

The Universe: Search for Neutrino on Earth

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ABSTRACT: *Our planet is bombarded with trillions of particles, from Space from all direction called "Cosmic Rays". The cosmic rays are made of tiny "elementary" particles such as photon, He, Neutrinos, Hydrogen and atomic nuclei have wide range of energies. Cosmic rays high energies suggest that they must be produced in the most energetic processes in the universe. As the cosmic rays particles have net electric charges they get deflected due to presence of geomagnetic fields during their travel and therefore do not travel in straight line. Cosmic rays particles can interact with matter and radiates at the sources to produced extremely particles called neutrino. Gamma rays radio Bursts of Electromagnetic energy in the form of gamma rays are the absolute, most energetic sources of energy known in the universe. The amount of energy that gamma ray bursts puts out in a few seconds is more than the Sun. every will in its entire life time. The neutrino, a fundamental elementary particles of nature, was born out of necessity to keep the conversation of energy principle. In observed alpha,beta,and gamma decay. Although neutrinos are mot massless like photon of light, they have very special property. Neutrino are omnipresent in nature pass through every square centimeter of bodies without ever notice. Neutrino originate from events in the Universe such as Colloding of Black Holes,Gamma Ray Bursts from exploding stars and or violent event at core of distant Glaxies. A high energy of particles neutrino transform in to it's particles lepton(electron,muon,ortauon).most accelerated Neutrino beam can also called muons , and few can create tauons. A detector which distinguished among these leptons can reveal the flavor of neutrino incident to charged particle current interaction because interaction involves the exchange of Boson the 'target' particle also change (e.g. neutron-proton).Netrinos detectors is a physics apparatus which is degined to study neutrinos, because neutrinos only weakly interact with other particles of matter, neutrino detector must very large to detect significant number of neutrinos. Confirmed extraterrestrial sources such as Sun,Super Nova1987A,*

KEYWORDS: universe, search, neutrino, earth

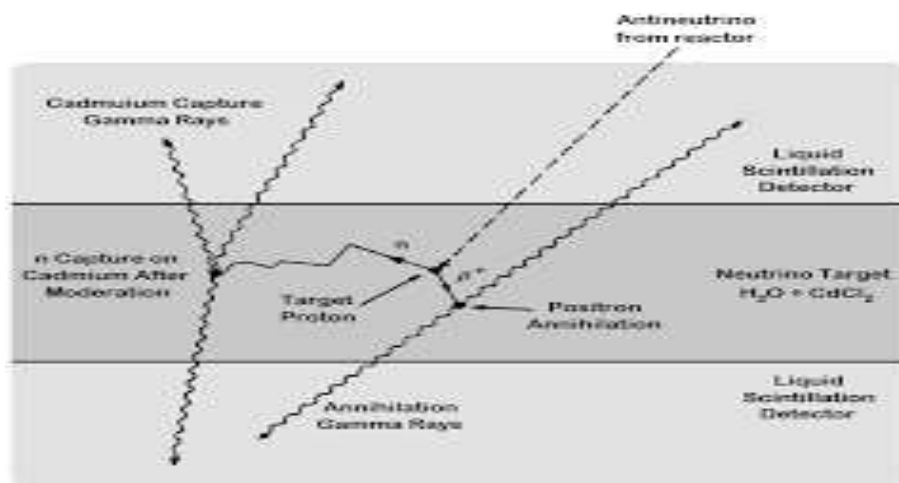
INTRODUCTION

Cosmic rays (CR) are High energy charged particles:

Cosmic rays (CR) are High energy charged particles that arrive at earth from all direction from space Gamma rays Bursts (GRBs) where main source of Cosmic Ray produced where High energy Neutrinos are charged less particles that can also be produced during the same process .CRs.Since Neutrinos travel in straight back to know if GRBs produce Neutrinos and there for Cosmic Rays.Cosmic rays and Neutrinos as our planet is bombarded from space from all direction called “Cosmic Rays.The cosmic rays are made up of tiny elementary particles such as photons, He, Neutrinos, Hydrozen and atomic Nuclei. Have wide energy.Cosmic ray particles can interact with Matter and radiated at source to produced extremely tiny particles called neutrino such as photons,Muons,neutrinos,CR Galactic particles, atom Nuclei, positrons.The cosmic rays particles have net electric Charges they get deflected due to the presence of magnetic fields during their travel and therefore do not travel in straight line.

Cosmic rays’s

Where exactly Cosmic rays’s come from cosmic rays High energies suggest that they must be produced in the most energetic processes in the Universe.usual aspect of Cosmic ray’sare where they come from SUN TeV,AGNs-Tev,GRBs-Pev, TDEs-PeV super Nova-TeV energy.Neutrinos have neutral Character and are almost massless they also interact very rarely with matter and radiation due to this, their travel is not affected by magnetic Field, and they do not get absorbed by gases or dust in the paths. As a result of their unique properties of Neutrinos can travel Vast Cosmic Distances in straight Paths; Pointing back to where they produced. Neutrinos can therefore the ideal Messenger Particles allowing us find sites of Cosmic ray production in the Universe.



Behavior of Neutrino

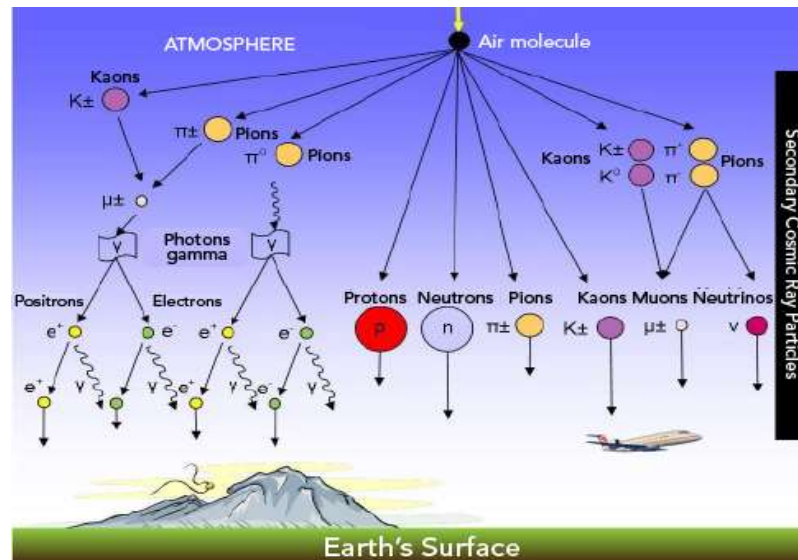


Figure 1(a)Cosmic Ray shower in earth atmosphere

Gamma Rays Bursts

Gamma rays Bursts (GRBs) can be produced by high-energy cosmic rays. GRBs are short bursts of high-energy radiation of cosmic rays in a beam-like manner; they typically last for a few seconds in duration and can outshine the entire galaxy in that period. There are two classes of GRBs: Long GRBs, with burst durations greater than 2 seconds, and short GRBs, with burst durations similar to 2 seconds. Each class of GRBs is understood to be created by different processes.

Figure Long GRBs and Short GRBs similar Process

A strong evidence for cosmic ray production at GRBs will be produced if we observe neutrinos from GRBs. We can detect neutrinos coming from such a direction of GRBs and at the same time as the gamma rays from GRBs were observed.



Figure 1(b) shows Origin of Neutrino through Solar Radio Bursts or Galactic Cosmic Ray

