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The Universe Search for Neutrino on Earth

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Abstract:- Our planet is bombarded with trillion 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 conversvation 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,

I. 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 Glactic 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.

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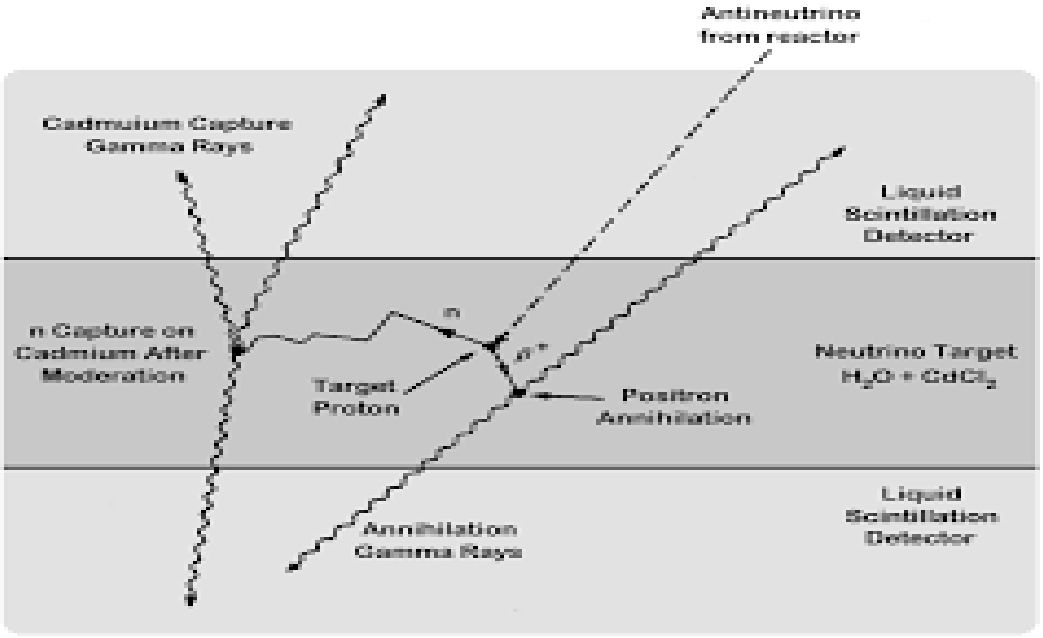

Fig 1 Behavior of Neutrino

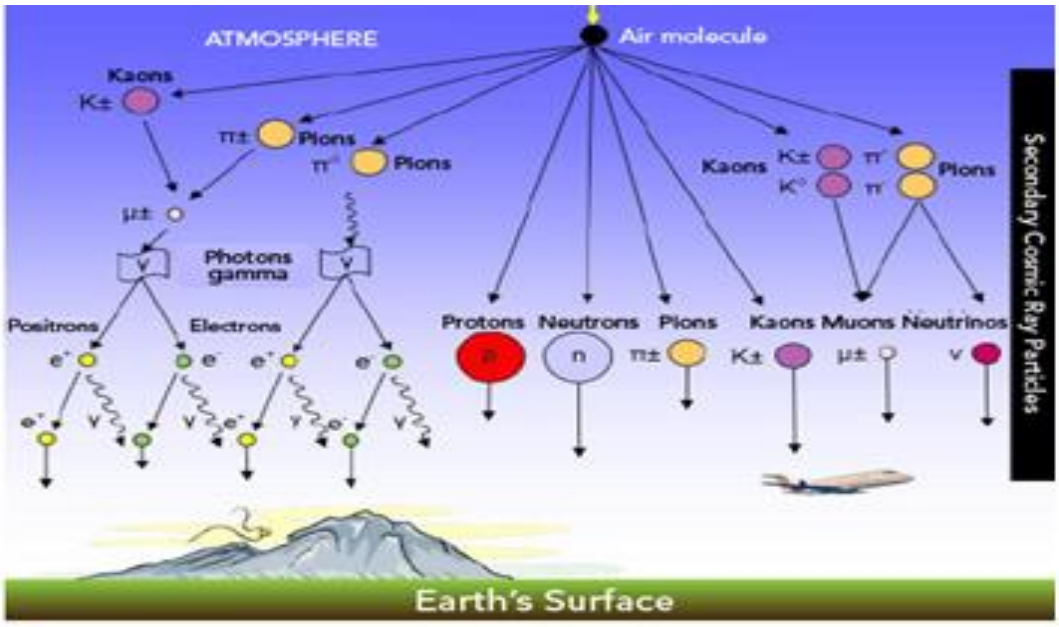

Fig 2 Cosmic Ray shower in Earth Atmosphere

➢ *Gamma Rays Bursts*

- Gamma rays Bursts(GRBs) can Produced High Energies Cosmic Ray'sGRBs are short bursts of high energy radiation of Cosmic Rays in beam Line manner , they typically last for few second in duration,and can out shine entire of Glaxies in that periods two classes of GRBs
- Long GRBs, with Bursts duration greater than 2 second and short GRBs duration is similar than 2s.
- Each classes of GRBs is understood to create due to 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 direction of GRBs and same time as the Gamma rays from GRBs were observed.

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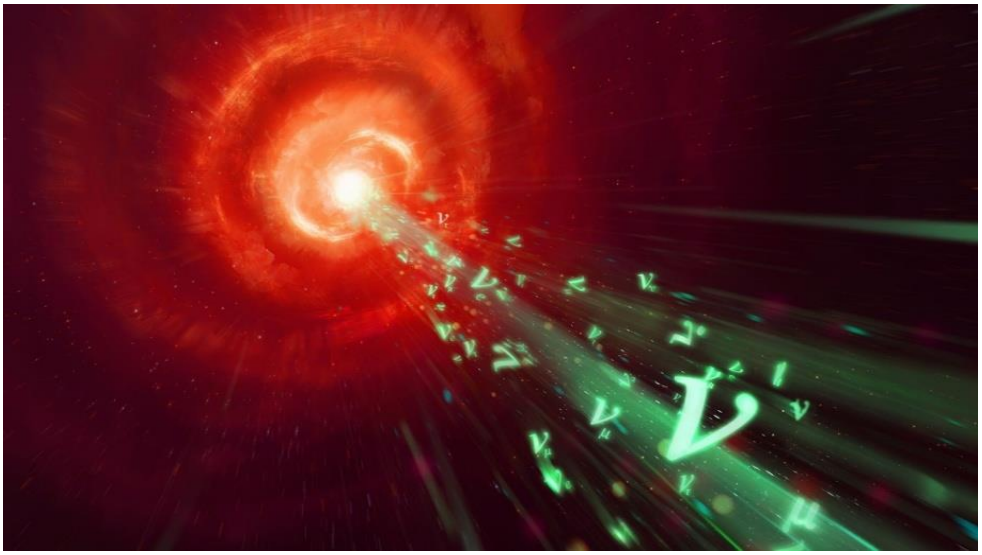

