Supernova SN1987A:
Direct measurement of the speed of light?

Nikitin Aleksandr
Ltd. "Kamgrazhdanproekt" 423814, Russia, Republic of Tatarstan, Naberezhnye Chelny,
Moskovsky Prospekt, d.98, kv.173,
tel. 8-919-620-53-81,
E-mail: anikitinaaa@mail.ru

Abstract
Frenson James (James Franson) from the University of Maryland in the journal New Journal of Physics published a paper [1], in which, referring to the observations of supernova SN1987A, believes that the photons can be slowed down due to the effect of vacuum polarization.
Respecting James Franson challenging assumptions about slowing the speed of light, allow to draw attention to the following explanation of the problem, which follows from the theory developed by us energy.
We believe that in 7h 35m (23.316 UT) at check-in first and then the neutrino burst optical observation Supernova 1987A in 10h 24m [23.433UT], there was a direct measurement of the actual speed of light.
In the paradigm of energy theory [10, 11, 12, 13, 14], where all changes and interaction in space defined by the change in the energy characteristics of the cosmos, in the article the following variant: neutrinos and photons "flew" from the exploding star at the same time at the same rate, but arrived on Earth at different times of the neutrino in the early 11160s photons due to changes in the gravitational potential energy and the cosmos in time.
Also, the result of the OPERA experiment in the difference of 60 ns between the time of arrival of neutrinos and photons, we have to admit quite possible.
Possible cosmological observation and the next experiment: after a registered neutrino burst in about the time $[(4\pi/3-1)\ H_0]^{1/2}\ T/C^2$ seconds (+ Accounting energy and gravitational potentials of galaxies) must occur optical photons supernova explosion that will serve as a confirmation of the theory of energy.

Keywords: Supernova 1987A, light, neutrino, photon, energy-gravity potential.

1.Introduction

February 23, 1987 in the local group of galaxies in the Large Magellanic Cloud at a distance of ~ 50 kpc (163,0 x10^3sv. = 5.1439 years x10^{12} s) on the site of a blue supergiant Sanduleak-1 B31 broke amazing supernova SN1987A.
Chronology:
In 2h 52m 36,79s (10357s from 0h 00m 00s) (23.124UT [2, s.726]) "... 23,124 February World time signal was detected in the Mont Blanc Neutrino Observatory. Signal consisted of 5 pulses above an energy threshold for the amount of 7MeV 7s. This is consistent with respect to energy, and duration with the predictions of the standard model with respect to the collapse of the iron core at a distance 50kpk. Probability of a random match with flash SN1987A is unity for 104 years "(telex K.Kastanoli of Turin) [2, s.726]
The Rome group at the detector of gravitational waves on 1,4s before the Mont Blanc group was detected gravitational signal-motion 2300-pound bar. [2 s.727]
In 7h 35m (23.316 UT [2, s.726]) (via 16943s after neutrino bursts under a mountain of Mont Blanc and for ~ 3h = 10800s? Before the first detection on the plate?) Neutrino observatory Kamiokande II, IMB and Baksan outbreaks of neutrinos lasting about 13 seconds. "The gap energy was on the threshold of 7.5 to 36 MeV" [2, s.727]
This was the first detection of neutrinos from a supernova. According to modern concepts, the

neutrino energy is about 99% of the total energy released during the flare. Estimated in a supernova explosion SN1987A allocated about 10^{58} neutrinos with a total energy of 10^{46} J.
In 9h 22m? [23.390UT] (through the 6420s after the neutrino burst in the Kamiokande II, IMB and Baksan) - "Even before (Feb. 23.390UT) A. Jones did not notice any object using its search telescope" [3, s.563] - "upper bound gloss Observer A. Jones (A. Jones) in 9h 22m and the discovery of radio emission from SN1987A» [3, s.564]?
At 10h 24m [23.433UT] (via 2h 47m = 10020s after the neutrino burst in the Kamiokande II, IMB and Baksan) Supernova 1987A reaches magnitude V = 6,0, and
At 10h 41m [23.445UT] (via 11160s after the neutrino burst in the Kamiokande II, IMB and Baksan) Supernova 1987A reaches magnitude V = 6,2- J.. Dzherrad and AD Mac Music discovered Supernova 1987A in the resulting image. [2 s.726]
Neutrino energy, registered from Supernova 1987A, were as follows: 5,8-7,8MeV in LSD, 20-40Mev in IMB, 7,5-35,4Mev in KAMIOKANDE II and the mass of electron neutrinos measured from Supernova 1987A, made from mve <6eV to mve <30eV. According to the modern theory of more energetic neutrinos reaching Earth will turn the low-energy.

