid any reference to both Newton's and Einstein's cosmological models. As to me, Hubble constant is only the *coefficient of a statistical linear correlation* between two sets of observed data, *i.e.*, between distances and mutual recession speeds of galaxies. Hubble's statistics is based on the assumption that the galactic recession speeds can be measured through the *red shift* of the light emitted by the galaxies observed. I have no intention to attach any other significance to Hubble's statistical correlation, so that *constant H*, as a "statistical coefficient", shall be considered modifiable *only* in consequence of more numerous and accurate astronomical observations, which inevitably imply objective adjustments in the methodological process of calculation of the most appropriate value for *H.*

If the sequence of future unbiased observations corroborates the linearity of Hubble's correlation, this statistical law may be accepted as an experimental law, from which one can draw logical deductions as well as observational predictions. Therefore, I deem it improper and I do reject any effort to bend Hubble's "law" to the needs of abstract cosmological theories. What follows is a way to analyze Hubble's law with the only purpose of giving its simple logical implications the due evidence, with no need for either relativistic or other cosmological reference or interpretation.

As known, Hubble's observations, and the subsequent ones of the kind, are based on the record of the *red shift* that is always associated with the radiation coming from any receding source of light.

In my view, Equation **[1]** should be written and read in a more significant way, with the aim to give evidence to the substance of the observations. Equation **[1]** may in fact also be written as follows

[1a] $$V_r = \frac{dR}{dt} = HR.$$

Written in this form, the equation shows that

$$\frac{dR}{R} = H\,dt$$

and, therefore, by integration

[2] $$R = R_o\, e^{H t},$$

after considering $\ln R_o$ as the relevant integration constant.

When $t = 0$ (at the supposed beginning of the universe's expansion), it is $e^{H t} = 1$, and R_o *cannot* be nil.

Let's verify this by an example, which considers the recession speed of galaxy NGC-7331 with respect to our Milky Way.

Galaxy NGC 7331 in Pegasus Constellation

For the purpose, let's use the value for H recently determined on the basis of data provided by Space Hubble Telescopes,[7] though one may

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[7] W. L. Freedman, B. F. Madore & al., ***Final Results from the Hubble Space Telescope Key Project to Measure the Hubble Constant***, Astrophysical Journal, J.553:47-72, 2001. Also NASA's Chandra X-Ray Observatory has recently measured this value independently, and came up with a similar number - 77 km per second per megaparsec (3.26 million light-years to the megaparsec ± 15%). This confirms that the Universe is still between 12 and 14 billion years old. However, an endless debate continues about the criteria to adopt in determining the value of Hubble constant. I do here suggest the adoption of the initial linear

expect that the data will once more be corrected in the future in consequence of more accurate observations by probes.

Once assumed that the age of the universe cannot exceed $T = 13.8$ billion years, the most reliable value for Hubble constant is approximately $H = 7.25\times10^{-11}$ **years**$^{-1}$.

The galaxy identified as NGC-7331 is now at an estimated distance of about 47 million (4.7×10^7) light-years from our Milky Way.

Using Equation **[2]** we can calculate the presumable distance R_o of NGC-7331 from our galaxy at the supposed beginning of the universe's expansion, 13.8 billion years ago. With reference to **[2]** above, the simple calculation is

[3] $$R_{o(NGC)} = R\, e^{-H\,T} =$$
$$= (4.7\times10^7)\textbf{light-years} \times \exp[-(7.25\times10^{-11})\textbf{years}^{-1} \times (1.38\times10^{10})\textbf{years})],$$

to obtain

[4] $R_{o(NGC)} \approx 4.7\text{x}10^7\text{x}\ e^{-1} = 4.7\text{x}10^7 \times 0.36787944 \approx 17{,}282{,}000$ **light-years**.

This means that such an *initial distance* between our Milky Way and galaxy NGC-7331 is about 36.8% (*i.e.*, e^{-1}) the estimated "present" distance; and almost 7 times the distance (≈2.5 million light-years) between us and Andromeda Galaxy, which is our nearest galaxy [8].

Therefore, if the calculation along with Hubble's law and relevant constant are correct, there is no reason for hypothesizing the Big-Bang. To the contrary, one should hypothesize that the universe's expansion, if any, did actually start from a remarkably large initial size of the universe, which is in any case incompatible with the almost "size-less" initial universe postulated by the Big-Bang paradigm.

In this connection, it is soon worth remarking that "mutual recession" of galaxies should *not necessarily* be viewed as *an expansion* of the finite physical universe.

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criterion, on the evidence that the universe is "flat" ($\Omega = 0$), thus avoiding all biases affecting this constant when accounting for questioned and questionable relativistic criteria.