Fig 3 Shows Origin of Neutrino Through Solar Radio Bursts or Galactic Cosmic Rays

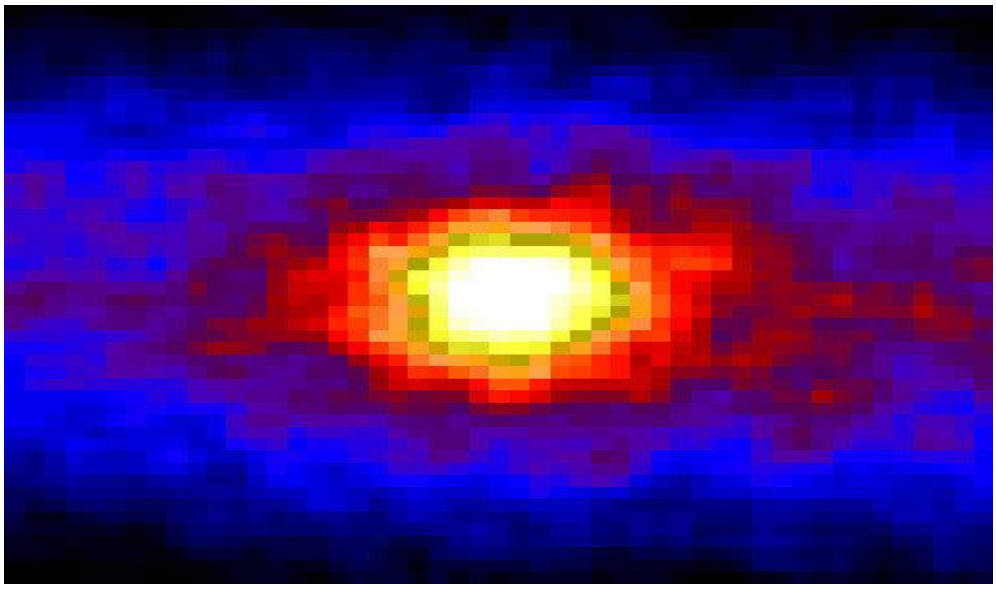

Fig 4 Solar Radio bursts

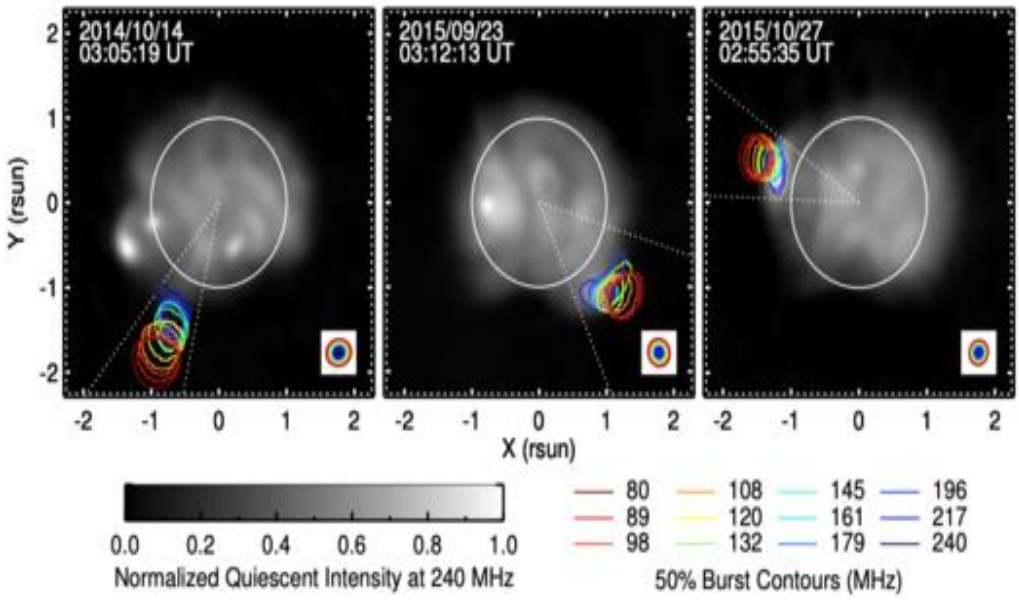

Fig 5 Searching Galaxy Through Radiowave

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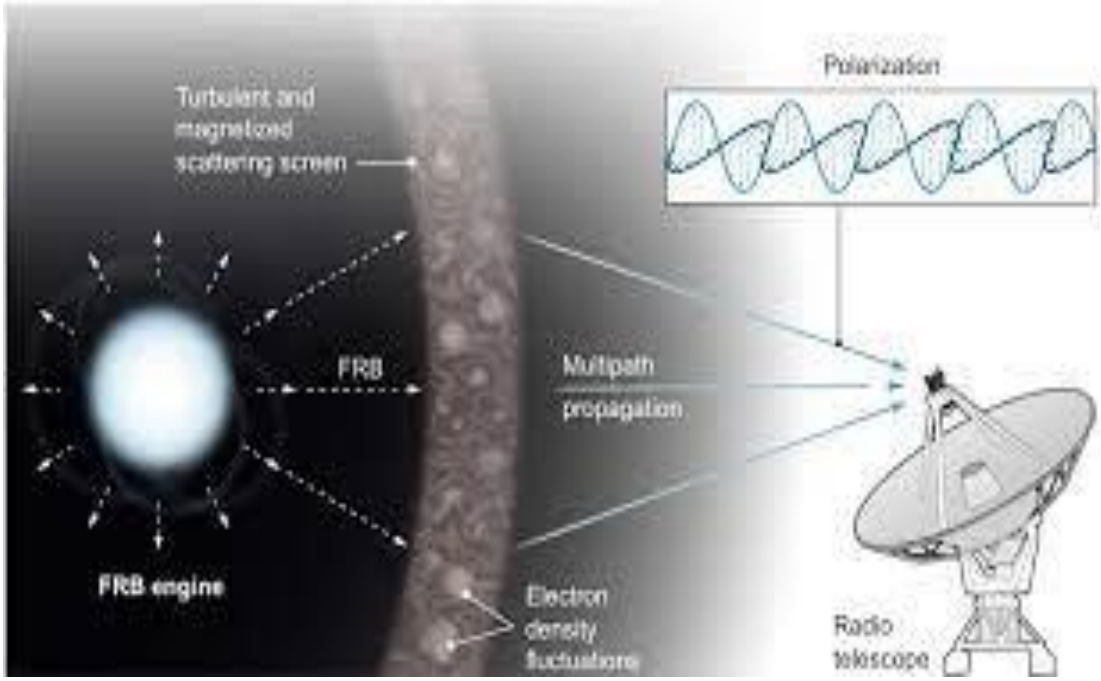

