10.6.5 Energy involved in the motion of astronomical object in gravitational CL space

10.6.5.1 Balance between the orbital kinetic energy and the inertial force moment (of folded nodes) for astronomical body moving in gravitational CL space

The plot of the planetary data point match quite well the theoretical plot of $[E_{IFM}/E_K]^2 = C_E r$, as shown in Fig. 10.8. In a first gland it looks, that the kinetic energy is not equal to the energy E_{IMF} (inertial force moment of the folded nodes). However **E_{IMF} is defined for a body motion in free space, where the gravitational field from other body is excluded.** So the energy ratio in the above shown expression and the plot in Fig. 10.8 does not take into account the folded node motion in gravitational field. If writing the above equation in a form $[E_{IFM}/E_K] = \sqrt{K_E}\sqrt{r}$ we see that the ratio between the two energies is proportional to the square root of the distance (orbital radius). In order two energies to be equal, the energy force moment for free space should be multiplied by a common factor, inverse proportional to $\sqrt{r}$. The physical meaning of this could be explained if accepting that:

The folded nodes in closer orbits exhibit larger interaction when passing through the moving body

It is equivalent to;

A. The folded nodes in larger gravitational potential exhibit larger interaction when passing through the moving body

The last consideration is completely logical if taking into account, that a larger gravitational potential corresponds to a larger CL stiffness. It is the stiffness that determines the node resonance frequency and consequently the light velocity. A very small change of CL stiffness leads to a change of the node resonance frequency. The gravitational effect on the light velocity is negligible because of the self adjustable parameters of the CL space. **The matter structure however, and especially the proton and neutron (formed of closed ring helical structures) could not be changed. Their dimensions in free or gravitational CL space are one and a same.** For this reason the moving matter exhibits quite stronger interaction in gravitational CL space. Then a question arises? What is the physical parameter that could provide the necessary correction factor for E_{IMF} in gravitational field CL space? The answer is: **The possible physical parameter is the spin momentum of the folded nodes.**

It is quite logical to consider that the dependence of the spin momentum is:

(a) From the relative velocity between the moving body and the external CL space

(b) From the stiffness of the external CL space, i.e. from the gravitational potential.

From the energy conservation principle it follows that the product of the E_{IMF} and the correction factor for the spin momentum should be equal to the body kinetic energy when moving in equipotential surface. Such motion is possible if the centripetal acceleration is equal to the gravitational attraction. The circular motion satisfies this condition, so we can use it in the following derived expressions.

Taking a square root of the basic Eq. (10.47), valid for a circular planetary motion in the solar system, we get:

$$\left[\frac{E_{IFM}}{E_K}\right] = 2\alpha c\sqrt{\frac{r}{GM_S}} = \frac{2\alpha c}{\sqrt{U_{Gn}}} \qquad (10.56)$$

$$U_{gn} = \frac{GM_S M}{r}\frac{1}{M} = \frac{GM_S}{r} = \upsilon_{or}^2 \qquad (10.57)$$

where: U_{Gn} - is the gravitational potential normalized to 1 kg mass (SI system only)

υ - is the orbital velocity for circular orbit

The kinetic energy obtained by Eq. (10.56) is

$$E_K = E_{IFM}\frac{\sqrt{U_{Gn}}}{2\alpha c}$$

According to energy equivalence:

$$E_{IFM}^G = E_K \qquad \mathbf{(10.58)}$$

where: E_{IFM}^G - is the inertial force moment of the folded nodes in gravitational CL space

$$E_{IFM}^G = E_{IFM}\frac{\sqrt{U_{Gn}}}{2\alpha c} \qquad (10.59)$$

The final Eq. (10.59) is valid not only for planetary circular motion around the Sun, but also for a planetary satellite motion. In this case the solar mass M_S in Eq. (10.57) should be is replaced by the planet mass, M_P.

Note: *The normalized gravitational potential is a theoretical value estimated for the central mass point of the moving object. In such case it does not depend on the size of the moving body.*

10.6.5.2 Physical relation between the inertial force moment (of folded nodes) and the gravitational potential.

10.6.5.2.1 Energy equivalence equation.

From the the planetary motion and its theoretical interpretation it is evident, that the folding/unfolding process involves reactive type of energy borrowed from the external CL space. This energy, however, it is not part of the kinetic energy and does not participate in Eq. (10.59). When using the concept of a local CL space with ESS, this energy appears located in the ESS. For a solid astronomical body with high matter density the separation surface can be beyond its solid surface.

Eq. (10.51) shows that the reactive energy E_S for any one of the planet does not depends on the distance from the Sun (because the radius of the separation surface depends on the distance). But this is valid for orbital velocity υ_{or} defined by Eq. (10.57), where the relation with U_{Gn} is relevant.

Eq. (10.59) from the previous paragraph also shows, that E^G_{IFM} in gravitational CL space depends on U_{Gn}. It was noticed that the latter parameter is theoretical and is referenced to the central mass point of the moving body. It is theoretical because in that point (and any point inside the body) the estimation of the parameters of the folded nodes (from the external CL space U_{Gn}) is impossible. Therefore, the physical parameters providing U_{Gn} may be attributed to the imaginary introduced ESS. Then one question arises:

How the value of E^G_{IFM} giving the energy of the folded nodes corresponds correctly to the energy of folding/unfolding process in imaginary ESS?