[8] For this calculation example I do not use the distance to Andromeda Galaxy, because Andromeda is approaching the Milky Way and is considered as something like a "satellite galaxy" of our galaxy (or *vice-versa*).

The ***nucleosynthesis*** (i.e., the formation of matter), including the formation of light elements, which is currently associated with the Big Bang process, might instead be associated with the process of formation and development of galaxies and stars: As for this subject, it should seriously be considered that there is an honest uncertainty about how galaxies and stars originate. No shared "scientific" theory is so far available concerning this aspect of cosmology.

The initial forces that promoted the formation of galaxies and stars, as well as the galaxy recession, are probably very different from any conceivable Big-Bang. With a view to justifying this suspicion, we may develop simple implications of Equation **[2].** By derivation of this with respect to time, we can now re-write Hubble's Law in the following way:

[5] $$V_r = \frac{dR}{dt} = H R_o e^{H t}.$$

which gives the possibility of expressing also the relevant *recession acceleration* a_r **:**

[6] $$a_r = \frac{dV_r}{dt} = H^2 R_o e^{H t}.$$

Referring again to the motion of galaxy NGC-7331 with respect to the Milky Way, this acceleration is, at $t = 0$,

[7] $$a_{r(NGC)} = H^2 R_o = (5.251^{-21}\ \mathbf{years^{-2}}) \times (17{,}282{,}000\ \mathbf{light\text{-}years}) =$$
$$= 9.0837 \times 10^{-14} (\mathbf{light\text{-}years\ /years^{\,2}}) =$$
$$= \mathbf{8.6413 \times 10^{-16} km/sec^2} = \mathbf{8.6413 \times 10^{-13} m/sec^2.}$$

Such a tenuous initial acceleration makes one figure out many causes but the super-explosion or hyper-energetic inflation theorized with the Big Bang.

This initial acceleration increases with time t, and – at $T = 13.8$ billion years from the supposed beginning of the recession – it becomes only:

[8] $$a_{r(NGC)}(T) = H^2 R_o e^{H T} = (5.251^{-21}\ \mathbf{years^{-2}}) \times (17{,}282{,}000\ \mathbf{light\text{-}years}) \times e =$$
$$= \mathbf{2.35 \times 10^{-12} m/sec^2.}$$

The present expected recession speed of galaxy NGC-7331 is then calculated by the product of **[8]** with H^{-1}, to obtain

[9] $$V_{r(NGC)}(T) = H\,R_o\,e^{H\,T} \approx \mathbf{1{,}022\ km/sec}.$$

Obviously, one can remark that the determination of the age of the universe depends on the correct determination of Hubble Constant, which could also be calculated by use of Equations **[5]** and **[6]** above, as follows:

[10] $$H = \frac{a_r}{V_r}; \quad \text{whence also} \quad a_r = H\,V_r = H^2 R$$

showing – by the way – that *the recession acceleration is directly proportional to the recession speed.*

A constant acceleration would be sufficient to generate an increasing recession speed, but in the case of the galaxy recession, if Hubble's law is confirmed by further observations, also the *recession acceleration increases* with the inter-galaxy distance.

Furthermore, it's worth comparing Equation **[10]** to Equation **[1]** to see that recession acceleration a_r can also be expressed as

[11] $$a_r = \frac{V_r^2}{R},$$

which has the features of a centrifugal acceleration. This result is also compatible with the hypothesis that the mutual recession *motion* of galaxies is not linear and develops - instead - along orbits that expand according to the vortex fluid-dynamics described in PART II of *Vacuum, Vortices and Gravitation* (see there – for instance – Equations **[54]** or **[56]**).

It seems to me that the preceding simple exercise suggests an acceptable description and explanation – implicit in Hubble's law – for the recent cosmological observations, made since 1998, which have shown that the recession speed of galaxies is accelerating *with distance and time,* instead of slowing down as per cosmologists' expectations. Nobody knows why this happens, but many cosmologists propose to restore the cosmological constant arbitrarily introduced by Einstein (by himself defined as his "greatest blunder"), or to introduce new and *ineffable* concepts such as "dark energy", "quintessence" and the like in cosmology. In my view, both restoring the cosmological constant and introducing unspeakable concepts, far from giving an explanation for the universe's accelerated expansion, seems only a non-scientific and useless trick.

Most cosmologists insist in considering the Big-Bang as the only acceptable explanation for the universe's expansion, because no other theory can explain either it or the cosmic microwave background.