2 Direct measurement of the speed of light

James Franson (James Frenson) from the University of Maryland in the journal New Journal of Physics published a paper [1], in which, referring to the observations of supernova SN1987A, believes that the photons can be slowed down due to the effect of vacuum polarization.
Respecting James Franson challenging assumptions about slowing the speed of light, allow to draw attention to the following explanation of the problem, which follows from the theory developed by us energy. [10, 11, 12, 13, 14]
Firstly, we believe that in 2h 52m 36,79s (10357s) (23.124UT) occurred registration of gravitational waves Roman group and detection of neutrino signals on Mont Blanc Mont Blanc neutrino observatory from the gravitational collapse of a star Sanduleak-1.
Secondly, we believe that in 7h 35m (23.316 UT) at check-in first and then the neutrino burst optical observation Supernova 1987A in 10h 24m [23.433UT], there was a direct measurement of the actual speed of light.
Below we explain our findings.
In our world there is essentially nonlocal several comprehensive cosmic energy processes, one of which - massoobrazovanie - formation of baryonic matter, one result of which is a cosmic scale is the change of the gravitational potential energy and the universe in a time equal to the currently $\varphi_t = C_t^2$. [14] Accordingly, together with the energy and gravitational potential changes and the speed of light, which is equal to $V = (\varphi_t)^{1/2} = C_t \neq const$.
We assume that the first neutrino and gravitational bursts in 2h 52m 36,79s (10357s) (23.124UT) - this is the beginning of the process of the gravitational collapse of a star Sanduleak-1, when there was a catastrophic contraction of the iron core of the star with the collapse of the shell, "the star exploded inside" so that even neutrinos could not leave the star. After some time, namely, through 4h 43m, when GA Gamow (George Gamow) baryonic matter the star as a result of the enormous compression has become a "dark energy" neutrino radiation, which tell the shell and "provoked" photon radiation, and the star flared up as a supernova, increasing many times its glow. It must be assumed that as a result of this explosion neutrino and photon radiation at the same time detached from the surface of the star and thrown into space up to 99% of the stellar matter.
"Unlike protons and photons, neutrinos can pass cosmological distances in the universe with little or no absorption" [5, s.936]
"Since neutrinos are stable and even at energies $E_v >> E_{GZK} \sim 7 \times 10^{19}$ Ev can pass cosmological distances with little or no absorption ..." [5, s.959]
In the paradigm of energy theory [10, 11, 12, 13, 14], where all changes and interaction in space defined by the change in the energy characteristics of the cosmos, namely, - energy and

gravitational potential, consider the following option: neutrinos and photons "flew" from the star at the same time with the same speed, but arrived at different times: neutrinos on 11160s before photons. We assume that the difference in the gravitational potential energy and the Cosmos 163,0h10^3 years ago in a galaxy the Large Magellanic Cloud (Large Magellanic Cloud) (LMC) was $\Delta\varphi T$, and in our time on earth is she $\Delta\varphi s = C^2$. We take into account energy and gravitational potential of our Milky Way galaxy (Milky Way galaxy) and LMC galaxy (LMC), and the potentials of the galaxy Small Magellanic Cloud (SMC) (IMO), the Sun, the Moon, the Earth will not be taken into account as a minor second and third orders.

Space factor of change in 1 second of the energy potential of the baryonic matter in the universe:

$\gamma b=\Delta\varphi/\varphi=H_0=2{,}3655\ 10^{-18}$, where

$\Delta\varphi$- change of power while within 1s,

$\varphi=C^2$, H_0 is a constant Hubble.