The above question has the following possible answer:

The reactive energy for the folding/unfolding process is equal to E^G_{IFM} energy. So it is exactly equal to the kinetic energy estimated by the orbital velocity.

$$E^G_{IFM} = E_K = E^R \qquad \textbf{(10.60)}$$

where: E^G_{IFM} - is the inertial force moment of the folded nodes in gravitational CL space; E_K - is the kinetic energy of the body possessing a local CL space; E^R - is the reactive energy borrowed from the external CL space and located around the ESS (while in the real case it is distributed through the whole mass of the body).

Eq. (10.60) is an energy equivalence equation.

In the theoretical case of motion in orbit with infinite radius the Newton's gravitation is intrinsically small and could be neglected. So this case could be regarded as a linear motion with kinetic energy determined by the body mass and velocity. Then we logically arrive to the following conclusion:

In case of circular orbital motion the parameter E^G_{IFM} implicitly includes the energy of Newton's gravitation. The linear motion of body in free space (away from gravitational field) does not include energy of Newtons' gravitational field.

The above made conclusion is in complete agreement with Eq. (10.59).

Now one question appears: Is there some upper limit of the radius of a circular motion, when it could be energetically considered as linear motion?

The possible answer is: **The upper limit of the circular orbital motion is determined by the equivalence between the gravitational potential of the large body and the Zero Point Energy of the free space.**

From the provided so far analysis it becomes evident, that the local CL space for any astronomical body (whose CL space is extended beyond its solid surface) exhibit a radial gradient. Let us use the parameter **CL space stiffness** (see Chapter 2) for describing the extended CL space gradient. For a planet orbiting a star, the gradient of the planet's CL space stiffness in a point residing in the connection axis between them, falls inversely with the distance from the planet centre and becomes equal to star CL space stiffness at the separation surface. The CL space stiffness it this point, however, is larger than the CL space stiffness in a free space (free CL space is an ideal case of CL space without any gravitational field).

10.6.5.2.2 Motion with linear acceleration (deceleration) component

In order to simplify the problem, let consider initially a motion with a constant velocity within a limited time range in order to be considered as a linear type of motion. In such case the parameter U_{Gn} could be considered as a constant and E_{IFM}^{G} will not depend of it. If the body obtains an acceleration in a second moment but U_{Gn} is still constant, we arrive to the following relations:

$$\frac{\Delta \upsilon}{\Delta t}\sqrt{U_{Gn}} = \upsilon_2^2 - \upsilon_1^2 \qquad (10.60.a)$$

where: υ_1 and υ_2 are respectively the initial and final velocity and $\Delta \upsilon / \Delta t$ is the velocity change or acceleration if $(\Delta t) \to 0$.

At the same time the energy equivalence according to Eq. (10.60) should be still valid. Then the reactive energy will be changed by the value

$$\Delta E^R = \frac{1}{2}m(\upsilon_2^2 - \upsilon_1^2) = \frac{1}{2}m\frac{d\upsilon}{dt}\sqrt{U_{Gn}} \qquad (10.60.b)$$

Eq. (10.60.b) shows that the change of the reactive energy at the ESS is proportional to the velocity change of the folded nodes, that in fact is the body acceleration.

10.6.5.3 Intrinsic energy balance.

The analysis of the process of molecular vibrations and photon emission/absorption in Chapter 9 has shown that the intrinsic energy balance exists in the system comprised of the molecular structure and the surrounding CL space. Extending the logical consideration for a similar balance in the gravitational/inertial interaction for macrobody we may **formulate the following hypothesis**:

The CL space of a star possessing a planet system with stable long time motion parameters (like our solar system) is characterized with accurate balance between E_{IG}(TP) and E_{IG}(CP) energy of any moving body.

The kinetic energy involved in the interactions between the folded nodes and the local CL space nodes could be regarded as IG(TP) interactions.

The energy involved in the folding/unfolding process is related with change of the CL node geometry. In this process IG forces from the prism's central part dominate over the peripheral part. The peripheral part interactions between both type of nodes are with opposite helicity and the net balance could be considered as zero. Therefore, the folding/unfolding process could be characterised only by IG(CP) interactions. We may conclude:

- **The energy related with the folding/unfolding processes of the CL nodes is a type of reactive energy borrowed by the CL space. When using the concept of local CL space with ESS this energy could be considered as allocated in the ESS.**

Using the local CL space concept, the reactive energy related with IG(CP) interactions depends on the size of the ESS area and the velocity. In reality, the folded nodes obtain spin momentum, depending of the relative velocity and the gravitational potential at the point containing mass.

The intrinsic energy balance for the motion of every planet, according to the above defined hypothesis, could be written in a form:

$$E_{IG}(CP) = E_{IG}(TP) \qquad (10.61)$$

In the provided so far analysis the circular motion was only considered, for which Eq. (10.60) is accepted. The same equation should be valid also for any stable elliptical orbit, where the average value of the kinetic energy will appear as a constant. In elliptical orbit, however, the relative velocity, the area of the ESS and the spin momentum of folded nodes will have different values for different orbital points.

The intrinsic energy balance for a planet orbiting around a star is illustrated by the diagram shown in Fig. 10.11. The section of the separation surface for idealistic case (no cavities) is shown.