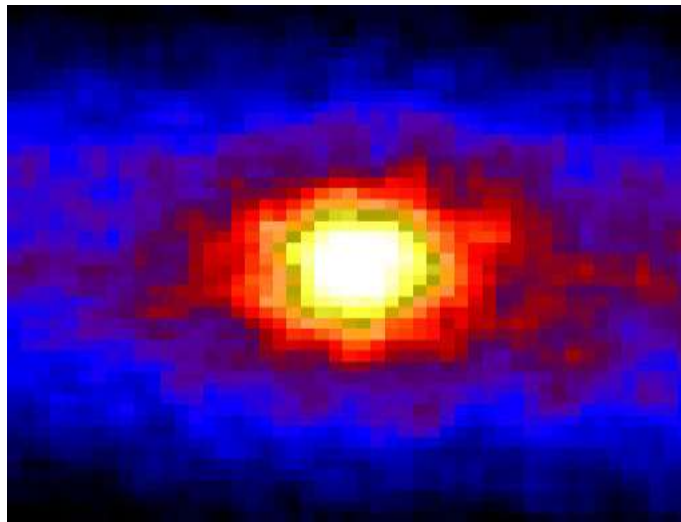


Figure1(c) Solar Radio bursts

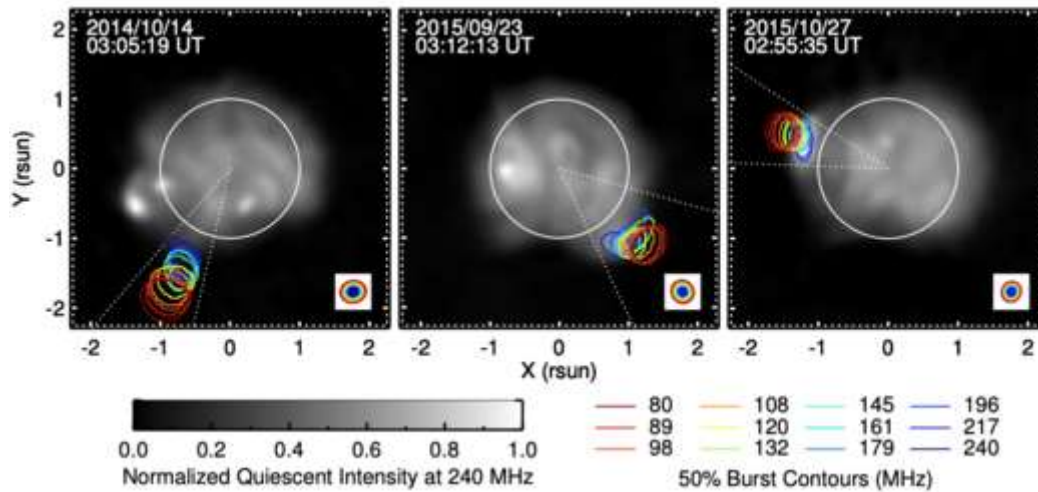


Figure1(d) Searching Galaxy through Radiowave

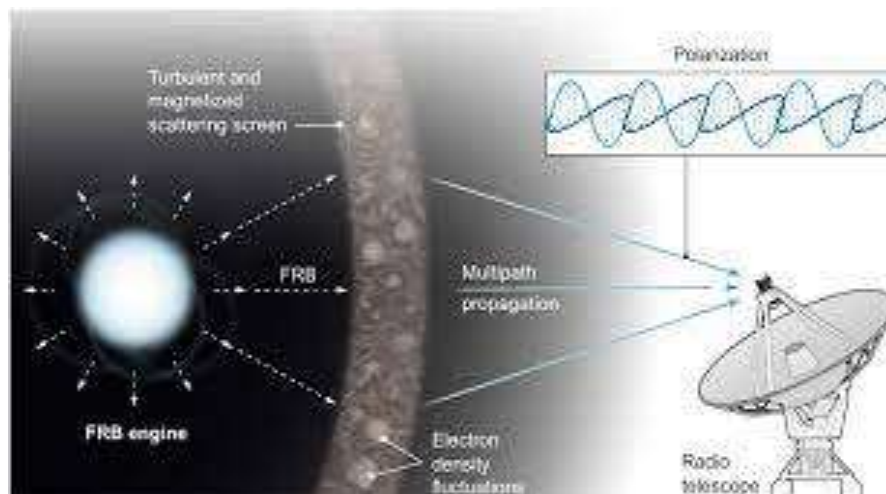


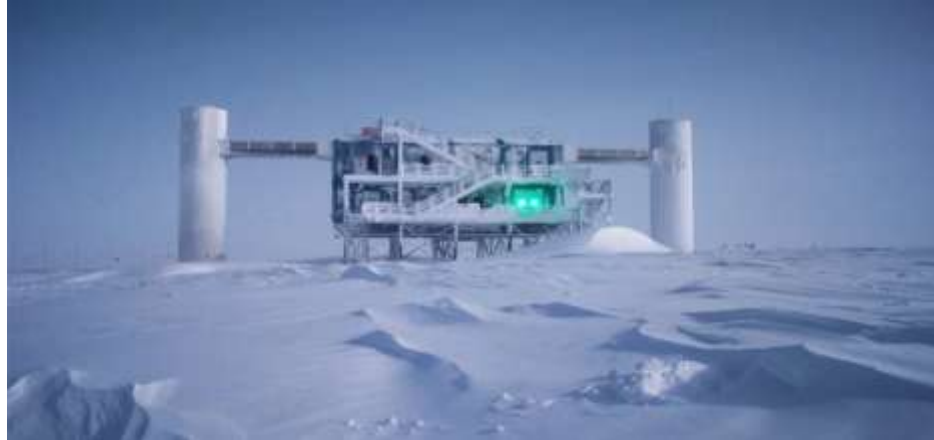
Figure1(e) Ground Based Radio Observatory search Galaxy

“Neutrino”: it’s Future Challenge and Application

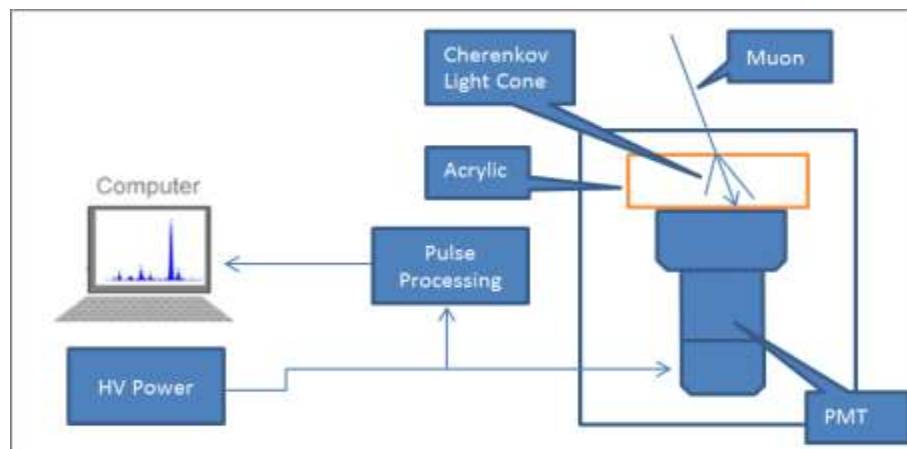
The Ice Cube Neutrinos Observatory

In this articles we correlation of Gamma radiation signals from GRBs and Neutrino observations. In investigated but if neutrinos are not affected by anything when travel through space How we can observe it. Under special circumstances; this processes eventually can result in light emission in special ‘conical’ pattern called “Cerenkov emission “. Detector can have observed effectively

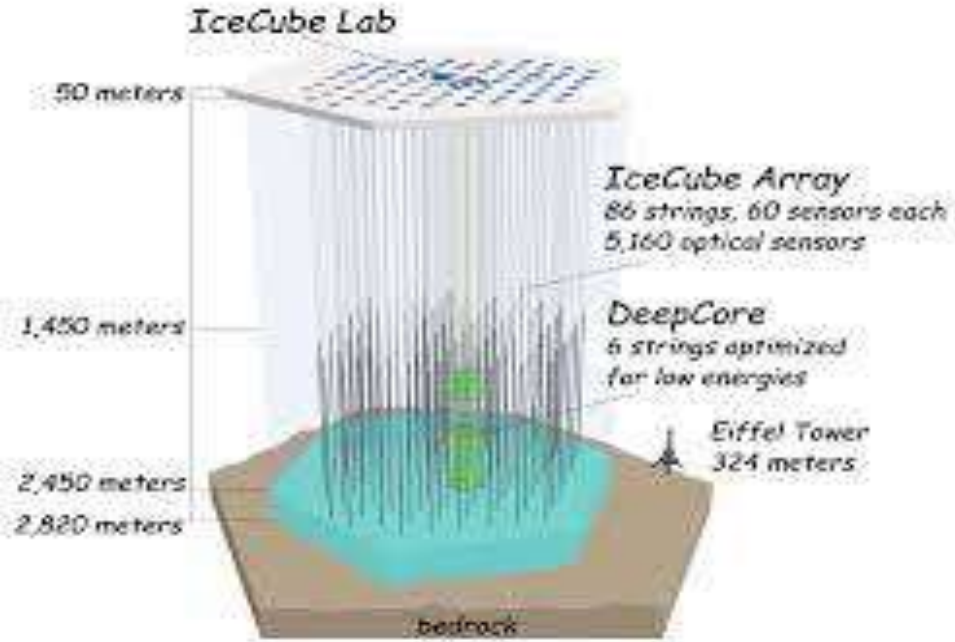
Cherenkov Light emission and them infer the properties, if present Neutrinos responsible for it. Detector making use of Chrenkov emission to detect Neutrinos at Heighest energies



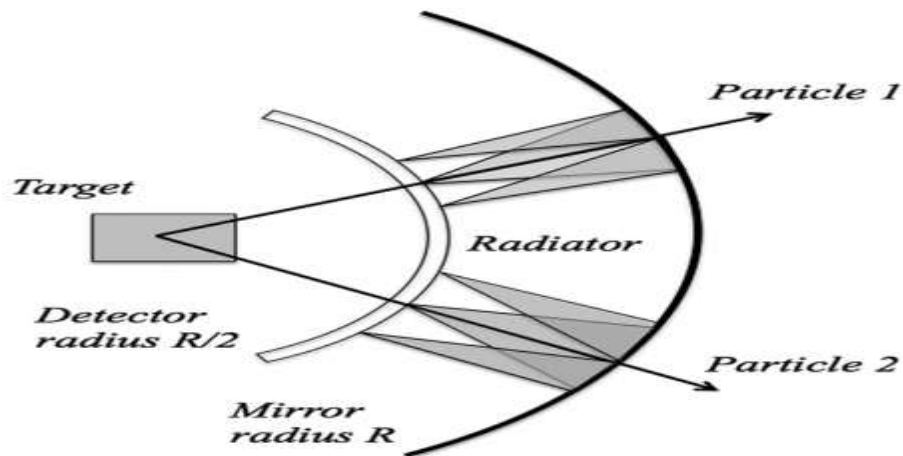
From 1(f) Shown In figureThe Ice Cube Neutrinos Observatory



.Figure1(g) of detector working and detect Neutrino through Computer simulation



Detector at geomagnetic south poles in Antractica; the Ice Cube detector make up sensors spreads over 1 k.m.³ of ice to detect the Cherenkov light resulting from neutrino interaction each light sensor unit in Ice cube is called a digital optical Modules(DOM) and there are about 5000 of the altogether in detector. The amount of light observed by each sensor and the timing of each observation is used to 'Constant' the pattern of the Cone, which tell us the energy and direction of the coming neutrino.