Fig 6 Ground Based Radio Observatory Search Galaxy

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

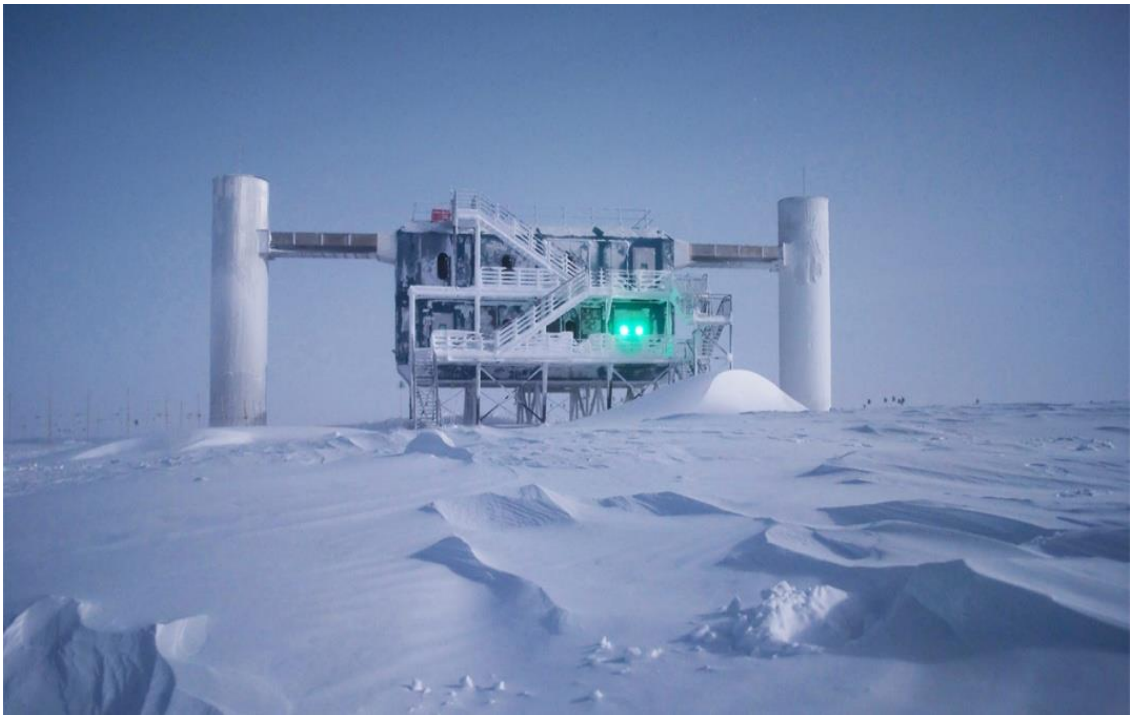
Fig 7 Shown in figure the Ice Cube Neutrinos Observatory

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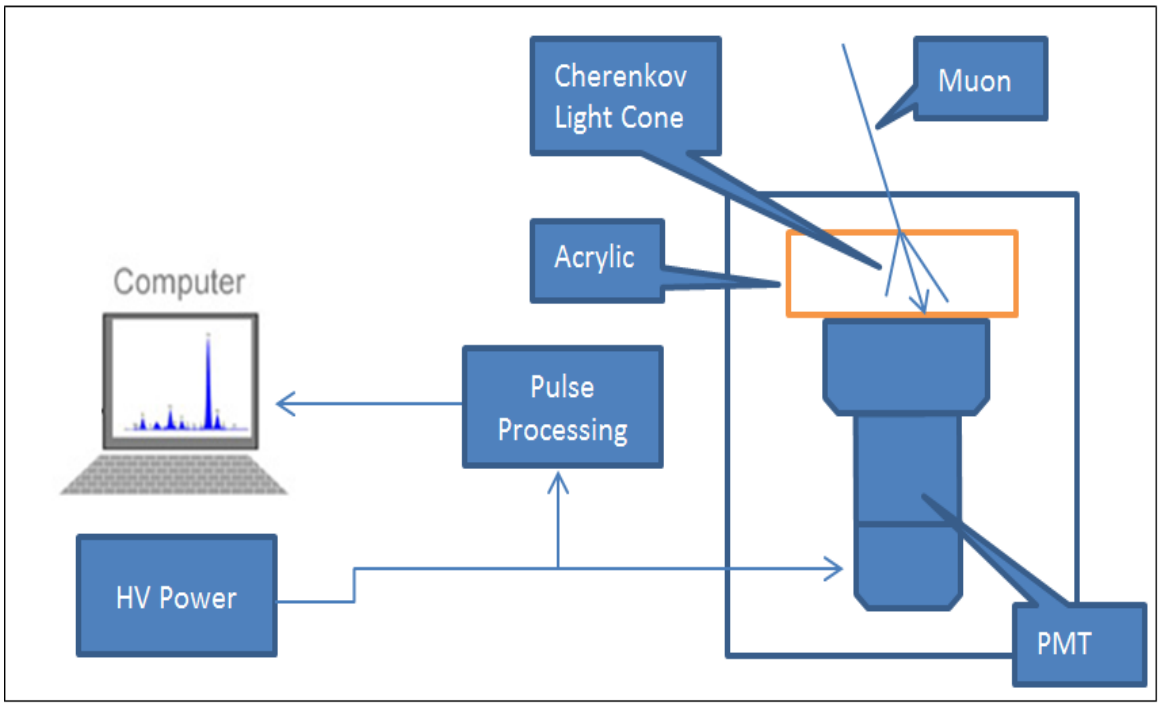