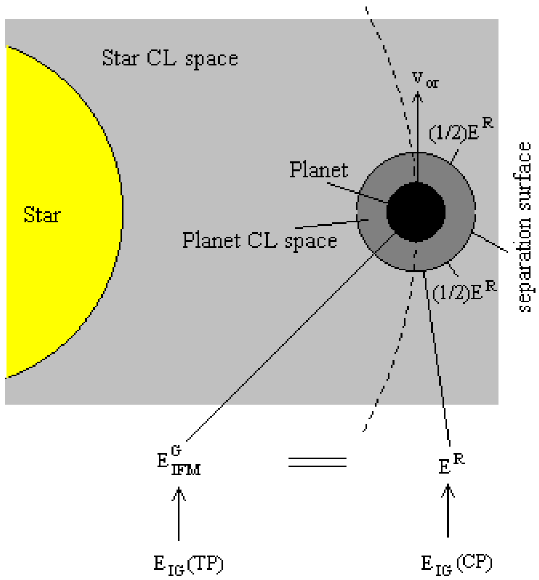

Fig. 10.11
Diagram of intrinsic energy balance of planet in a circular orbit around a star

The star and planet CL spaces are shown without their stiffness gradient. The section of separation surface is shown by two half rings (in order to show the entrance and exits part of the ESS) properly oriented to the orbital velocity υ_{OR}. Using the imaginary concept of Local CL spaces with ESS, we must consider (also imaginary) that the folding process occurs at the lower part of the separation surface, while the unfolding - at the upper part (as shown in Fig. 10.11). The corresponding energy for each part is one half of the total reactive energy E^R. The equivalence between E_{IG}(TP) and E_{IG}(CP) is realised via E^G_{IFM} and E_K. The intrinsic energy equivalence involves the CL space of the planet and the star CL space.

10.9 Mass grow of astronomical body by matter accumulation.

Let considering an example of a solid body immersed in a gravitational field of a massive astronomical object. If the mass of the real solid body is comparatively small, it does not posses a local CL space. Now let imagine that the body mass increases continuously by accumulating of some matter. Then in some moment it will obtain own CL space beginning from domains with larger matter density. Let considering the ideal case that the body has a spherical shape with a matter density larger at the centre and gradually decreasing with the radius. If the matter accumulation increases, the growing CL space may overpass the solid surface of the body at some moment.

In the real case of matter accumulation, the shape of the solid body could be not spherical (there is not a mechanism to make it a spherical). Then in the process of mass growing, some portion of the growing local CL space, which is also not spherical, may overpass the solid surface, while other not. In such case, assuming the body is **rotating**, the conditions of ESS surface are constantly changing (estimated by the gravitational force equivalence). But this means a change of the reactive energy E^R (defined in &10.6.5.2.2). This energy is quite large because it is in balance with the kinetic energy of the orbital motion of the body. According to the balance diagram of Fig. 10.11 the energy E^R is related with E_{IG}(CP) interactions, that are quite strong. The change of E^R appears as active energy dissipated directly on the solid volume of the body. So it may heat the body volume. If the accumulated mass is quite large but the shape is not spherical, the change of E^R may dissipate enough energy to melt a part or the whole body. Then the massive body could obtain a shape closer to a sphere, possessing an own CL space. The obtaining of a spherical shape leads to a decrease change of E^R caused by the body rotation in the external gravitational field of the more massive body.

The asteroids in the solar system and small planetary satellites could serve as proper objects for analysis the growing trend of a massive body. It is more convenient to compare objects with circular orbits arranged in close distances from the main massive object. Otherwise normalization to the distance is required (because it is related to the reactive energy E^R via orbital kinetic energy). The asteroids between Mars and Jupiter orbits are convenient for such kind of analysis. (The planetary satellites require more complicated analysis, taking into account the common motion in the star CL space together with the planetary one). Table 10.7 shows some of the data of 9 asteroids taken from "asteroid fact sheets"
(http: //nssdc.gsfc.nasa.gov/planetary/factsheets/asteroidfact.html)

Asteroids data **Table 10.7**

No	Name	Mass x 10^{15} [kg]	distance [au]	size [km]	volume [km^3]
1	Eros	6.69	1.458	33x13x13	5577
2	Ida	100	2.861	58x23	262100
3	Mathilde	103.3	2.646	66x48x46	145728
4	Siwa	1500	2.734	103	5.72E5
5	Eugenia	6100	2.721	226	6.04E6
6	Juno	20000	2.669	240	7.238E6
7	Vesta	3E5	2.362	530	7.795E7
8	Palas	3.18E5	2.774	570x525x482	1.44E8
9	Ceres	8.7E5	2.776	960x932	4.43E8

Using the mass and volume data the average density is calculated (without pretending for high accuracy because only the size parameter is used). Fig 10.12.A shows the average matter density dependence from the mass in two different scales: **a**. - lower mass range and **b.** - higher mass range. The asteroids are marked by their numbers according to the Table 10.7.