Working diagram of Neutrino detector(How Light Scattered in Ice)

Figure and working ICE Cube Detector.

Cosmic rays particles interact with particles of earth’s atmosphere to produce atmospheric neutrinos and other particles which can act as unwanted signal called “Noise” in The detector. These Noise ‘Background’ to detect our neutrino data using computer algorithms involving of mathematical calculation.

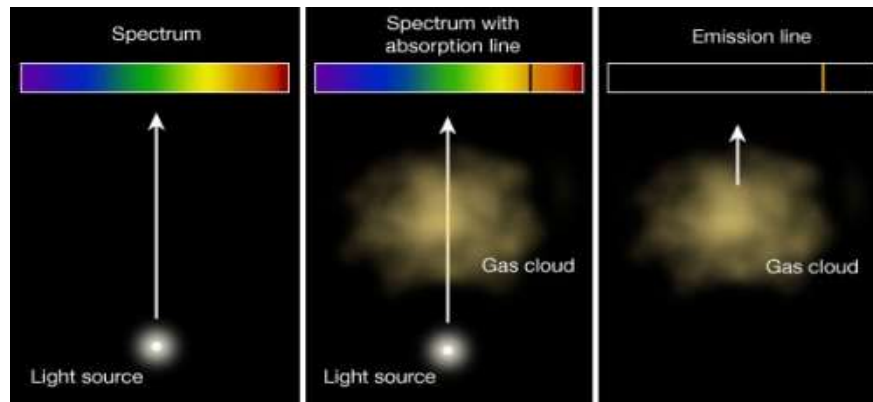


Figure 2(a) Searching ET through Spectrum analysis

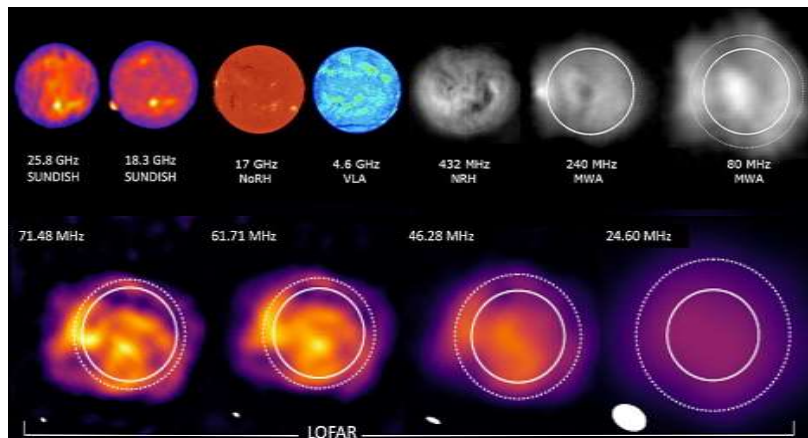


Figure 2(b) Searching Galaxy through LOFAR radiowave Observatory

How Neutrino Born?

Neutrino are born during the processes of Nuclear fusion in the Sun Core in fusion proton(then Ncleaus from the simplest element hydrozen) fuse together to form heaviour element, helium. This release neutrino and elementary particles will eventually reach earth as in form of Light and

Heat.

Solar Neutrino oscillation:

Ray Davis Homestake experiment 1960's observed a defect in the flux prediction of standard Solar model using chlorine –based detector this gave rise to the Solar neutrino problem. Many subsequent radio, chemical and water, Cherenkov detector's confirmed the defect, but neutrino oscillation was not conclusively identified as the source of defect until the Sudbury neutrino observatory provided clear evidence of neutrino flavor. Solar Neutrino energy below 20 MeV at energies but 5 MeV above. Solar Neutrino oscillation actually takes place in time Sun through known as MSW effect a different resonance process from the vacuum tube oscillation described. reference(Davis R, Harmer; Hoffman, Don (1968).

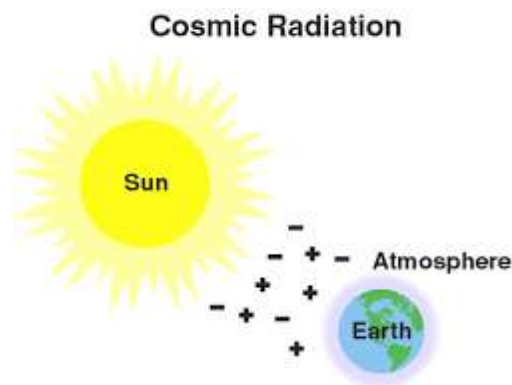


Figure 2(c) of Solar Neutrino

Solar Neutrino

A major breakthrough happened that when the second time in history a neutrino was tracked back to source from outside of Solar System. It came from an immense Galaxy four billion light years away with a supermassive black hole at its heart. The neutrino happened to be lined up on the perfect trajectory toward its detector planted within the Antarctic Ice sheet, at the IceCube Neutrino observatory near the south pole, only **20 to 30 Neutrino** are detected here each year. But actually tracing them back to their origins requires an additional lucky combination of events in both time and space. The detection last September yielded a wealth of information. An astronomical event's neutrino is accompanied by a sequential wave of X-rays and wave of extremely high-energy photons called Gamma rays, was emitted by the Black Hole.

The basic fact that neutrinos almost never interact with matter makes them difficult to study directly but if a neutrino passes through an ice crystal, at just the right angle, the charged interaction releases a subatomic particle called muons. Because ice slows down light that travels through it, the muon is emitted at a speed greater than the surrounding light within the ice sheet. This causes a blue light flash.

of light called Cherenkov radiation Cherenkov radiation detected by sensors.

A muon can travel many kilometers through ice; and Cherenkov radiation several hundred meters, until it reaches an Ice cube sensor.

Atmospheric Neutrino Atmospheric Neutrino Oscillation

Electromagnetic, weak and strong forces, a few experiments on proton decay followed in large detectors such as IBM, MACRO, Kamiokande have observed deficit in the ratio of flux of muon to electron flavour atmospheric neutrinos (muon decay). The Super Kamiokande experiment provided a very precise measurement of neutrino oscillation in energy range from hundreds of MeV to few TeV. Many experiments have researched by oscillation of electron anti-neutrino produced in nuclear reactor, no oscillation were found until a detector was installed at distance 1-2 km. such oscillation given value the parameter.

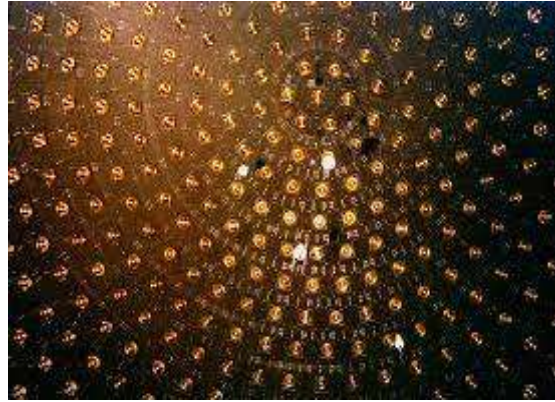
Beam Neutrino oscillation

Neutrino beam produced at particle accelerator offers the greatest control over neutrinos study. The study the same oscillation as in atmosphere neutrinos oscillating using neutrino with few GeV of energy and several hundred km. baselines the MINOS, K2K and Super-K experiment have all independently observed muon, neutrino disappearance over long baseline.

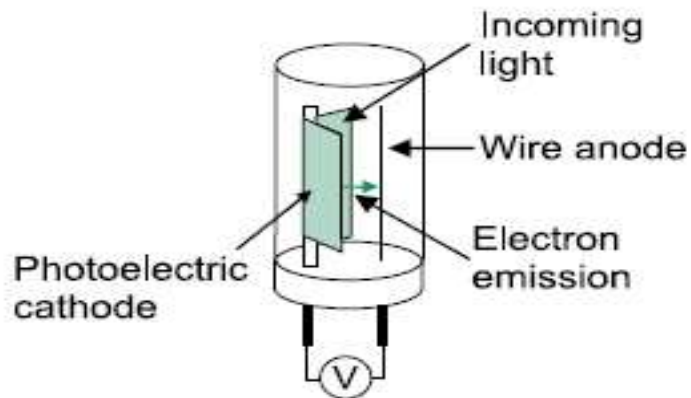
Neutrino oscillation a quantum mechanical phenomenon in which a neutrino created with specific lepton family number (lepton flavour) electron, muon or tau) the probability of measure of a particular flavor for neutrino varies between three known states as it propagates through space. Neutrinos have the potential to do amazing things like speed up communication detect nuclear weapons and even confirm the presence of elusive dark matter.