Marc Lachièze-Rey, in his excellent book « *Au-delà de l'espace et du temps – La nouvelle physique*» (Le Pommier, Paris 2003), maintains that it's wrong to think of the Big Bang as of an explosion, since the Big Bang theory is only a description of the universe's expansion process starting from an extremely dense concentration of the space energy. However, if it is not an explosion, Lachièze-Rey's opinion seems questionable, at least to the extent that big-bang theory doesn't explain why (*i.e.*, thanks to what force) the universe was and still is compelled to accelerate its expansion. An original excess of energy concentration might justify the initial force of an explosion (as it happens, in an analogy, in *supernovas*); but what could be the cause of the *ever-increasing* force/energy that pushes galaxies toward higher and higher recession accelerations?

C - Does the universe expand?

If the universe expands, it means that the physical space expands "within" an *external* empty space and with respect to its own geometrical centre, i.e., with respect to the "core" of the physical universe. In my view, the mutual recession of galaxies could not necessarily occur because of an "expansion" of the universe. Should really the "*plenum*" (*i.e.*, the physical volume of the universe) expand to any extent, the expansion might only depend on a continuous intrusion of *void* nuclei associated with the *chain effect* of matter creation that is intrinsic to the chain effect of vortices and sub-vortices proliferation. In this connection, the cosmological theory outlined by Fred Hoyle (1915-2001) [9], and overlooked by cosmologists during recent decades, could be an acceptable basis for further theoretical refinements.

However, from another standpoint, the mutual recession of galaxies could also depend on mere repulsive gravitational as well as propulsive forces proper to vortices, as already remarked in commenting on Equation **[11]** above. Moreover, there is reason for thinking of the universe's core as of a *monster vortex,* whose gravitational field is as large as the entire physical universe[10]. This core might work like a *hyper-black-hole*, which has

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[9] Fred Hoyle, ***Astronomy, A History of Man's Investigation of the Universe***, Crescent Books Inc., London 1962

[10] **Updating note (2006):** «The team led by Roland Dichl of the *Max Plank Institute for Extraterrestrial Physics* in Garching, Germany, determined that gamma rays from the decay of Aluminum 26 originate from central regions of our galaxy, implying that the production of new atomic nuclei is an ongoing process and occurs in star-forming regions galaxy wide» (article from ESA-European Space

partly swallowed (*i.e.*, attracted and made it invisible) the matter created by its fluid-dynamic field (considering that the whole universe is its gravity field), and has partly repelled other created vortices (together with the relevant amount of matter) because of a mutual fluid-dynamic repulsion.

The vortex kinetics entails that the formation of every vortex with any given "vorticity" Θ is always associated with the subsequent formation of one or more other vortices, each with its particular "vorticity" θ_j, so that their overall "vorticity" amounts to $-\Theta$, *(i. e.,* $\Sigma\theta_j = -\Theta$. See also Footnote 70, in PART II of *Vacuum, Vortices and Gravitation*).

According to the properties of vortices, the *shape* of the core *monster* vortex of the universe can be thought of as either a hyper-ring-vortex or – more likely – as an *open giant vortex cord,* which crosses the whole universe from one of its border areas to another opposite border area. The spin-axis of such a vortex would then be the axis around which the whole universe spins. Therefore, the universe, as well as its galaxies with relative stars and planets, might be viewed as a system and sub-systems of vortices generated inside each other, all forming a *unique* gigantic gravitational field of a fluid-dynamic nature, within which mutual attraction and repulsion forces are equally possible depending only on the *sign* of the "spins" of the interacting vortex fields. Vortices having spins of equal sign repel each other. According to this prospect, the mutual recession of galaxies does almost certainly occur by accelerated motions along spiral trajectories, from the universe's core outwards. Looking at Equation **[2],** the receding galaxies should move along logarithmic spiral paths described - with respect to the motion's centre - by vector radiuses whose angle varies like $\alpha = Ht = \ln(R/R_0)$.

The fate of receding galaxies seems to be eventually that of shattering against the "wall" of *nothingness* beyond the borders of our universe's physical space; or – maybe more likely – darting away from this universe

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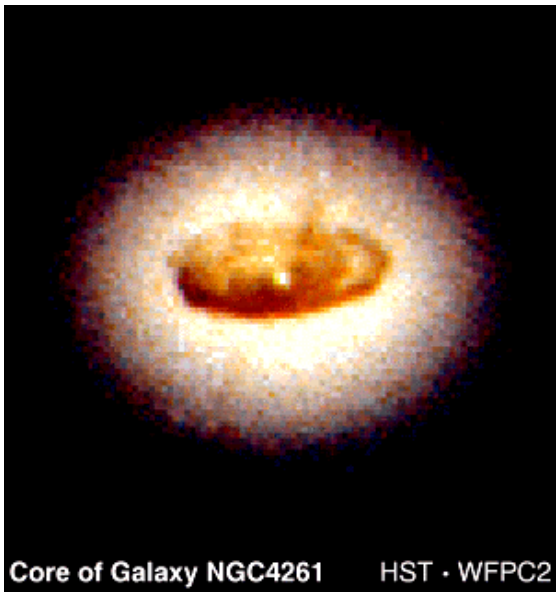
Agency, dated January 4, 2006, heading "***InteGral identifies supernova rate for Milky Way***").