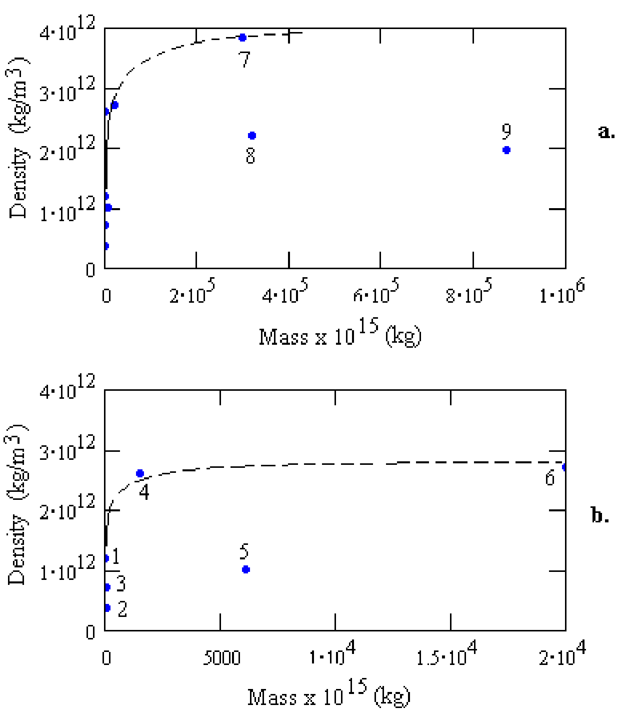

Fig. 10.12.A

Fig. 10.12.A.a. shows that asteroids 1, 2, 3, 4, 5, 6, 7 (according to Table 10.7 numbering) define some trends that is shown by dashed line. Two asteroids 8 and 9 do not follow this trend. Fig. 10.12.A.b. shows the lower scale range of the mass, where the trend is formed by asteroids 2, 3, 1, 4, 6. The asteroid 5 (Eugenia) exhibits lower average density and is aside of this trend. The following conclusions could be made:

- Asteroids residing near the common trend show tendency of spherical shape with mass increase
- Asteroid deviated from the common trend do not have a spherical shape even if possessing a larger mass
- Asteroid No 5 (Eugenia) is an exclusion from the observed trend, however, the provided data are not enough for deeper analysis of this case.

The tendency to a spherical shape could be explained by a partial melting of the solid body. In case of larger astronomical objects (like planetary satellites) the increased mass leads to more perfect spherical shape.

10.12. Interactions between the folded nodes and the planetary atmosphere.

10.12.1 Gravity waves phenomena.

Let regarding the atoms and molecules from the atmosphere as simple small microbodies whose protons and neutrons posses own FOHS CL spaces. The protons and neutrons in the nuclei are subjected to a definite order, so we may regard the FOHS CL space as a common **atomic CL space**. Its configuration, however, is quite different than the astronomical object CL space. The molecule contain atoms with their CL spaces but with additional vibrational-rotational motion. In order to analyse the interaction between the folded nodes from the external space and the atomic (molecular) CL space we will consider the following two cases

1. **Idealistic case**: assuming the molecules do not exhibit a Brawnian motion. In such case we may distinguish three types of folded nodes passing through the molecular local CL spaces:

- folded nodes from the Earth CL space
- folded nodes from the Sun CL space
- folded nodes from the Galaxy CL space

Note: Keeping in mind that the introduced local CL space is imaginary, we use this concept for separating the GR effect of space curvature invoked separately by the Earth and Sun gravitational field.

We may apply Eq. (10.59) for a laminar flow of folded nodes. From this equation we see, that if the velocity and gravitational potential are both constant, the energy balance is constant and the borrowed reactive energy E^R is also constant. Let assuming the gravitational potential is constant i. e. there is not vertical motion of the molecules. Then:

(a) if ignoring the rotational motion of the solar system in our galaxy the reactive energy E_R will exhibit diurnal variations due to the sideral period of Earth rotation (24 hours).

(b) if considering the solar system motion in the Milky way galaxy the energy R^E will exhibit semiannual variation due to the Earth orbital motion around the Sun. The latter variations will be additionally asymmetric because the Earth orbit is not perpendicular to the solar system orbital plane around the Milky way centre. The magnitude of the semiannual modulation is also a small, because the Earth orbital velocity is about 1/7 of the solar system velocity around the Milky way centre.

While the constant reactive energy E^R is not detectable, the change of this energy could be detectable by accurate observation of some atmospheric phenomena. Such phenomenon is the observed **waves structure in the Earth atmosphere with semiannual period** (BSM interpretation).

2. **Realistic case:** The molecules and atoms of the atmosphere posses a Brawnian motion characterised with a velocity direction randomness. This will affect the interaction between the molecules and the folded nodes in two ways:

- In respect to gravitational potential U_G: The vertical component of Brawnian motion will cause slight changes in U_G. Then according to Eq. (10.59) and (10.60) a slight change of E^R could be observed in a global planetary scale.

- **Affecting the relative velocity vectors** between the folded nodes and the momentary velocity of the molecule casing a some random velocity component. The features (a) and (b) from idealistic case will be still valide but the randomness will introduce some noise component.

Question: How the change of reactive energy E^R could appear as an active detectable energy?