Fig 8 Of Detector Working and Detect Neutrino Through Computer Simulation

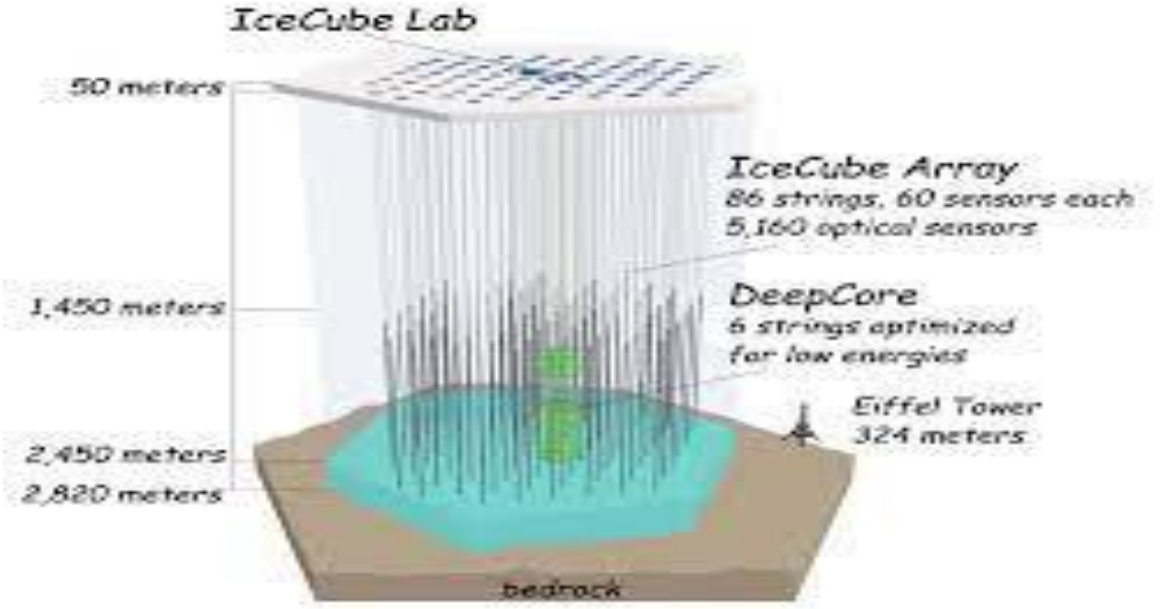

Fig 9 Ice cube lab

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.

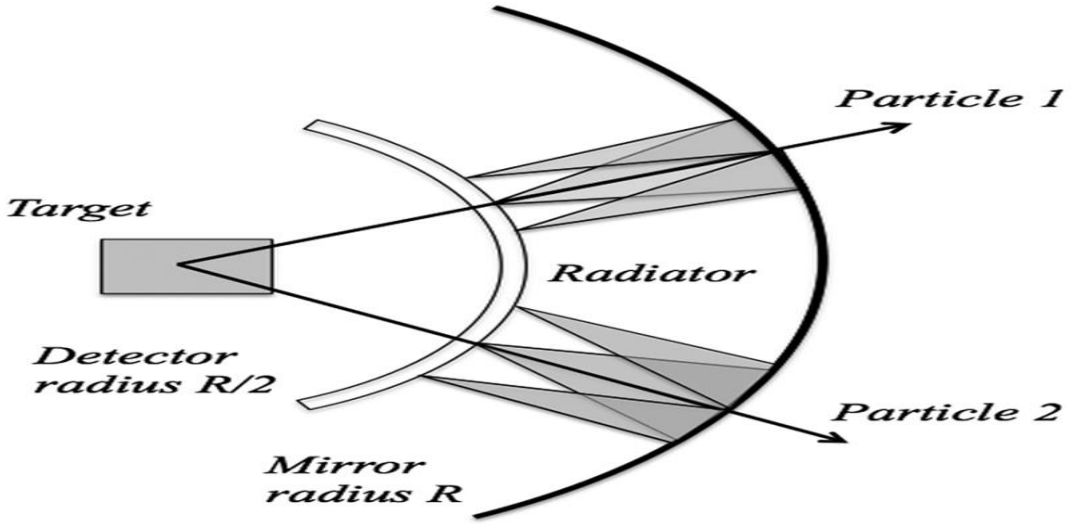

Fig 10 Working diagram of Neutrino detector(How Light Scattered in Ice)

- *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 alogrithms involving of mathematical calculation.