Space factor of change in 1 second energy potential "dark matter" in the universe:

$\gamma_d=\Delta\varphi_d/\varphi_d=4\pi/3H_0 = 9{,}908583$ h10^{-18} where

$\Delta\varphi_d$- change the energetic "dark matter" to within 1s,

$\varphi_d=4\pi/3C^2=4{,}18879\ C^2$- energy potential "dark matter",

$\Delta t_f=T(H_0)^{1/2} =5.1439$ s h10^{12} h1,5380 h10^{-9} = 7.9114 h10^3s = 7911s.

$\Delta t_n=T(4\pi/3\ H_0)^{1/2}$ = 5.1439 s h10^{12} h3,1478 h10^{-9} = 16.1919 h10^3s = 16192s.

Energy and gravitational potential on the orbit of the Sun in our Galaxy is $V_C^2=(2{,}2\ x10^5)^2=4{,}84\ x10^{10}\ m^2/s^2 =\Delta\varphi_G$.

The gravitational potential of the baryonic matter in the center of the galaxy LMC is (the effect of galaxy SMC will not be taken into account) $\Delta\varphi_{LMC}=GM/R=6{,}67384\ x10^{-11}x2\ 10^{40}/4{,}63\ x10^{19}=2{,}883\ x10^{10}\ m^2/s^2$.

The probability that the Supernova 1987A exploded in the center of LMC galaxy is small; therefore take ~ 50% ~ 1/2:

$\Delta\varphi_{LMC}=2{,}883\ x10^{10}\ m^2/s^2.x0{,}5=1{,}4415\ x10^{10}=1{,}4415\ m^2/s^2$

$\Delta\varphi_G$- $\Delta\varphi_{LMC}=4{,}84\ x10^{10}-1{,}4415\ x10^{10}=3{,}3985\ x10^{10}=3.3985\ m^2/s^2$

Hubble factor for the gravitational potential is

$\gamma_{bG} = 3{,}3985\ x10^{10}/8{,}9876\ x10^{16}\ x5{,}1439\ x10^{12}=0{,}0736\ x10^{-18}$

$(\gamma_{bG})^{1/2} = 0.2713\ x10^{-9}$

$(\gamma_{dG})^{1/2}=0{,}2713\ x10^{-9}\ x2{,}0466=0{,}5553\ x10^{-9}$

$\Delta t_{fG}=T(\gamma_{bG})^{1/2}=5{,}1439\ x10^{12}\ x0{,}2713\ x10^{-9}$=1396s.

Δt_{nG} = 2856s

The calculated theoretical time difference between the arrival of neutrinos and photons for Supernova 1987A is

$\Delta t =(\Delta t_n +\Delta t_{nG}) - (\Delta_{tf} +\Delta t_{fG})$=(16192s + 2856s) - (7911s + 1396s) = 19048-9307s = 9741s = 2h 42m.

The difference between the observed neutrino bursts in 7h 35m (23.316 UT) and subsequent optical photon flash in 10h 24m [23.433UT] (when Supernova 1987A reaches magnitude V = 6,0) was 2h 47m (10020s).

We believe that such a "coincidence" speaks in favor of the stated our energy theory with a variable speed of light and neutrinos, and absolutely impossible to explain in terms of the modern paradigm of physical science, built on two foundations of the theory of relativity and quantum mechanics with an absolute constant - the speed of light.

3 Supernova

After Supernova SN1987A is closest to the Earth Supernova SN2014J, broke out January 21-22, 2014 in the M82 galaxy at a distance 11mln.sv. years. 11h10^6sv =. years = 3500kpk = 3,5Mpk. In this galaxy, there is intense star formation.

Supernova SN1993J - double star, one of which is a red supergiant, supernova erupted March 28, 1993 in the spiral galaxy M81 at a distance of 3.96 Mpc = 12.92 h10^6sv. years = 3961kpk = 3.961