In order to provide a physical explanation we will consider a short interval of motion of the oxygen molecule in *nadir* (direction toward Earth centre). The Earth orbital motion velocity could be larger than the molecular one, but the velocity ratio is still finite. Let considering a very short patch of CL nodes entering inside the protons and neutrons at time moment 1 and exiting at time moment 2. The E-field inside the proton and neutron is highly oriented and the folded nodes are strongly guided around FOHSs volumes (occupied by RL(T)). So entering the proton's or neutron's internal volume the folded nodes may lose their common group synchronization while they are inside. In the exit, however, they have to restore their common synchronization matching to the groups that have bypassed the internal proton's or neutron's volume. If assuming that they have not exchange any energy with the molecule the patch of folded nodes will appear at level with a slightly higher gravitational potential but with a same velocity. Their "running" position will differ from the "running" position of other neighbouring patches that have not passed through the internal proton (neutron) volume. Then a spatial nonuniformity will appear in result of their spatial positions and different U_G. This nonuniformity has to be removed by the Zero point waves. Then some local zones may have larger activity of this waves. They may cause excitation of some electronic quantum levels in atoms or some molecular vibrational-rotational levels. In a nightglow emission layers these excitations could be detected as wavelike structures with pretty large spatial dimensions. This kind of phenomena according to BSM provides **a wavelike phenomena, corresponding to the known gravity waves** detected in the atmospheric airglow.

Gravity waves are well known phenomena in the atmosphere. BSM theory provides a different explanation of the physical mechanism for one type of the gravity waves.

10.12.2 Gravity waves in Earth atmosphere with semiannual period

The phenomena is discovered initially as a semiannual variation of the zonal wind in the equatorial and upper atmosphere ((Reed, 1965). The gravity waves are modern topic of experimental and theoretical work at the present moment. Lot of observational data are accumulated covering a large vertical altitude in the Earth atmosphere.

Some of the gravity waves at lower altitudes and near mountains could be influence by vertical tide. In higher altitudes, however, the existence of large scale gravity waves could not been explained by the vertical tides. Then the BSM concept of gravity waves phenomena might be more relevant for altitudes above 50 km in respect to the see level. Fig. 10.12.B shows a vertical time-section of monthly mean zonal wind, in which the semiannual period is clearly apparent.

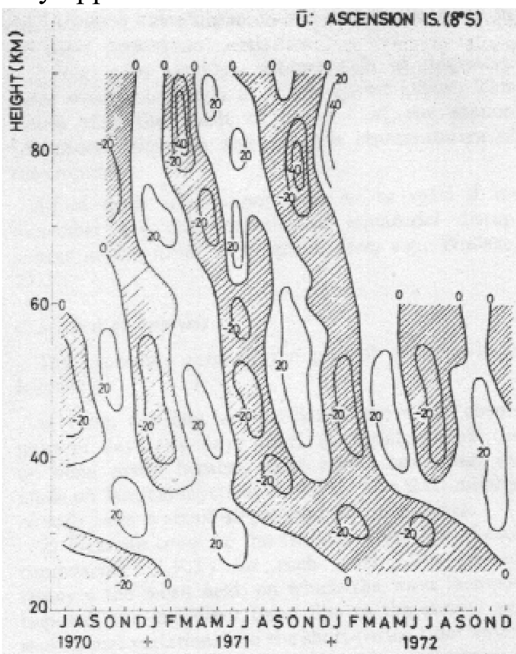

Fig. 10.12.B

From the above shown plot and other observations it is found that the neighbouring semiannual patterns are not exactly equal and the average ratio between their (even and odd order) magnitude is preserved. The possible explanation according to BSM is the following: The Earth orbital plane is not exactly perpendicular to the plane of solar system rotation around the Milky way centre. Then the folded node velocity from the Earth orbital rotation obtains a small cosine in respect to much larger velocity of solar system rotation around the Milky way centre. The relative positions between the Earth orbital plane and the galaxy plane are illustrated in Fig. 10.13.

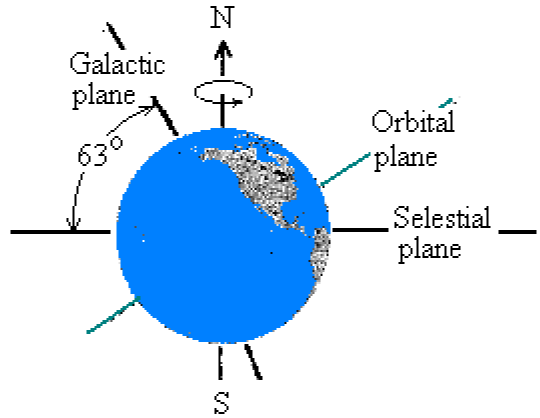

Fig. 10.13

According to Eq. (10.60) the energy balance is

$$E^G_{IFM} = E_K = E^R, \text{ where } E^G_{IFM} = E_{IFM}\frac{\sqrt{U_{Gn}}}{2\alpha c}$$

and $E_{IFM} = (m_n c\alpha)v$

For a circular orbit U_{Gn} is a constant. Consequently the change of folded node velocity υ affects E^G_{IFM}, but the energy balance (10.60) should be preserved. Then the energy for the wave structure should come from the reactive E^R energy of the space. In fact the process is more complicated, because of the additionally involved interactions between the solar and Earth magnetic fields.

10.12.3 Gravity waves at altitudes of 95-100 km.

Fig. 10.14 shows gravity wave structures obtained during ALOHA-90 campaign by wide angle all-sky camera at OI (557.7 nm and Na (589.2 nm) nightglow emissions. (Taylor et al. 1955).