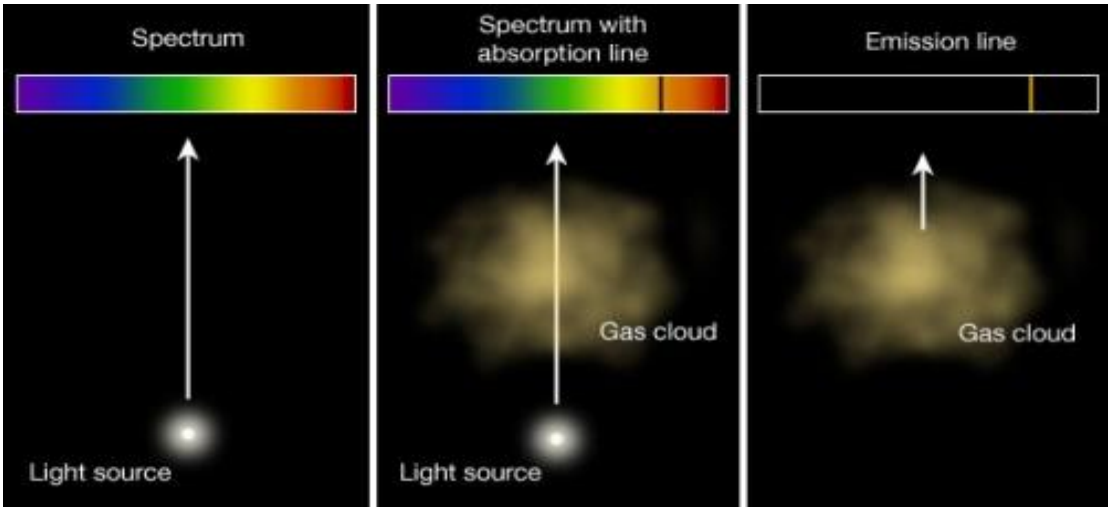

Fig 11 Searching ET Through Spectrum Analysis

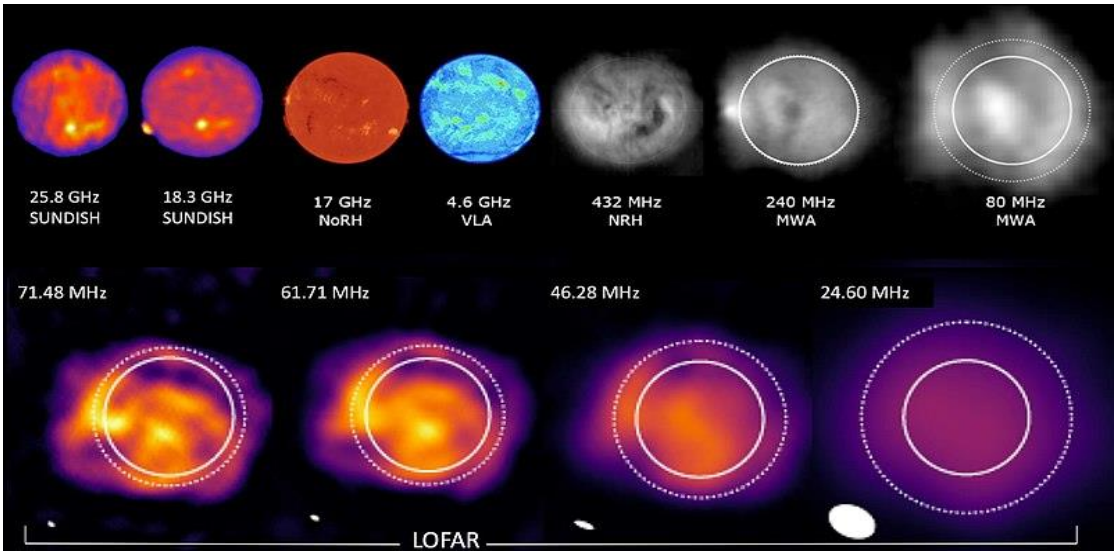

Fig 12 Searching Glaxy Through LOFAR Radiowave Observatory

➢ *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 reaches earth as in form of Light and Heat.

➢ *Solar Neutrino Oscillation*

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

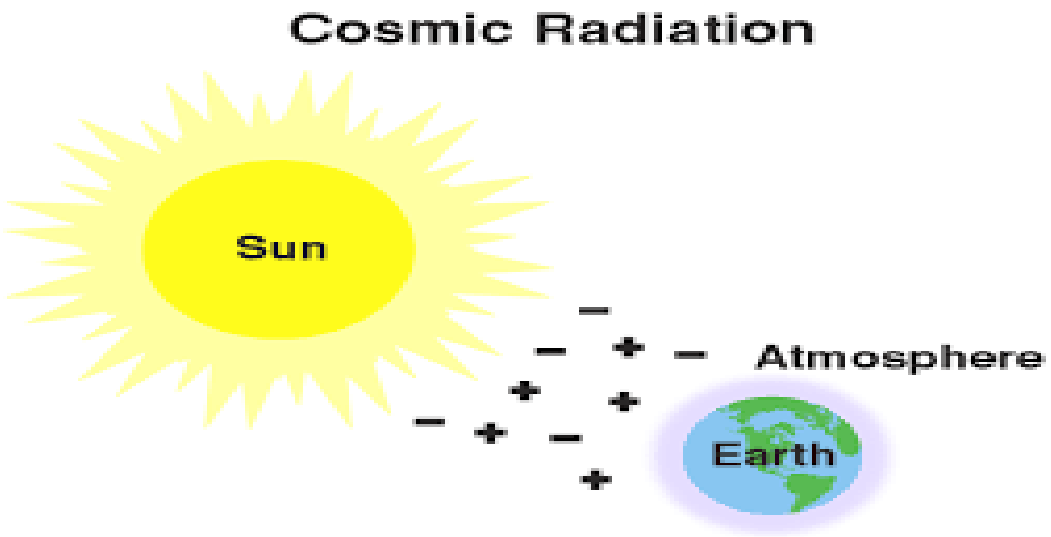

Fig 13 Of Solar Neutrino

➢ *Solar Neutrino*

A major Back through happened that when the second time in history a neutrino was trecked back to source from outside of Solar System. It come from an immense Galaxy four billion light years away with supermassive black hole at it's heare.The neutrino happened to be lineup on the perfect trajectory toward's detector planted within Antratica Ice sheet, at the Ice Cube 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 yield a wealth of information Astronomical event's the neutrino are accompanied by susequential wave of **x** rays and wave of extremely hight- energy photons called Gamma rays , was emitted by the Black Hole.

The basic that neutrinos almost never interact with matter make them difficult to study directly but if a neutrino pass through by Ice crystal, at just right angle, the charged interaction releases subatomic particle called muons.

Because Ice slow down light the travels through it, the muon is emmited at speed greater than the surrounding light within Ice sheet. This cause a blue light flas of light called Cerenkov radiation Cherenkov radiation detected by sensors.

A muon can travel many kilometer throuh Ice; and Cherenkov radiation several hundred meter, until it reached an Ice cube sensor.

➢ *Atmospheric Neutrino Atmospheric Neutrino Oscillation*

Electromagnetic ,weak and strong forces , a few experiment on proton decay followed in large detector such as IBM,MACRO,Kamiokande have observed deflict 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 Hundred of MeV to few TeV. Many experiment 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 k.m. such oscillation given value the parameter.

➢ *Beam Neutrino Oscillation*

Neutrino Beam Produced at particles accelerater ofters 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 k.m. baselines the minos K2K and Super-K experiment have all independently observed muon, neutrino disaaperance overlong base Line.

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Neutrino oscillation a quantum mechanical phenomenon in which a neutrino a 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 propagate through space. Neutrino have the proportional to do amazing things like speedup communication detect Nuclear weapon and even confirm the presence of of elusive dark matter.