Mpc.
Supernova SN2011fe in the galaxy Messier M101 (NGC5457) is open 23-24 August 2011 at a distance of 21 St. years = 6439kpk = 6,439Mpk. It is believed that she broke 12 hours before detection.
Supernova SN2011hz - November 7, 2011.
Supernova SN2012A - in January 2012 in the galaxy NGC3239 at a distance of 25 million. Communication. years = 25 x 10^6 communication. years = 7,665 h10^6pk = 7665 kpc = 7,67Mpk.
Supernova SN2012z-in January 2012 at a distance of 110 light years 110h106 mln.sv.let = 33730 = kpk = 33.73 Mpc.
Supernova SN2012aw- March 16, 2012 at a distance of 38 million. Communication. years = 38 x 10^6 communication. years = 11650kpk = 11.65 Mpc.
In August 2011 and January 3, 2012 (?) IceCube detector recorded two particles with high energy 1,0-1,14 PeV - "Bert" and "Ernie."
By analogy with our calculations for the Supernova 1987A, which broke out at a distance 50kpk and the difference between the arrival on Earth of neutrinos and photons was ~ 3h, for Supernova SN2011fe in the galaxy Messier M101 (NGC5457), broke out August 23, 2011 at a distance of 6439kpk, neutrinos should arrive by ~ 15 days earlier that apparently and recorded on the IceCube as "Bert" in early August 2011. Recorded January 3, 2012 neutrino particle "Ernie" was a herald photon flash Supernova SN2012aw, observed from March 16, 2012 at a distance of 11650kpk in the M95 galaxy.
13-14 January 2014 at the IceCube should be fixed neutrino burst from Supernova SN2014J of the M82 galaxy.

4 Ekcperimenty OPERA

In connection with the above, believe that we must also pay close attention to the collaboration experiments OPERA (Oscillation Project with Emulsion-Racking Apparatus), which is September 22, 2011 has announced the registration of the possibility of exceeding the speed of light muon neutrinos to 0.00248%. Measurements took place between accelerator SPS (CERN, Switzerland) and the detector in an underground laboratory Gran Sasso (LNGS) (Italy) at a distance of L = 730,53461 km = 7.3053461 h10^5m [9] (other sources 731.278 km), which showed that neutrinos arrive at the detector at 60,7 ns [9] before the calculated time, with clock synchronization in two laboratories to within a few nanoseconds. Unfortunately, in May 2012, OPERA ceased these experiments, recognizing the ridiculous technical error: bad inserted connector optical cable, because of what supposedly was broken clock synchronization. In the experiments, OPERA reference light signal from measurements went 1048,5 ns, and neutrinos arriving for 988 ns, ie 60,7ns faster. [9] The accuracy was evaluated by the authors in 10ns.
Time of flight of photons to the detector adopted by the authors of the experiment t = 2,43928 ms = 2,43928 × 10^6 ns (t=L/C =7.31278 h10^8 m/2.99792458 x10^8m/s). The speed of neutrinos is defined by the authors of the experiment equal to V_n=2,99800 x10^8 m/s
The neutrino energy was 10-40 GeV. The average energy detected in the Gran Sasso neutrino was 17 GeV, which is ~ in 1x10^3–2x10^3 times more energy neutrinos recorded from Supernova 1987A (5,8-7,8MeV in LSD, 20-40 Mev in IMB, 7,5-35,4 Mev in KAMIOKANDE II).
"The deep question - a question which is interesting as a negative and positive" (Niels Bohr)
"The standard theory of supernova predicts that similar supernova SN1987A, carries 3x10^{53} erg (99% of its associated gravitational energy) in a flash of neutrinos in a few seconds after the explosion," [7, p. 1358]
We believe that there are good reasons to consider and "unorthodox" version of explanations before the detection of neutrinos from supernova light Supernova 1987A and experiment OPERA, namely delay photons from neutrinos, ie the change in the speed of light, depending on the changes in the difference between energy and gravitational potential of the cosmos. Necessary to assume that the

rate of neutrinos with energies of 10-40 MeV energy-difference of the gravitational potentials of the baryonic matter affects only slightly, at least for a few orders of magnitude smaller than the photons. We can assume that the "movement" of neutrinos provide energy characteristics "dark matter" and "dark energy." Apparently, the explosion of a supernova - a transition of the baryon mass-energy neutrinos through a "dark energy" - a variant of "cycle" of energy in the cosmos.
This can be explained by slowing down time or decrease the speed of light as a result of global change in the energy characteristics of the Cosmos.
The reason for such large deviations in 60,5ns photons from neutrinos in the OPERA experiment may have been unaccounted for energy and gravitational influence of the Earth, Moon and Sun, which in our estimation is:
1.From the Sun energogravitatsionny potential at the Earth's orbit is
Разница во времени прилёта к детектору нейтронов и фотонов составит:

$\Delta\varphi_1$=GM/R= 6,67384 x10^{-11} 2x10^{30}/1,5 10^{11} =8,8984533333 x10^8 m^2/s^2
$\Delta\varphi_2$=GM/R=6,67384 x10^{-11} 2x10^{30}/1,5000073 10^{11} =8,8984100277 x10^8 m^2/s^2
difference $\Delta\varphi$ at a distance of 7.3 x10^5 m is $\Delta\varphi$=(8,89845333333-8,8984100277)x$10^8$$m^2/s^2$=0,0000433x$10^8$$m^2/s^2$=4330 m^2/s^2 Assume for estimating 25% of the measured value, because it is a 100% maximum case when the ray path of the photons and neutrinos will be located exactly in the direction of the sun with no other influence: $\Delta\varphi$ =1083 m^2/s^2
$\Delta\varphi$/t=2,43928 x10^6 ns = 1083 м^2/c^2/2,43928 x10^{-3}s =0,444 x10^6
Change in gravitational potential energy and for the time while flying photons is:
γ_{bG}=0,444 x10^6/8,9876 x10^{16}x2,43928 x10^{-3}s=20,25 x10^{-10} that many orders of magnitude more Hubble factor, equal to 2.3655 x10^{-18} s^{-1}
Changing the energy potential of the time while flying neutrinos will be:
γ_{bG}=20,25 x10^{-10}x4,188=84,8 x10^{-10}
Hence, in this case, the latter will change the energy-gravitational potentials baryonic and "dark matter" in the distance between the accelerator SPS (CERN, Switzerland) and the detector in an underground laboratory Gran Sasso (LNGS) (Italy) at a distance of L = 730,53461 km = 7.3053461 x10^5 m during 2.43928 x10^{-3} s.
The difference in time of arrival to a detector of neutrons and photons is:
Δt=2,43928 x10^{-3}s[(20,25 x10^{-10})$^{1/2}$x2,0466 -[(20,25 x10^{-10})$^{1/2}$]=2,43928 x10^{-3}s[(4,5 x10^{-5} x2,0466 -4,5 x10^{-5}]=2,43928 x10^{-3}s x4,7 x10^{-5}=11,5 x10^{-8}s=115 x10^{-9}s**=115 ns**
Our estimate of the time difference of arrival of neutrinos and photons is approximate and is made without regard to us in calculations of influence of the Moon, the Earth, the Earth's rotation, the tilt of Earth's axis relative to the ecliptic, the Hubble factor, the approach and removing the beam of neutrinos and photons from the center of the Earth, etc. In practical terms multifactorial OPERA experiment value of the difference of energy-gravitational potential between the SPS accelerator and detector in the Gran Sasso fluctuate over a considerable range.

5 Conclusions

We understand that the findings do it is too early, but nevertheless:
The calculated theoretical time difference between the arrival of neutrinos and photons for Supernova 1987A, which amounted to 2h 42m, which practically coincides with the experimentally observed difference between the neutrino bursts in 7h 35m (23.316 UT) and subsequent optical photon flash in 10h 24m [23.433UT] (when Supernova 1987A reaches magnitude V = 6,0), which amounted to 2h 47m (10020s). Our theoretical model is not contradicted by the facts.
We believe that such a "coincidence" speaks in favor of the stated our energy theory with a variable speed of light and neutrinos, and absolutely impossible to explain in terms of the modern paradigm of physical science, built on two foundations of the theory of relativity and quantum mechanics with an absolute constant - the speed of light.

13-14 January 2014 at the IceCube should be fixed neutrino burst from Supernova SN2014J of the M82 galaxy.

The result of the OPERA experiment at 60 ns we have to admit quite possible.
For a more precise definition we propose to consider the experiment with detectors in the IceCube, and photons will probably have to start up via satellite. Maybe there is an opportunity to experiment a similar experiment between the Earth and the Moon.
Possible cosmological observation and the next experiment: after a registered neutrino burst in about the time $[(4\pi/3-1)H_0]^{1/2}T/C^2$ seconds (+ Accounting energy-gravitational potentials of galaxies) must occur optical photons supernova explosion that will serve and confirming energy theory. [10, 11, 12, 13,14]

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