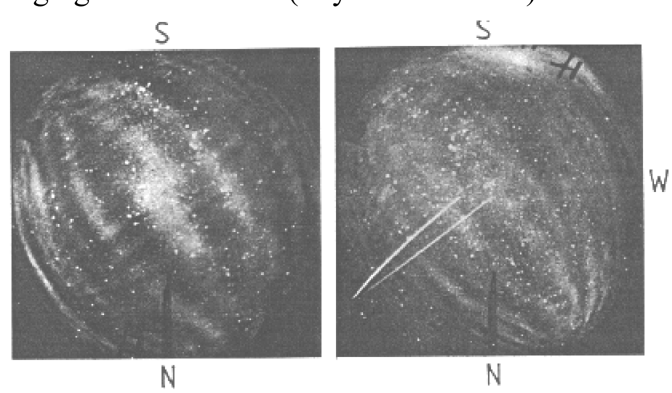

Fig. 10.14

Two examples of all-sky wave structure imaged in the visible wavelength OI (557.7 nm) and Na (589.2) nm nightglow emission during ALOHA-90 campaign. (Courtesy of Taylor et al., 1955)

In the same article of M. J. Taylor (1997), number of other large scale images obtained from different experiments and authors are presented. One of them is a large scale airglow wave structure photographed from Spacelab 1 mission (Herse, 1984).

10.14 Magnetic field hypothesis (for astronomical objects)

In §10.6.2 and Fig 10.7, the break of the mass trend as a function of the volume of the astronomical body was discussed in connection to the critical volume defined by theoretical critical mass given by Eq. (10.47). The break of mass trend was explained by **hypothesis for formation of kaons core** by breaking the protons and neutrons in the central zone of the massive astronomical body due to the strong gravitational pressure. The concept of such hypothesis can explain two phenomena simultaneously:

(a) a change of inertial property (and consequently the Newton's mass)

(b) creating conditions for a strong magnetic field

The phenomenon (b) could be explained by the strong field alignment generated by the internal RL(T) structures of the **straight shaped kaon**. The axial vector of RL(T) from a straight shaped kaon is much stronger in comparison to curved shaped R(LT) of the proton (or neutron). Then bunch of straight shaped kaons may form very strong axial component of phased synchronized SPM vectors, much larger than this of the single kaon. Figure 10.17 illustrates a bunch of 6 kaons in a parallel arrangement, while number of such bunches may get a serial arrangement, as well.

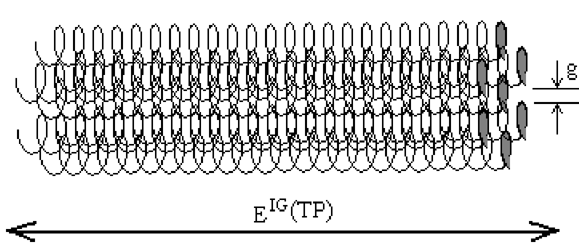

Fig. 10.17. Bunch of six kaons. The drawing shows only the external envelopes of the kaons and their common position. Only portion of kaon length is shown, as the length to diameter (of single kaon) ratio is 3451.

A magnified part of radial section of kaon bundle (nucleus) showing the order of the positive and negative FOHSs with their internal RL(T)s is given in Fig. 10.18. i

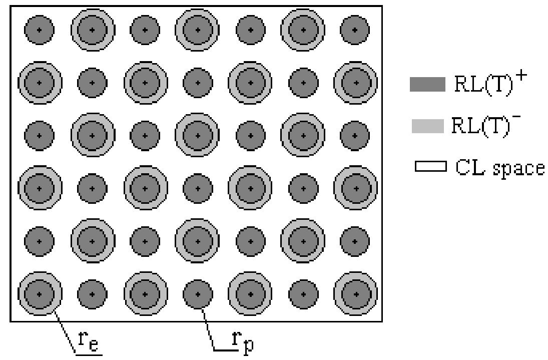

Fig.10.18
Magnified part from the radial section of kaon bundle

The number of positive FOHSs of type H_m^{2-}:+(-) is equal to the number of negative FOHSs of type H_m^{1}:-(+(-). In such case the total charge is equally balanced. There is small edge effect charge difference, but it could not disturb the total charge integrity. Every positive FOHS contains internal positive RL(T) with central negative core. Every negative FOHS contains internal negative RL(T), inside of which there is a positive FOHS with internal positive structure and central negative core. (see the detailed description of kaon structures in Chapter 2). The both types of FOHS are separated by regions filled with CL space. The twisted proximity fields of RL(T) keeps the structures mechanically isolated. At the same time the penetrated CL space is heavily modulated by the aligned RL(T). This provides conditions for strong phase connection between the SPM vectors of the CL nodes along the align gaps between the kaons. The common mode synchronization provides energy flows in closed path in a form of magnetic field (for more details see the magnetic field explanation in Chapter 2). It is evident that such arrangement of positive and negative FOHSs is able to provide super strong magnetic field. The ordinary atomic matter is not able to provide so strong field. The CL space inside the kaon bundle is strongly affected by the IG forces of FOHSs whose matter density is much larger than the average atomic matter.

Then the resonance frequency of internal CL space might be a higher harmonics of the free external CL space.