Fig 14 Neutrino Detector

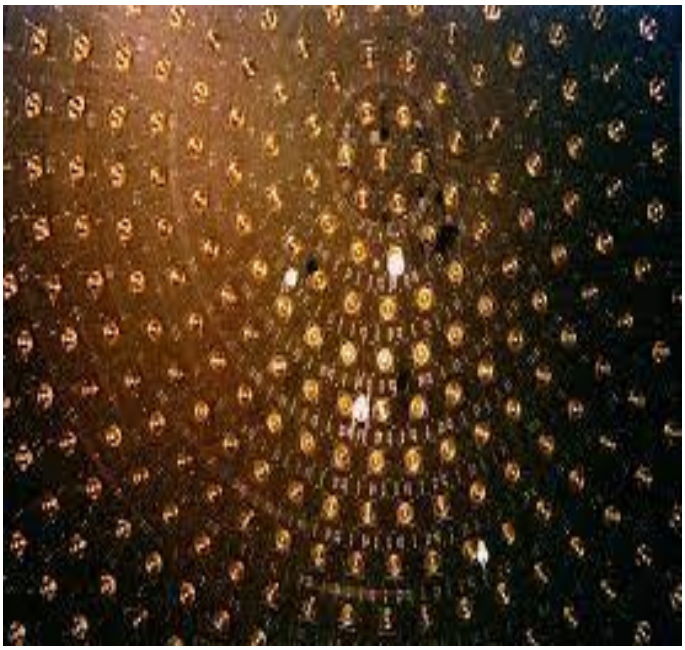

Fig 15 Kamiokande water detector use to detects Muon Particle

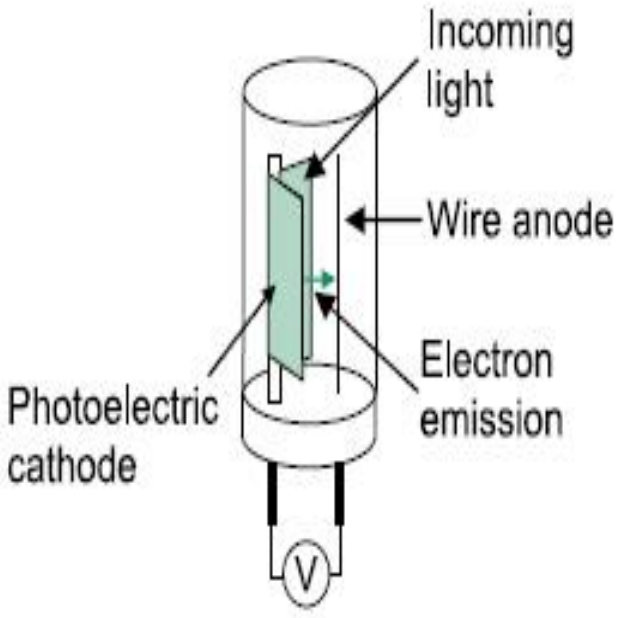

Fig 16 Photodiode are use to Detects Muons

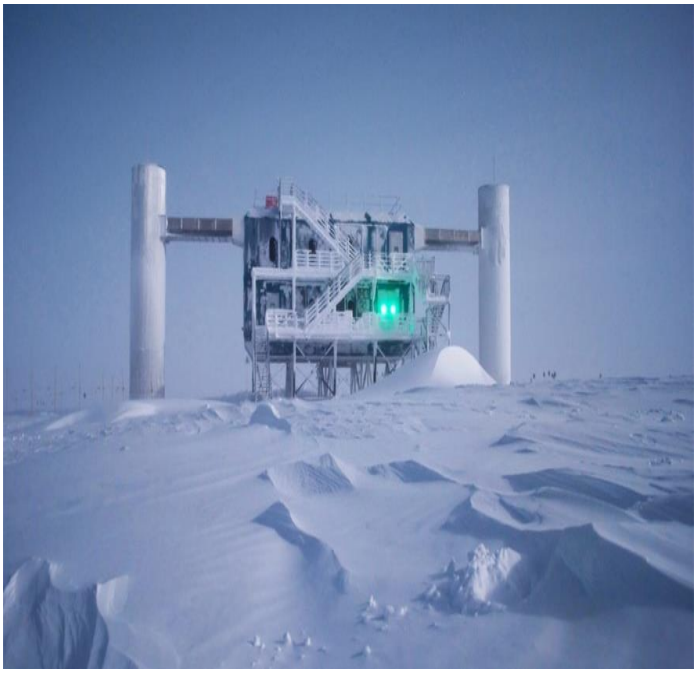

Fig 17 Ice Cube Lab to Detect Neutrino Through Cherenkov Effect Image :Ice Cube /NSF

➢ *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 Antratcic 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.

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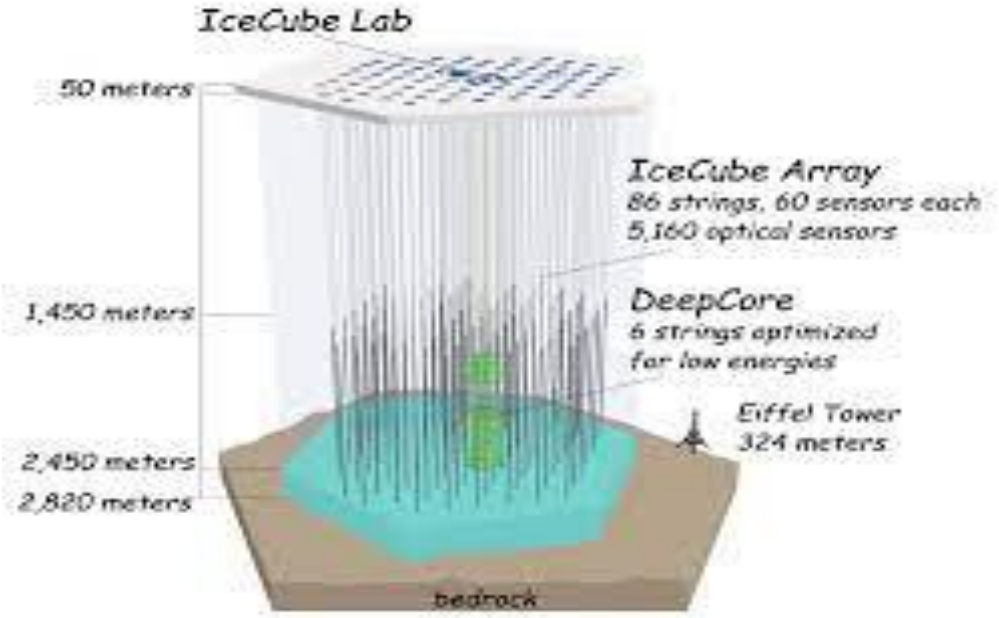