Another article from ESA, dated October 17, 2005, heading "***InteGral: three years of insight into the violent cosmos***", reads: «*InteGral has been looking at gamma-ray sources within our galaxy, the Milky Way, and outside it. The galactic centre of our galaxy is one of InteGral's prime targets. It hosts a super-massive black-hole equivalent to three million solar masses […] Extragalactic observations of so-called "active extra-galactic nuclei", combined with results from XMM-Newton, revealed that the super-massive black-hole housed in their internal regions is surrounded by a doughnut-shaped gas cloud* ».[InteGral and XMM-Newton are space-probes]

ninto the surrounding void, like migrating smaller *drops or shreds of "plenum",* invisible *isle-universes* definitively separate from the mother-universe and dispersed into the infinite void.

Some images provided by *Hubble Space Telescope* are impressive. They suggest that the hypothesis of vortex cores, which generate gravitational fields that spark a subsequent constellations of stars (*vortex stars*), and so on, in a sort a long chain-reaction down to the synthesis of material particles, should not be rejected as that naive.

The *Hubble Space Telescope* image shown here below contains three main features. The outer whitish area is the **core or centre** of the **galaxy NGC4261**. Inside the core there is a darker spiral-shaped disk. Such a core weighs one hundred thousand times as much as our Sun. The central bright point seems to indicate a *nucleus* of maximum activity intensity of the physical space ("the plenum") around a nucleus of "absolute void".

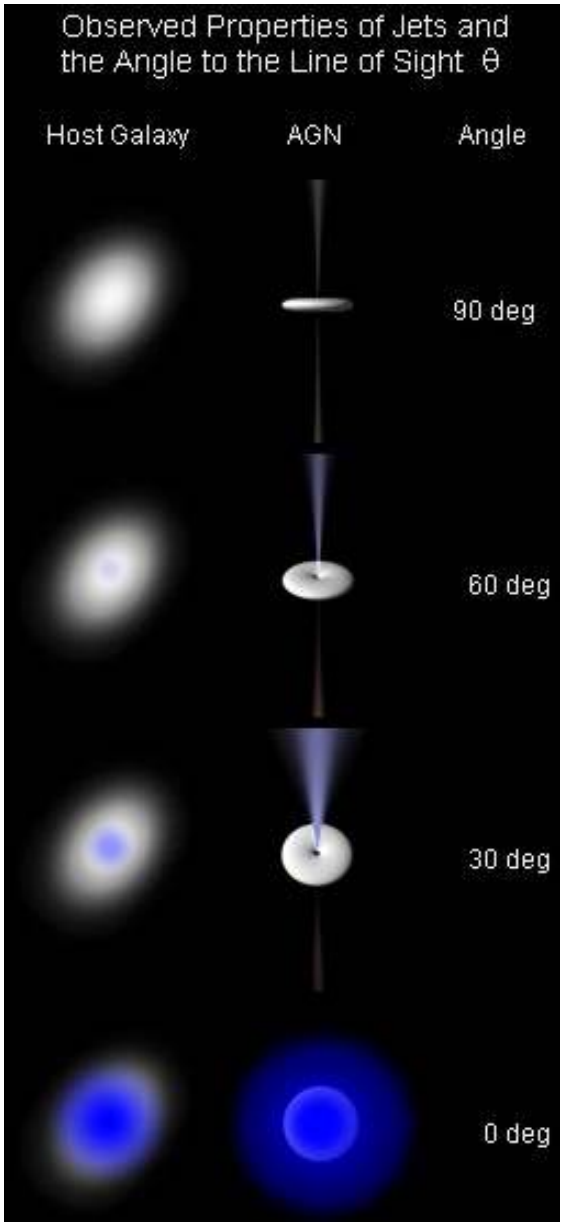


The fluid-dynamics of vortex generation, according to which no isolated vortex can form, helps explain a number of cosmic phenomena whose interpretation is still highly uncertain, not to say largely inadequate.