The CL space parameters inside the kaon bundle are strongly influenced by the spatial configuration of the structure. The E^{IG}(TP) vector of the CL nodes will have a strong component aligned with the FOHSs axes. In Fig. 10.15 it is shown as E^{IG}(TP) vector with two arrows, emphasizing its equal behaviour in two opposite directions similar as for a single prism. From these features one important conclusion follows:

(c) The common E^{IG}(TP) vector provides conditions for superstrong magnetic field that may have N-S or S-N direction.

The described kaon structure may influence strongly the surrounding CL space, creating excellent conditions for a magnetic field. The generation of such field then is provoked by the inertial interactions of the moving body in respect to the external CL space. In the case of planetary magnetic field of our solar system, the magnetic filed should be preferentially aligned with the larger velocity vector of the folded nodes. This is the vector of the solar system motion around the Milky way centre. This condition might be fulfilled in some earlier epoch of the planet evolution, providing the orientation of the kaon nucleus. Once the nucleus is formed it could not be reoriented in respect to the solid structure body if the rotational axis of the planet or planetary satellite) is changed. So if the spin axis has been changed and the internal region is not melted, the alignment of the previously formed kaon nucleus will be preserved. The large angle between the spin and magnetic axes for the planets Neptune and Uranus confirm this conclusion.

The orientation of the Earth magnetic axis in respect to the velocity vector of solar system motion around the Milky way centre could be inferred from Fig. 10.13. Table 10.8 provides some of the angles for estimation of the angular difference between the axis of the planetary magnetic field and the velocity vector of the solar system motion in respect to the galaxy centre.

Planetary magnetic field orientation Table 10.7

Planet	magnetic field	tilt to rotational axis (deg)	obliquity to orbit (deg)
Mercury	(*)		0
Mars	(*)		25.19
Venus	No?		177.4
Earth	Yes	11.2	23.45
Jupiter	Yes	~11	3.13
Saturn	Yes	<1	26.73
Neptune	Yes	47	28.32
Uranus	Yes	58.6	97.8
Pluto			122.23

The Mercury magnetic field may not be well defined, for a few reasons:

- Mercury is very close to the Sun and its graviational field may influence a possible formation of kaon nucleus.
- The eccentric orbit of Mercury involves a large change of the E^R energy, that may also disturb the conditions for formation of kaon nucleus.

Earth, Jupiter and Saturn have well defined magnetic fields. The angle between their axes (taking into account the sideral rotation) and the solar system velocity vector is much smaller than 90 deg. Therefore, their evolution to the present state perhaps did not changed significantly the initial direction of their rotational axes.

The magnetic axes of Neptune and Uranus are in quite different positions. This indicates that once the kaon nucleus is formed its direction in respect to a solid body is preserved even if the axis of their sideral rotation is changed. The rotational axis of Neptune and especially Uranus perhaps have undergone significant change of their directions. The directional change of the rotational axes is more logical for the planets that are at larger distance from the Sun.

It is proved, that the direction of Earth magnetic field has been changed few times in the past. This is in agreement with a feature **(c)** of the kaon nucleus.

The presented concept is not able to provide a satisfactory explanation especially for Mars and Venus. The presented concept, however, may be useful for deeper understanding of the magnetic interactions between the Son and the individual planet.

The existence of kaon nucleus is not valid only for the planet, but for the stars as well (in some point of their evolution). This is discussed in Chapter 12. The Sun also possess very strong magnetic field and it is also oriented along the vector of its motion around the Milky way centre. The kaon nucleus could not be disturbed or destroyed of possible high temperature in the centre of our star (this also becomes apparent from the analysis of some cosmological phenomena in Chapter 12 of BSM)

Further discussion and proof for kaon nucleus especially for stars is provided in Chapter 12. The observational data about pulsars indicate that they are huge kaon nuclei released after the star death.

10.15 Physical explanation of the phenomena of General Relativity:

10.15.1 Gravitational potential and local CL space

The gravitational potential of massive astronomical body for a particle with mass *m* is given by the equation:

$$U = -G\frac{Mm}{r} \tag{10.65}$$

The equipotential surfaces could be represented as concentric spheres with radius inverse proportional to the distance from the centre. This dependence has different effect on a body with finite mass and on the photons. The Sun gravitational field, for example, will cause a slight shrink of the local CL space. Then the local CL space parameters might be slightly different than those of a free CL space. The energy exchange however, could be preserved if there is not involvement of mass change in the emission - detection process. In all processes of photon generation and detection (with exception of bremsstrahlung and radioactive decay) the electron particle is involved.

10.15.2 Influence of the gravitational field on the parameters of elementary particles. Explanation of the gravitational red shift.

Only stable particles will be considered: a proton, a neutron (inside the atomic nucleus) and electron (a normal electron system containing a positron).

The CL space in the gravitational field may have a slightly changed parameters in comparison to the free space (away from any gravitational field). Such parameters are the static CL pressure, the CL node proper frequency and respectively the SPM frequency and consequently the speed of light. These are basic CL space parameters that will affect all physical constants. The change of the light velocity, for example, could not be detected inside of this local field, because the time base (SPM frequency = Compton frequency) changes accordingly. The same is valide for other parameters and respectively the physical constants. One important thing that must be taken into account is that the first proper frequency of the electron will be also affected because it is always equal to the Compton frequency of the CL node. The electron is an open single coil helical structure, so it is flexible enough in order to accommodate the necessary small change.