Fig 18 Ice Cube Working Procedure Image

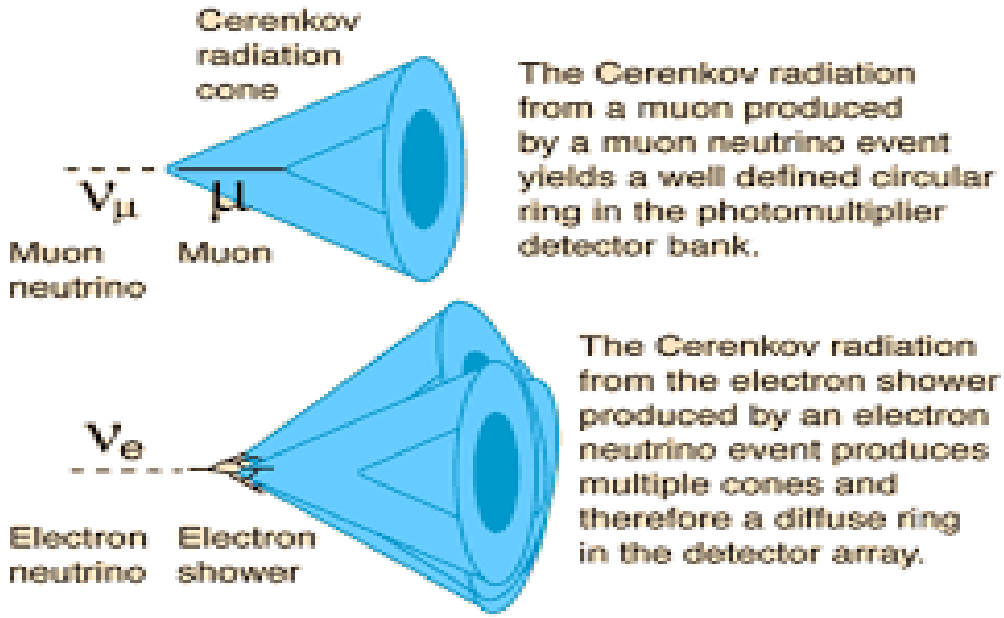

Fig 19 Cerenkov radiation cone

➢ *"Neutrino": From Histrocical perspective and it's Future Challenge*

The neutrno, a fundamental elementary particles of nature, was born out of necessity to keep the conversvation 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 evernotice. 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 o. Netrinos detectors is a physics apparatus which is desgined 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,

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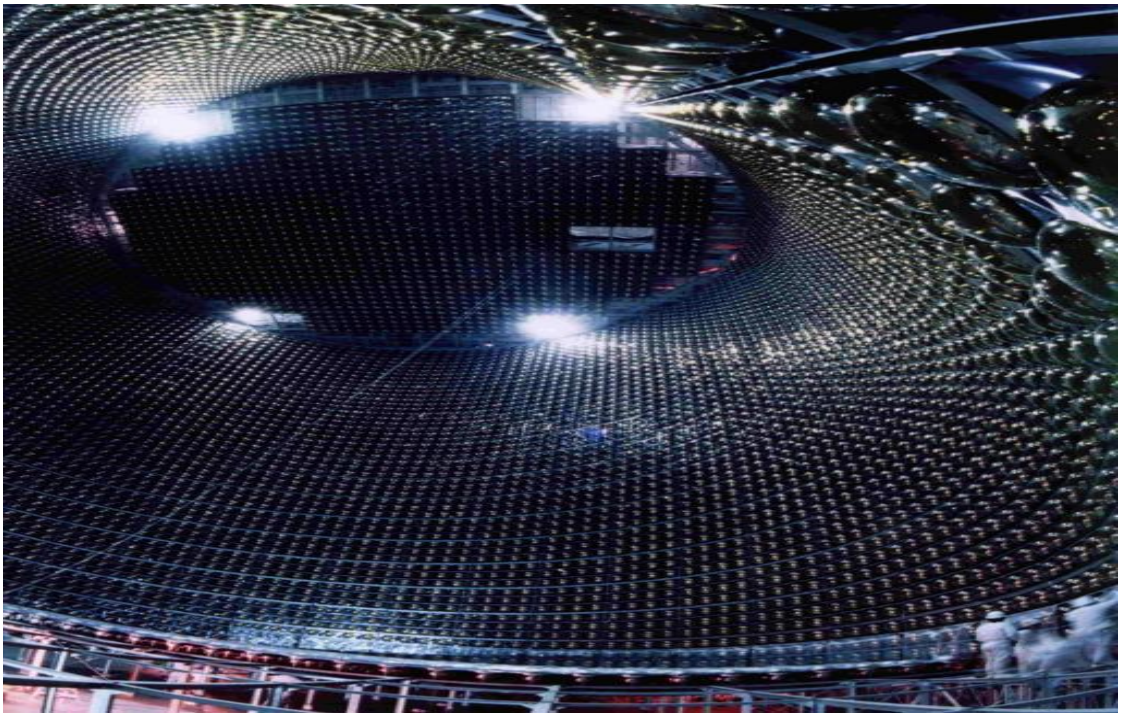

Fig 20 Shows Super- Kamiokande Detector Coutesykamioka Observatory,ICRR (Institute for Cosmic Rays Research), the University of Tokyo. is Kind of Neutrino Detector Super Kamiokande which Detect Muons in the Water.Figure of the Inside of the Mini Kamiokande Detector