The *quasars* identified by Halton Arp's very long lasting observations deserve the first mention. According to Arp, despite their exceptional red-shift, quasars are not receding galaxies, but celestial systems or bodies originated by "parent galaxies" with which quasars seem normally associated. Nothing strange in such an interpretation, if one admits that galaxies are vortices that forge stars and matter, and if stars, matter and much more are viewed as complex systems of vortices whose size ranges from micro to macro up to giant scales.

Within large galaxies, the formation of smaller or much smaller galaxies is also possible. Considering the structure of vortices of plenum, as described by the preceding sections of this essay (in particular, see also the *Appendix* herewith), the axes of gravitational vortices are sort of very long "void-rails" (or extremely long and narrow "void-funnels") along which sucked and ejected plenum flows and swirls at speeds even exceeding the speed of light, thus generating also very high energy electromagnetic

radiation of any kind. It is where the physical space achieves its highest turbulence and most creative activity. Observations and images transmitted by space probes have identified such axes of activity in the "flares" that stretch out for many hundred thousands of light-years from the centre of galaxies.



It seems possible to interpret quasars as "star-like" or "quasi-galaxies" whose vorticity has the same sign (*vortical spin*) as that of their parent galaxies, so that parent galaxy and quasar repel each other. Moreover, it is also possible that quasars are those of the "quasi-galaxies" (or "star-like" objects) that move toward the observer keeping their vortex axes collimated with the observer's line of sight. If so, the sucked high energy particles of the observed quasar, while falling at extremely high speed onto the core of the quasar's vortex, do also cause the observed high red-shift, because the "sucked" particles recede from the observer at a speed that is much higher than the speed at which the quasar approaches the observer, and – obviously – much higher than the receding speed of its parent galaxy.

There is to consider that the maximum brightness of the observed flare is confined within an extremely narrow solid angle, out of which the flare's brightness vanishes. Thus, in conjunction with the quasars' red-shift, it should also be possible to detect a certain degree of "blue light" in the crown area external to the "sucked stream", as an indication of the quasar's motion toward the observer.

In general, looking at the activity of galaxies as at the activity of vortices, it should be relatively simple to recognize that a continuous process of child-galaxy formation is possible, together with the more "normal" process of star, planet and matter formation inherent in the existence of galaxies.

Besides, there is reason for doubting that the speed of light keeps constant in propagating through the plenum, especially – but not only – through the vortex gravitational field proper to the source of the light. The reasoning expounded in PART III of this essay, concerning the deflection of light across a vortex, leads also to conclude that either deflected or generated light undergoes a loss of its frequency that is inversely proportional to the square distance from the centre of the gravitational field, approximately. (See Paragraph ***3*** of the *Appendix* herewith).

The other cosmic objects classified as *blazars*, which astronomers consider as belonging to particular classes of quasars, may be viewed as a confirmation of the interpretation given above for quasars. Most *blazars* show very high luminosity, and their *flares* are commonly described as *jets* whose direction may form different angles with the observer's line of sight. The blazars' ***flares*** should consist of very high energy particles expelled by the relative galactic nucleus with a (more or less) rapid approaching motion toward the observer, as detected through the *blue-shift* of their light. When this occurs, my interpretation is that the *blazar*, together with its host galaxy, *moves away* from the observer.

The "apparent asymmetry" detected in the motion of the "north" and "south" flares of a *blazar* is very significant to me. Instead, I deem it awkward looking at the attempts made by astrophysicists to find an explanation for that**:** It seems impossible to astrophysicists to admit that the "two flares" of a blazar are the *same one-way stream* of materials sucked from ahead and ejected from behind.[11]

I do not know why flares stretching out up to many hundred thousand light-year distances from a galactic nucleus should only be explained as an effect of violent explosions, which should take place in the core of the galaxy through quite an unclear process involving a "black-hole". By the way, such very long and almost rectilinear flares could much better be viewed as images of long-range shots rather than of explosions.

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[11] The images in the preceding page show structure and shape of a *blazar* according to different lines of sight. These images and those in the previous pages are taken from " http://en.wikipedia.org/"

Obviously, I cannot feed any hope to induce astrophysicists to view *blazars* as perhaps the most evident example of how gravitational vortices and galaxies form and move across the cosmic "plenum". In my view, the "accretion disks" shaped like toruses (or "rings" or "*doughnuts*") are perfect images that reveal the structure of the vortex cores, with an evident vortex *nucleus* of *void* (*i.e.*, a nucleus of *absolute nothingness*) at the centre of each ring. (Unfortunately, it is also a fact that we incline to understand and *see* only what is already settled in our minds).