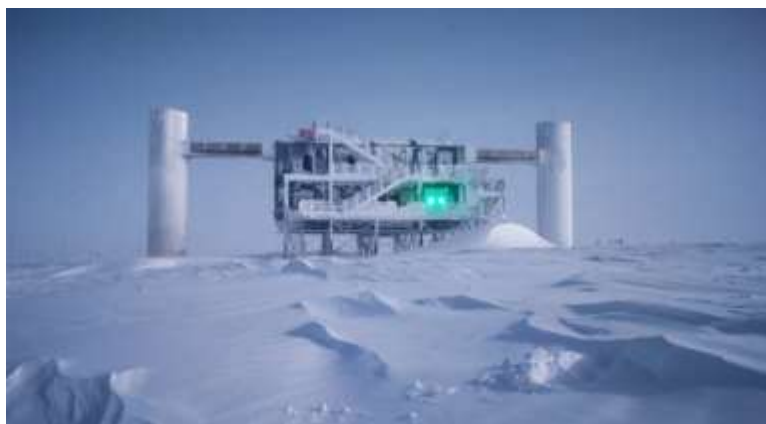
Neutrino detector



Kamiokande water detector use to detects Muon Particle



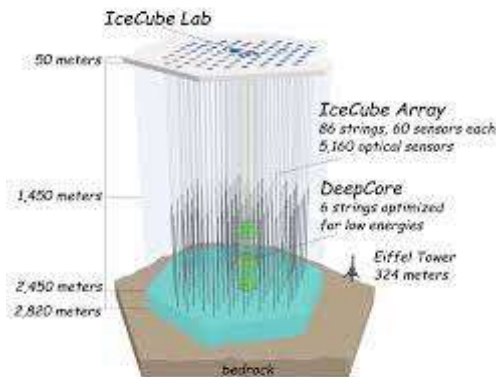
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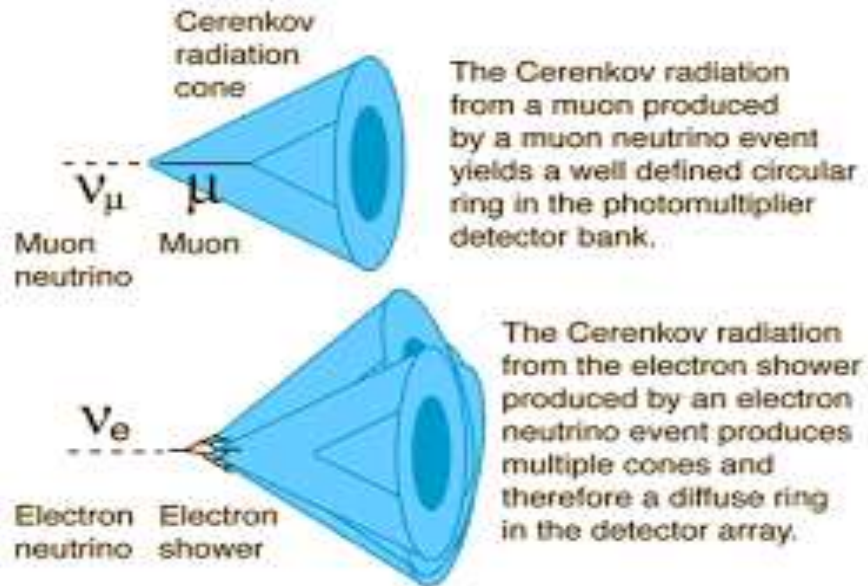
Ice Cube Lab To detect Neutrino through Cherenkov effect Image :Ice Cube /NSF

Ice Cube Sensor :

Ice cube system involves more than 5,0000 sensor that measure the angle of light that's emitted when a neutrino strikes the bend of Antratic Ice Sheet, creating a subatomic particles called muon. Scientist us angle to calculate the direction from which the neutrino came AMAND, The Antratic Muon and neutrino detector Array, served as a proof or concept for Ice cube was turned off in may 2009. Together, these immense bodies of water and ice on our World are the best for exploring how neutrinos from the far-flung comes that How Universe are made?. Probe the properties of neutrino get our understanding clear that these neutrino particles is really beginning to reach new research



Ice cube Working procedure image



“Neutrino”: From Historical perspective and its Future Challenge

The neutrino, a fundamental elementary particles of nature, was born out of necessity to keep the conservation of energy principle. In observed alpha, beta, and gamma decay. Although neutrinos are not massless like photon of light, they have very special property. Neutrinos are omnipresent in nature pass through every square centimeter of bodies without ever notice. Neutrinos originate from events in the Universe such as Colliding of Black Holes, Gamma Ray Bursts from exploding stars and or violent event at core of distant Galaxies. A high energy of particles neutrino transform into its particles lepton (electron, muon, or tauon). Most accelerated Neutrino beam can also called muons, and few can create tauons. A detector which distinguished among these leptons can reveal the flavor of neutrino incident to charged particle current interaction because interaction involves the exchange of Boson the ‘target’ particle also change (e.g. neutron-proton). Neutrinos detectors is a physics apparatus which is designed to study neutrinos, because neutrinos only weakly interact with other particles of matter, neutrino detector must very large to detect significant number of neutrinos. Confirmed extraterrestrial sources such as Sun, SuperNova 1987A,

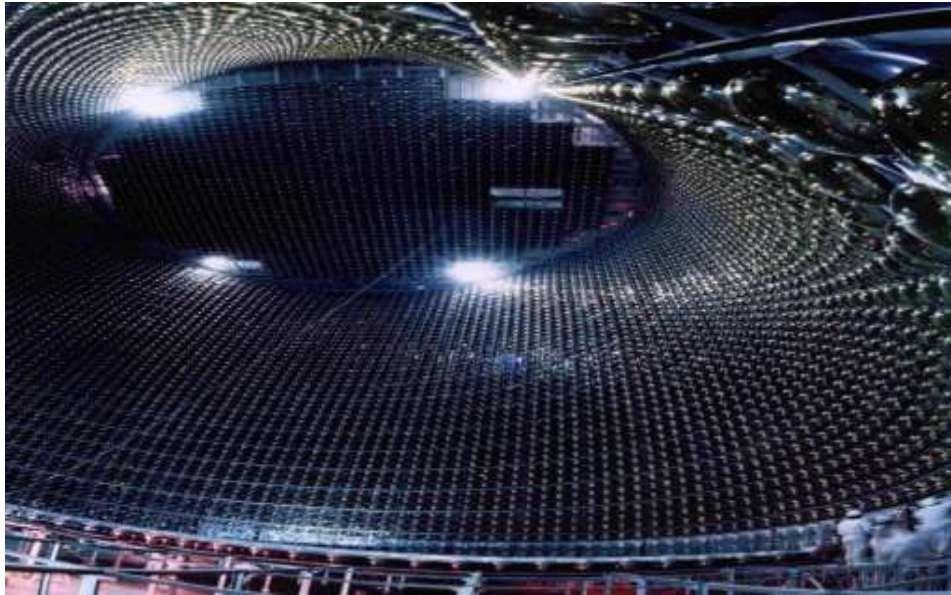


Figure 1(a) shows Super-Kamiokande Detector courtesy Kamioka Observatory, ICRR (Institute for Cosmic Rays Research), The University of Tokyo. It is a kind of Neutrino detector Super Kamiokande which detects muons in the water. Figure of the inside of the mini Kamiokande detector

A large volume of water. Water surrounded by phototubes that watch for Cherenkov radiation emitted in coming neutrino creates when an incoming neutrino creates an electron or muon in the water. The Sudbury Neutrino Observatory is similar; but uses heavy water as the detecting medium.

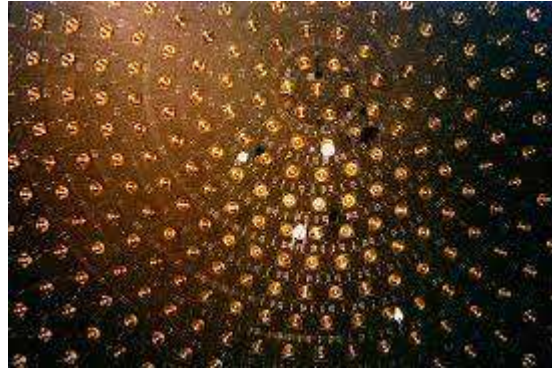


Figure neutrino detectors Kamiokande water detector use to detects Muon Particle

Application of Neutrino in Technology

Neutrino have potential to do amazing things Like speed up global communication, detect the presences of Nuclear weapon and even confirm presences of elusive Dark matter.

Application Neutrino technology

Invisible and almost mass less particles could be building block for some incredible new technology Neutrinos have potential to do amazing things like speed up global communication detect and presence of Nuclear Weapon. Neutrino are produced from agency to use Neutrino detectors to monitor which contires are following the treaty on non-proliferation of Nuclear weapon. It detect neutrinos emitted from the decay in nuclear reactor and have proposed using neutrino detectors to locate undocumented Nuclear reactor or reactor that scretely harvesting plutonium. 'X-ray' the earth to find cavities of mineral oil deposits. Fastest global communication it easy way to communicate with submarines submerges far below the sea surface. Detect Dark matter certain type of neutrino might come from decaying dark matter. The Ice Cube lab has built to detect Neutrino through detector in Antartica that has detect extremely beigin energy neutrinos. Communication with extraterrestrial Life. Beam of Neutrinos have Ability to detect alien life and receving end would be able to decode message. Neutrino-anti neutrino anihilation can also use us tactical weapon to target hide out that unreasonable by conventional means

Neutrino counter Nuclear Weapon

Radiation annihilation at zero pole can be used to heat up the primary stage of thermonuclear warhead and can in principle detonate the device remotely, Neutrino-anti-Neutrino annihilation can also be used as tactical assault weapon to targets hide out that unreachable by conventional means. At the height energies , neutrinos will be absorbed by earth and will never make it to Ice Cube image via Ice Cube Collaboration. In Human Bodies 100 trillion Neutrino pass through our bodies in every second. The problem of the physicit is that neutrinos are impossible to see and difficult to detect.