The detection of GR effects are possible only remotely from other local gravitational field. For example:

(a) If a photon emitted from a distant star (the source is outside of Sun gravitational field) passes near the Sun disk and is detected on Earth, its initial direction will be changed while its energy should be preserved.

(b) A photon emitted near the Sun and detected on the Earth will exhibit a red shift if the gravitational potential of the point of its emission is stronger than the gravitational potential in the point of its detection.

In case (a) there is not involvement of electron from the Sun gravitational field, so the photon energy is preserved. Only the direction is changed due to CL space geometry. This is a gravitational type of lensing. It is equivalent to passing a light through a lens.

In case (b) the electron involved in the photon emission has a slightly different first proper frequency in comparison to the electron involved in the photon detection. For this reason a red shift is detected.

10.15.3. Advance of perihelion of Mercury

Mercury is orbiting the Sun in elliptical orbit with eccentricity of 0.2056. The orbit rotates very slowly in respect to the solar system. Estimated by the direction of the perihelion, the latter changes about 43 arcseconds per century. The phenomenon is known as "advance of the perihelion of Mercury".

The explanation of this phenomenon by BSM is quite straightforward. The Mercury local space is periodically plunging in stronger gradient local field of the Sun. This causes changes of the relative velocity between the two objects and constantly the folded node velocity. If applying the concept of LOcal CL spaces we will see that the area of the separation surface around Mercury will pulsate for every orbital cycle. This will involve a pulsation of the reactive CL space energy E^R around one average value. Physically the pulsating component is caused from the Mercury immersion in the solar space with different gradient of the CL space shrinkage (space curvature) between its aphelion and perihelion. The change of E^R appears as an active energy (see §10.6.5 and Eq. (10.59) and (10.60)). This energy causes the slight advance of the perihelion of the Mercury.

The physical explanation if this effect is demonstrated also by the sketch shown in Fig. 10.19. The solar gravitational field is shown by equipotential surfaces. The orbital rotation is highly exaggerated.

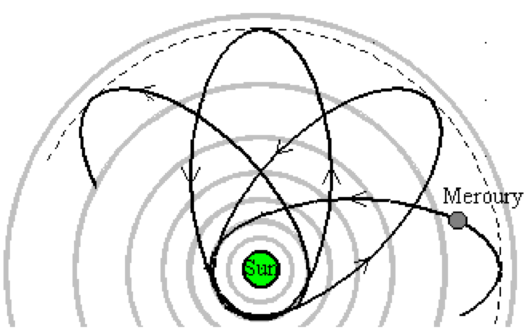

Fig. 10.19
"Advance of perihelion" of Mercury
in the Sun gravitational field

10.16 Special relativistic phenomena

10.16.1. Mass increase at relativistic velocity

The mass increase has been discussed in §10.3.4.

10.16.2. Relation between the concept of inertial frame (according to the Special Relativity) and the concept of local CL space (according to BSM).

The folding/unfolding process and folded node interactions with the local space has been discussed in §10.11. Some of the conclusions, relevant to discussed here issue are given again below:

- The deviated folded nodes have resonance type of interactions with the bumps of the CL nodes quasispheres of the normal CL space.

- The sporadically occurred phase difference between the moving folded nodes is corrected at every node along the path, so the folded nodes obtain commonly synchronized motion

- The commonly synchronized motion keeps a constant uniformity of the folded nodes flow, providing in such way a constant spatial characteristics of the partial pressure for a motion with a constant velocity. The spatial characteristics allows the initial direction of the folded nodes to be restored after they have been deviated from the FOHS's volumes of the elementary particle.

- The macrobody exhibits uniform inertial interactions as acceleration/deceleration, from every points of its structure, because the spatial characteristics of its FOHS's CL node space participate in both: the Newtonian mass and Newtonian inertia (both valid for the atomic type of matter organization).

We must emphasize one major difference between the concept of inertial frame, formulated by the Special Relativity and the concept of body local CL space, formulated by the BSM.

(a) The concept of the inertial frame in SR does not have a point of absolute reference, while in the BSM concept such point exist : the centre of the home galaxy.

(b) The concept of inertial frame does not take into account the mass of the object and the gravitational potential in which it is immersed. These attributes are taken into account in General relativity, but the relation between SR and GR is not quite apparent.

The BSM concept does not have the above disadvantages. It is able to provide explanations of all relativistic phenomena without contradictions.

10.17. Coriolis force

The oscillation plane for a pendulum located in Earth and moving for a long time precesses about the vertical. This effect was first demonstrated in 1851 by the french physicist Jean Foucault. The forces that cause this rotation are called Coriolis forces. The Coriolis forces are valid also for the satellites motion around the Earth. They are caused by the Earth rotation about the polar axis. The physical effect causing this forces, however, has been not explained so far. According to Einstein theory the Earth should be considered an inertial frame. Then why the Coriolis forces appears for a simple pendulum on the Earth and for the satellites, that are quite distant from the Earth surface?

BSM interpretation of the Coriolis forces is quite logical. These forces are caused by the modulation of the CL space by the Earth gravitational field. In this particular modulation the sideral rotation of the Earth influences slightly the CL space in which the Earth and all material objects are immersed.