Solid –state Neutron detections application

Neutron detector application Neutron detector application include those for homeland security(e.g Border screening) fundamental research such as water content in soil .Solid state neutron monitor detectors provide an alternative to ^3He based, a high thermal –neutrons detection affecting ,at fraction of the Volume, Mass, Voltage and power requires from gas, liquid or crystal detectors, recommended AC coupling to electronic readout circuit

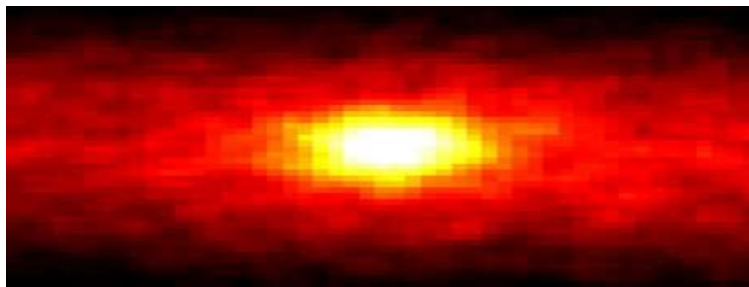
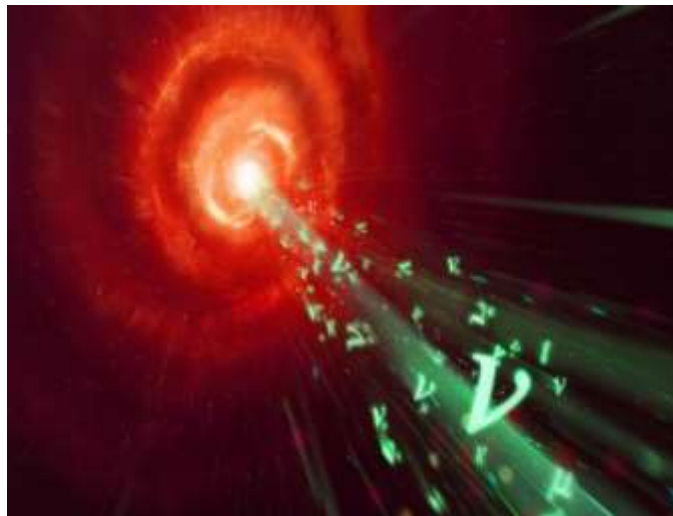
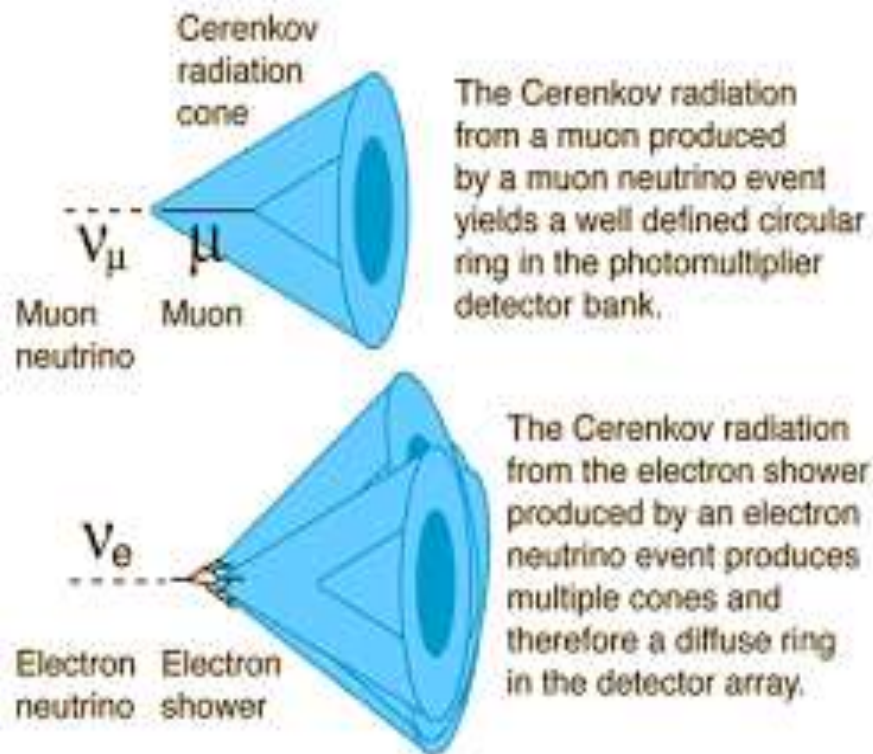
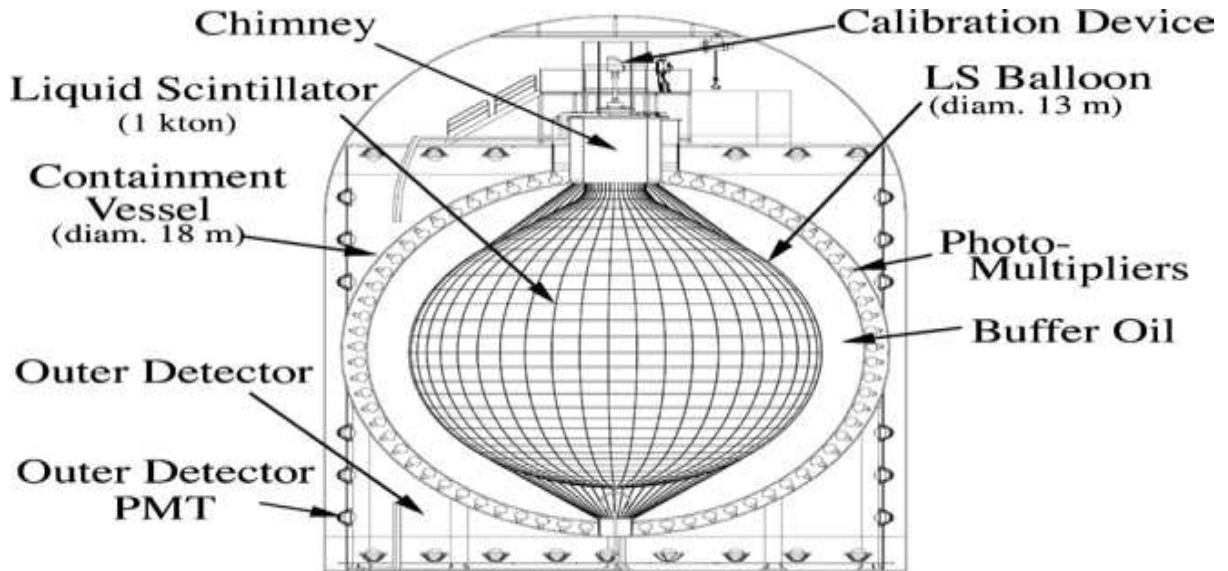
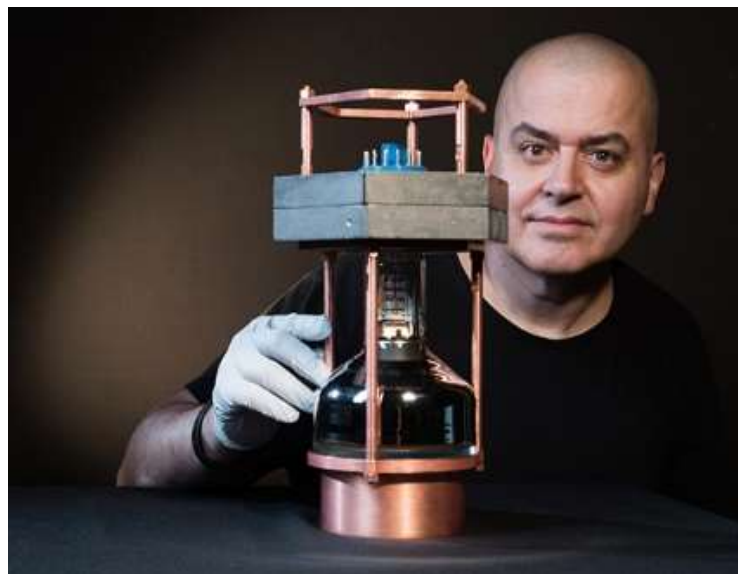
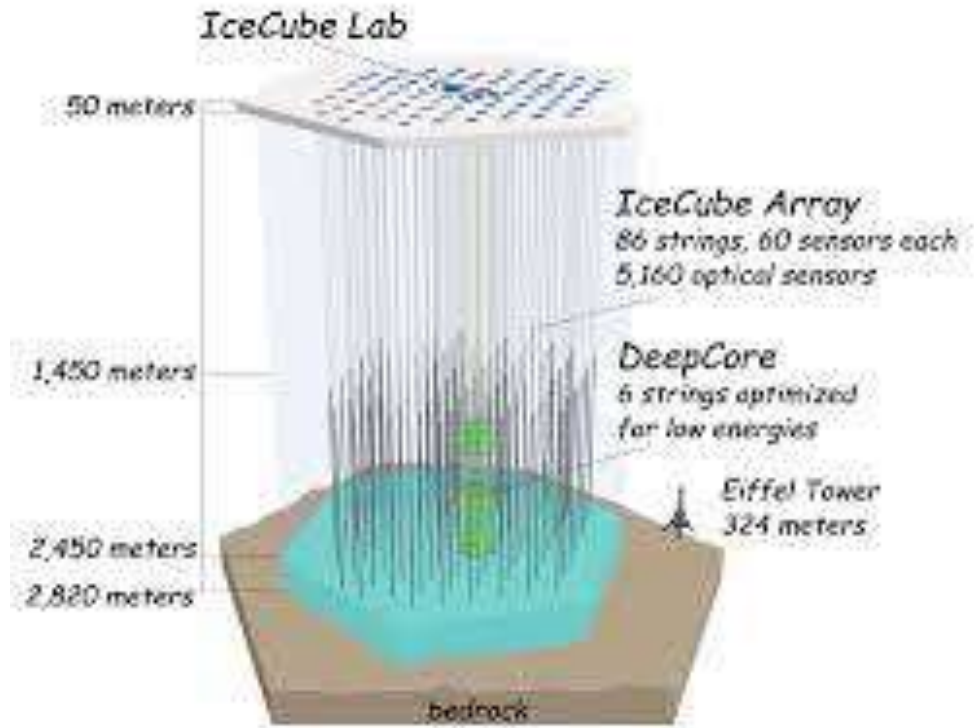


Figure 1(b) a Picture of the Sun made from looking at direction of Solar Neutrinos courtesy of (NASA APOD).



Neutrono comes from Galaxy





Neutrino detector

Analysis and result

The neutrinos detected; ICE CUBE and GRBs observed as Space based Telescope are checked to see if there are any coincidence in direction and detections GRBs.

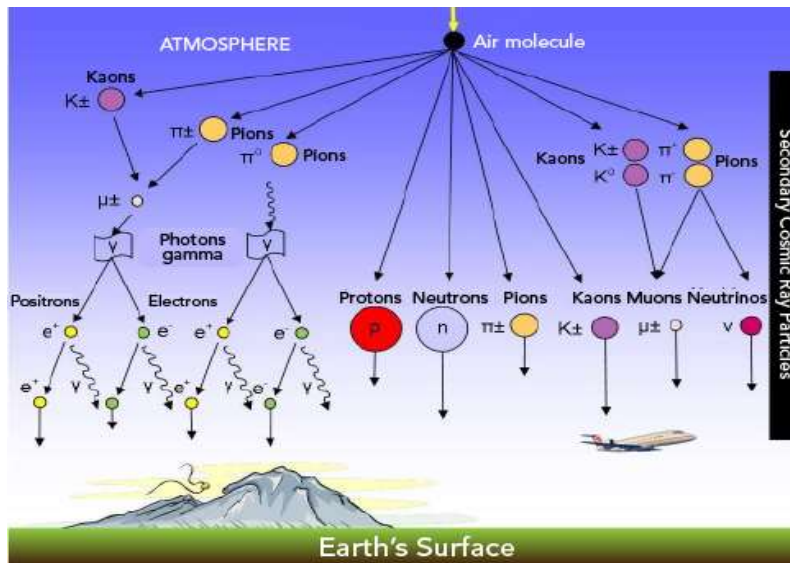
GAMMA RAY's SATELITE

If the neutrinos is observed coming from the direction GRBs at same time the gamma-rays from GRB where observed, however an atmospheric neutrinos can also aligned with detections and time of observation of GRBs as a chance of Occurance. To properly distinguished between these two scenerio 1. mathematical calculation we use "P value" Voice recorder to resolve through Voice and frequency The Voice in form of Noise so we identify Voice of difference animals and birds recording.

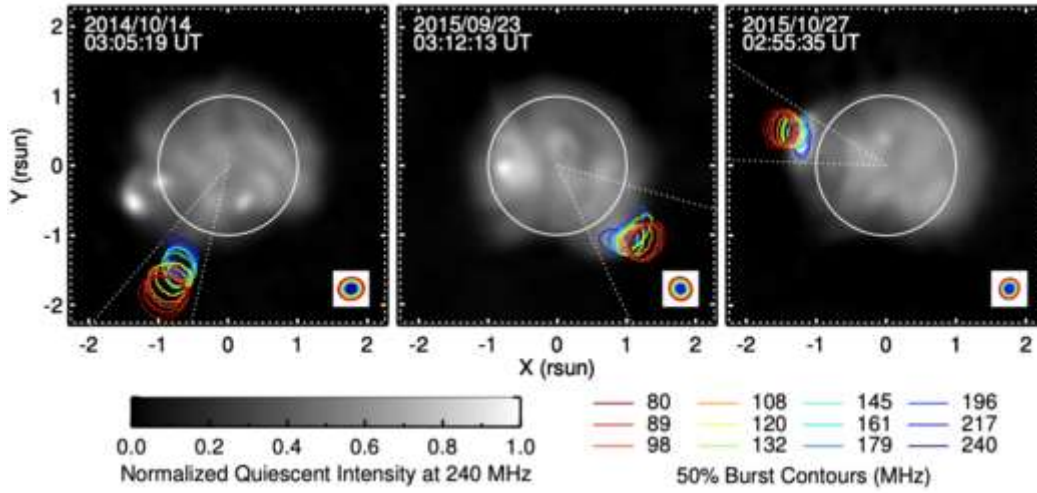
Conclusion

Evidence to produce GRBs produced Neutrinos or CRray's and detect by Ice Cuber detector.

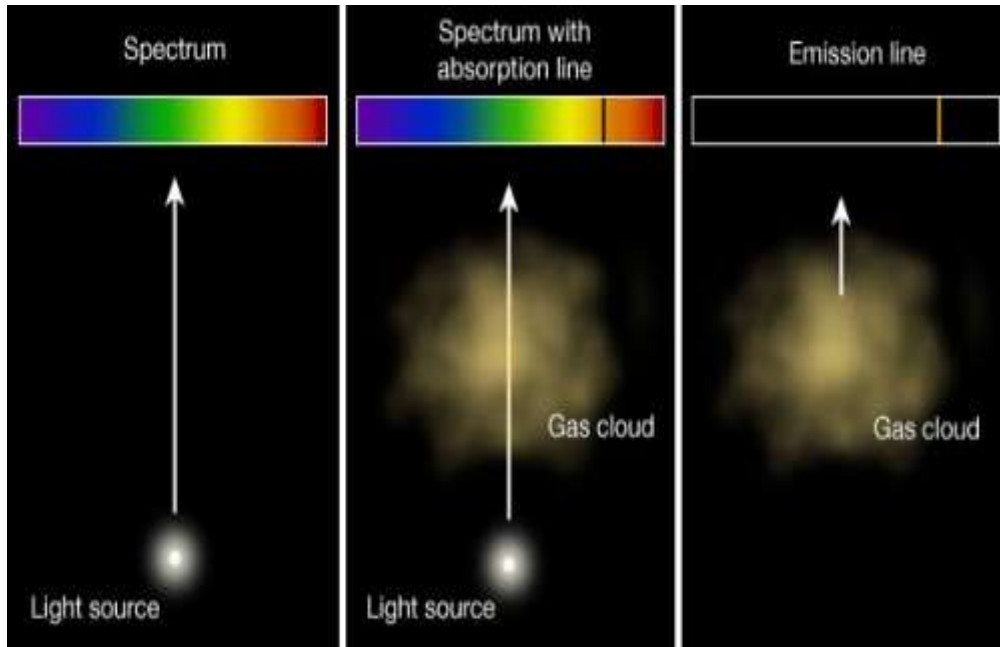
Gamma rays produced from Cosmic ray's and Neutrinos???? What difference between Glactic energetic particles and Neutrinos or radioBursts particles??



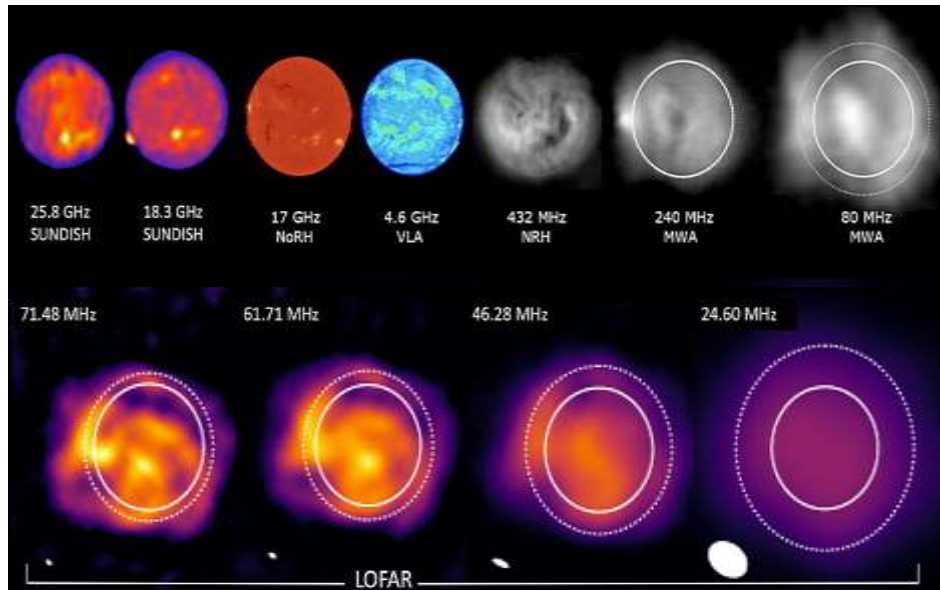
Cosmic Ray shower in earth atmosphere



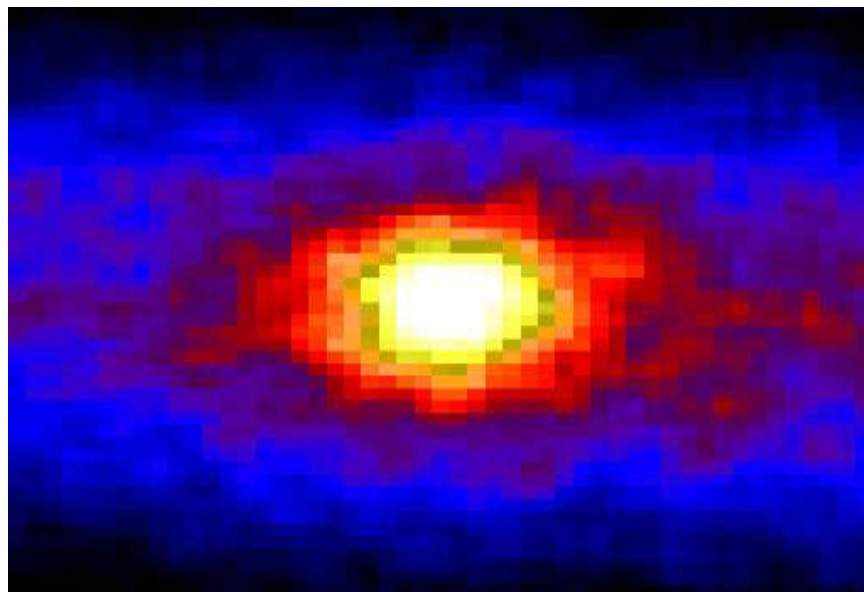
Searching Glaxay



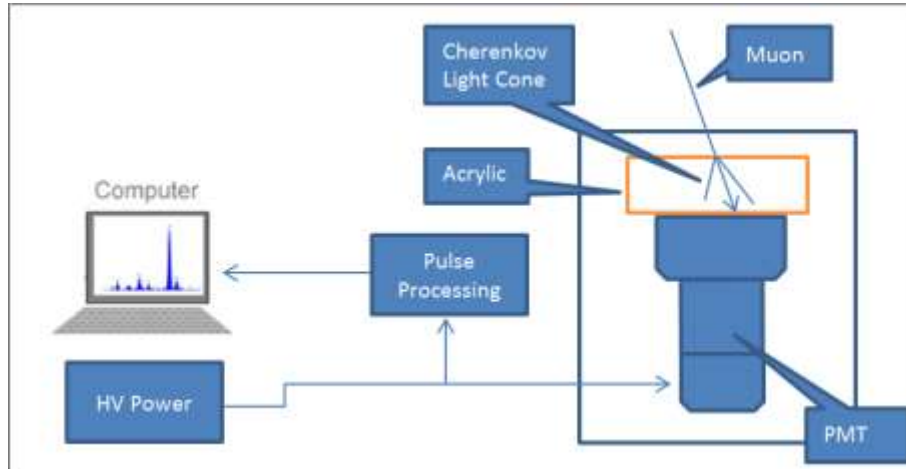
Searching ET through Spectrum analysis



Searching Galaxy With LOFAR



Solar Radio bursts



Instrument procedure of Cherenkov effect in Ice cube Detector

Cosmic Radiation

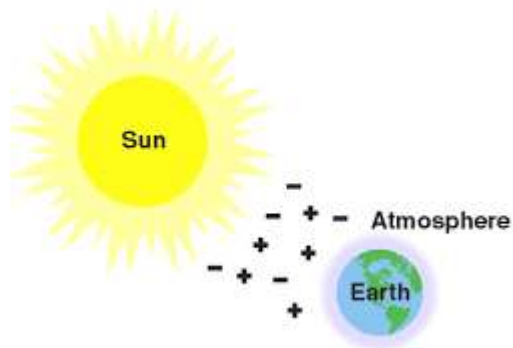
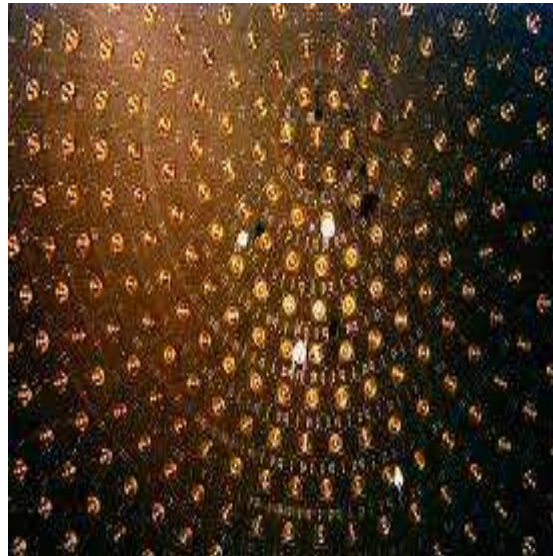


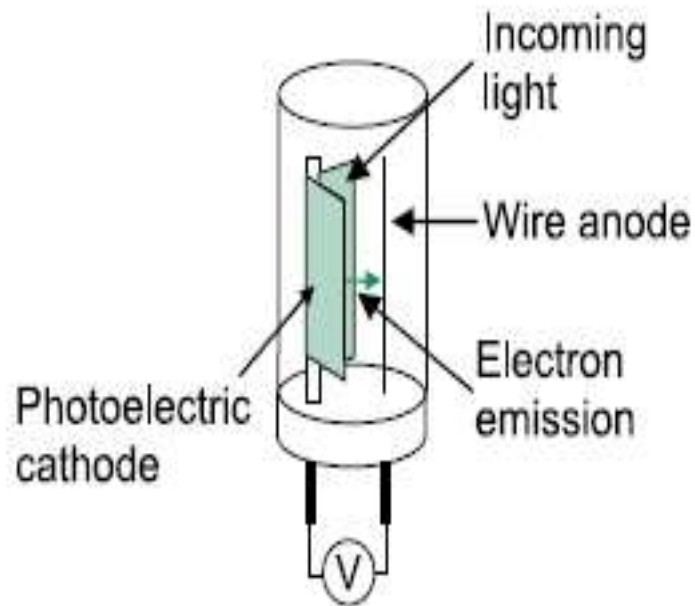
Figure of Solar Neutrino



Neutrino detector



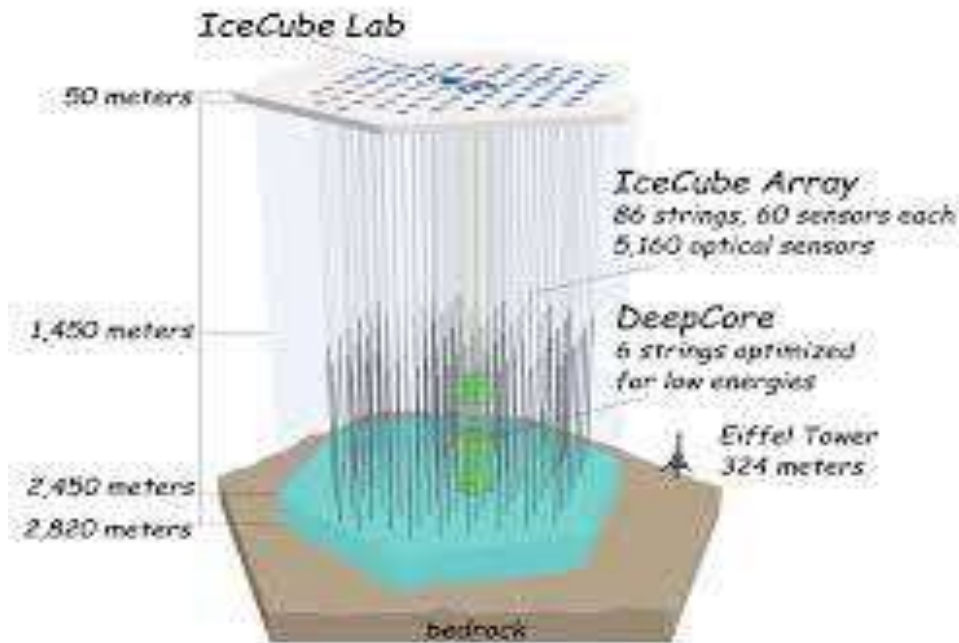
Kamiokande water detector use to detects Muon Particle



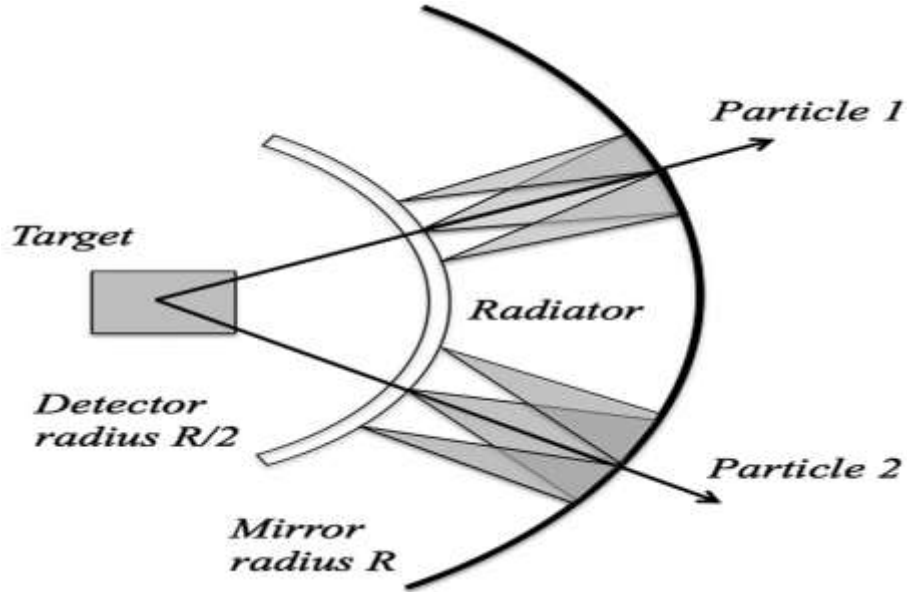
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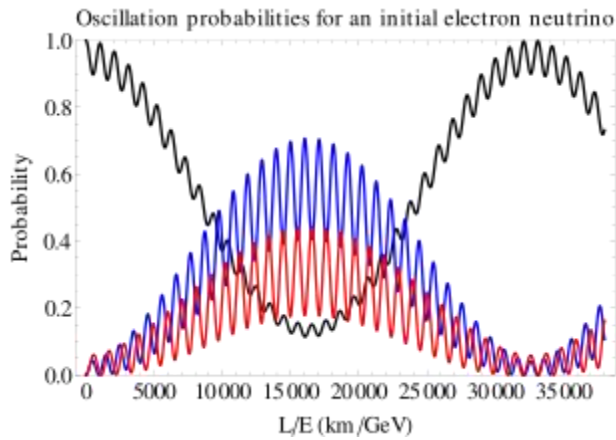
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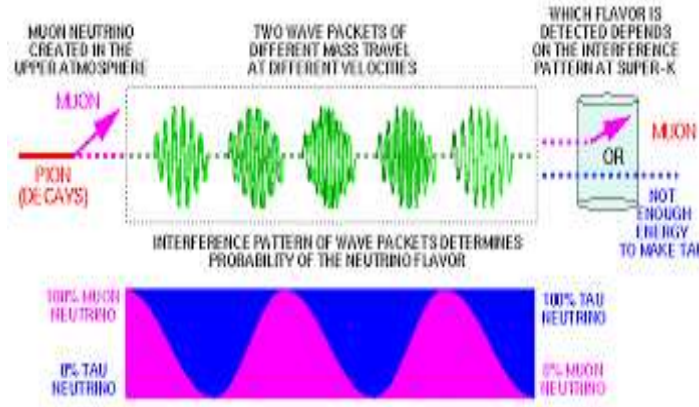
Ice cube Working procedure image



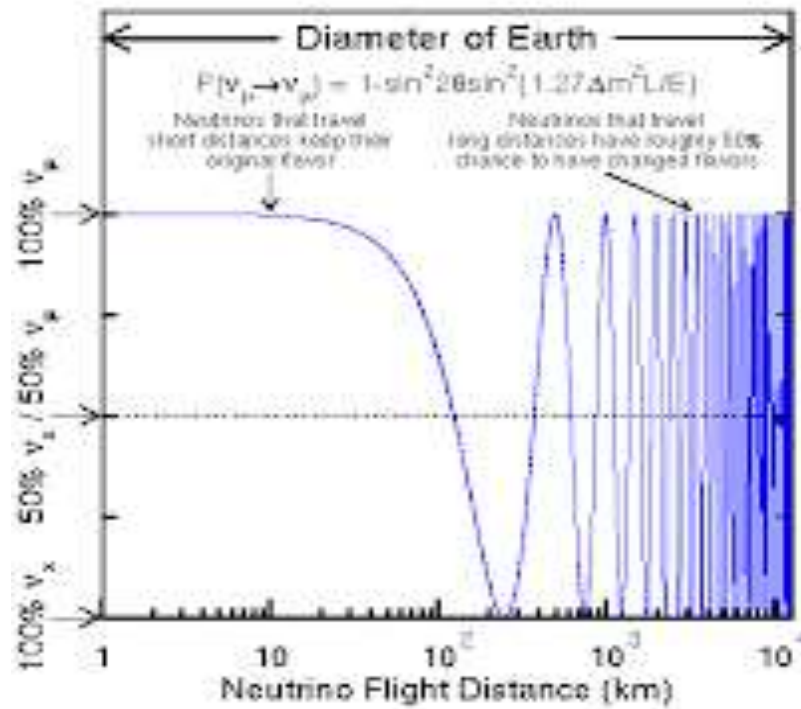
Working diagram of Neutrino detector



*Neutrino oscillation through oscillation Neutrino particle change
flavor or change Behaviour*



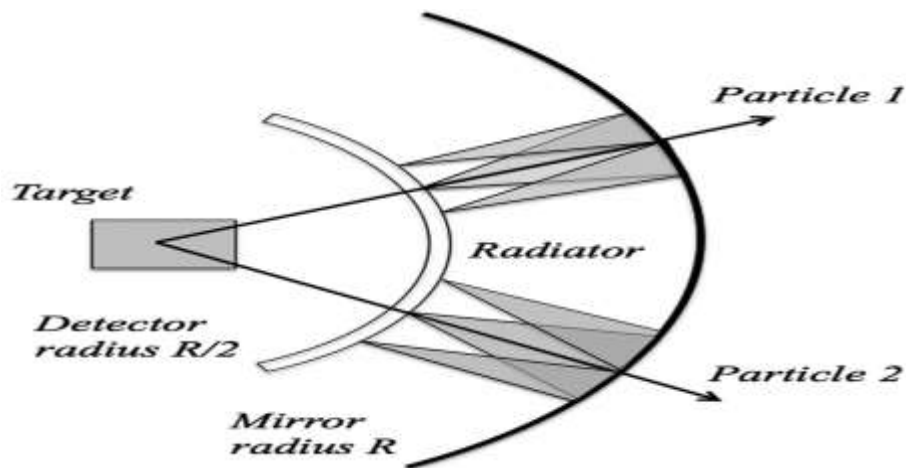
Ray Diagram Of Chrenkov effect



Neutrino flight changes in Flavour



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Working diagram of Neutrino detector **Figure of the inside of the mini kamiokande detector**

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Figure neutrino detectors

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Solid –state Neutron detections application

Neutron detector application Neutron detector application include those for homeland security(e.g.) Border screening) fundamental research such as water content in soil Solid state neutron monitor detectors provide an alternative to ^3He based, a high thermal –neutrons detection affecting, at fraction of the Volume, Mass, Voltage and power requires from gas, liquid or crystal detectors, recommended AC coupling to electronic readout circuit.

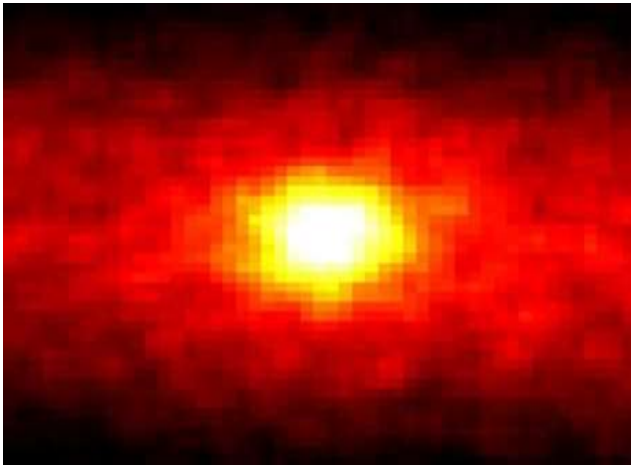
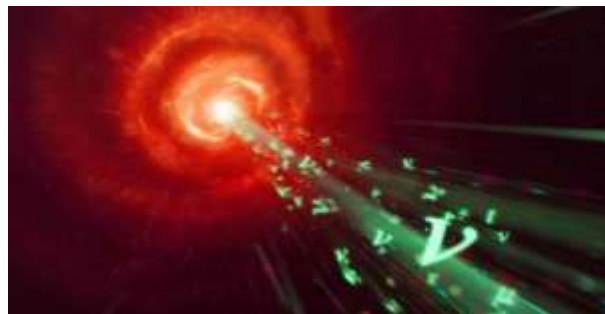


Figure 1(b) picture of the Sun made from looking at direction of Solar Neutrinos courtesy of (NASA APOD)



Neutrino

CONCLUSION

Evidence to produce GRBs produced Neutrinos or CR ray's and detect by Ice Cube detector. Together, these immense bodies of water and Ice on our Water and Ice on our World are the best for exploring. How Neutrinos from Far-flung comes that How Universe are made? All aspect Neutrino search for it. Probe the properties of Neutrino get to our understanding clear that these Neutrino particle is really beginning to reach through New Research on behavior of Neutrino. IS it Gamma rays produced from Cosmic ray's and Neutrinos????

What difference between Galactic energetic particles and Neutrinos or radio Bursts particles?? How they effect in Earth environment still answerable.

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Biography of Authour

Dr.Rakesh kumar Mishra has devoted countless Hour to searching many years to Water science and Solar physics and researching on Solar transient’s and their impact on Geomagnetic Field a book madeup in solar and Water research and make contribution from collagues (Past and Present. We urge you to read my book and get inspired about it how to work in services for the greater good of Water.

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