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

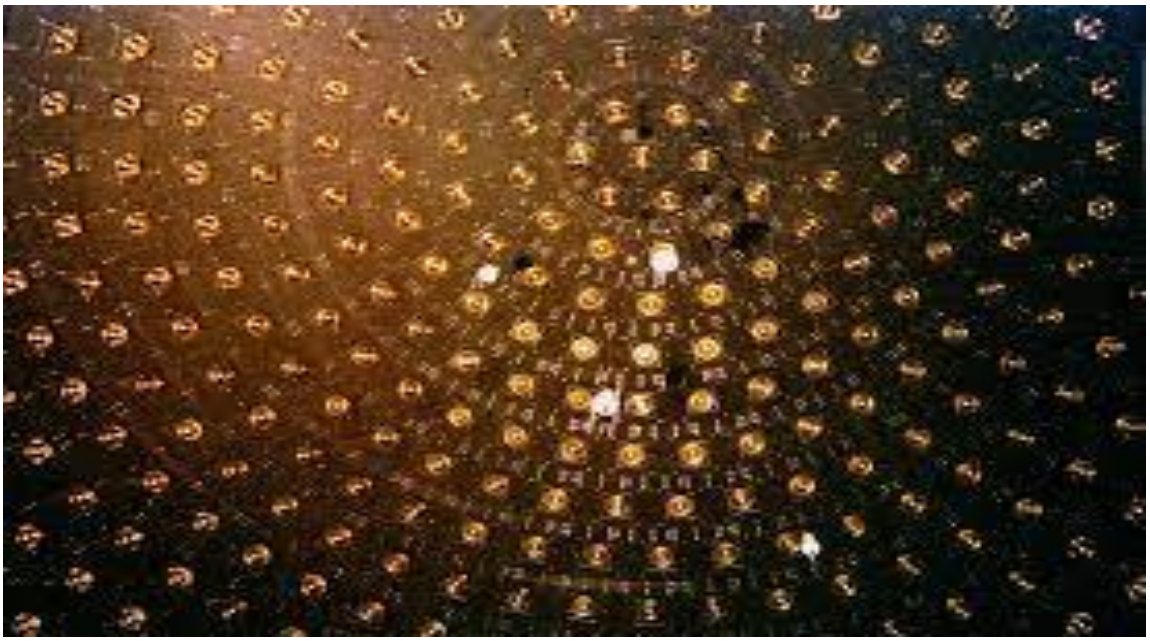

Fig 21 Neutrino Detectors Kamiokande Water Detector Use to Detects Muon Particle

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III. 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 reacter 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 anhiliation can also used 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 $_3$He 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.

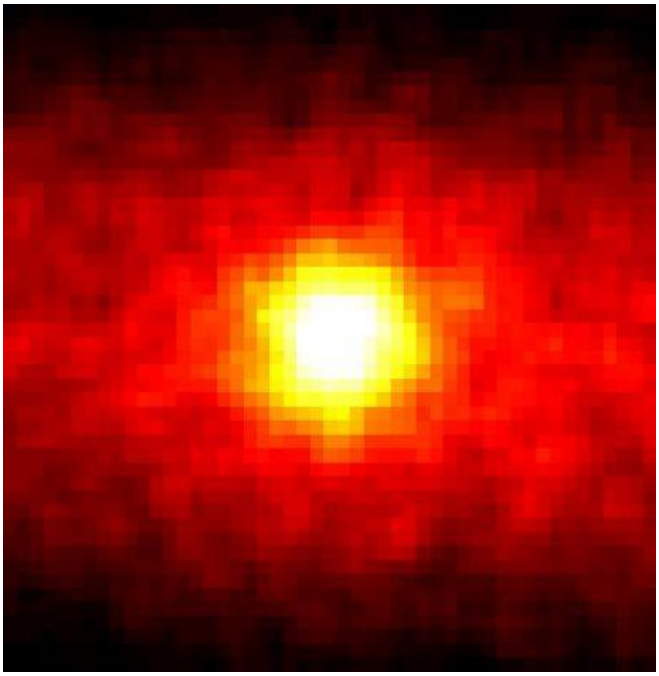

Fig 22 A Picture of the Sun made from looking at direction of Solar Neutrinos courtesy of (NASA APOD).

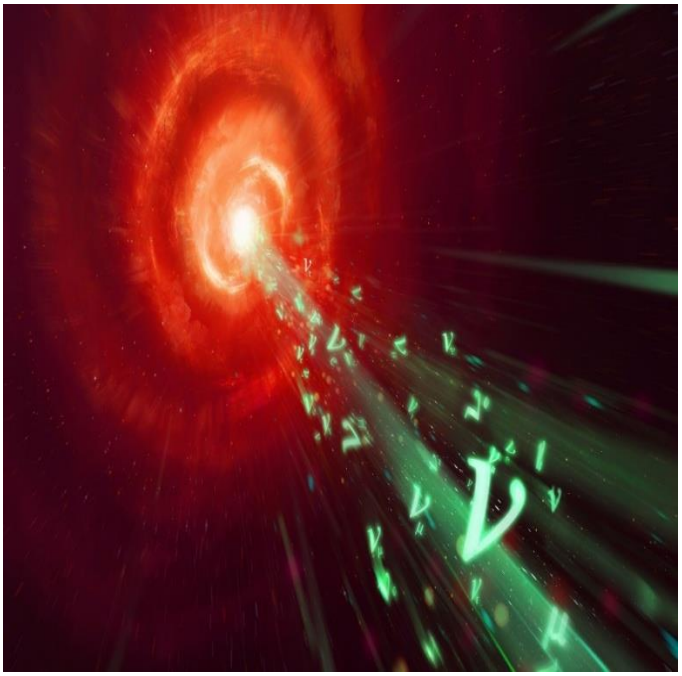

Fig 23 Neutrono comes from Galaxy

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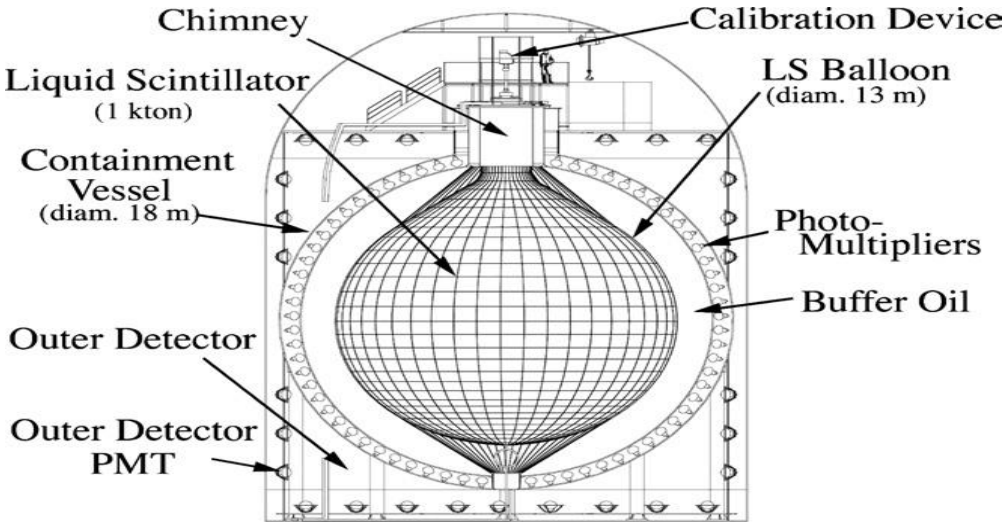

Fig 24 Chimney

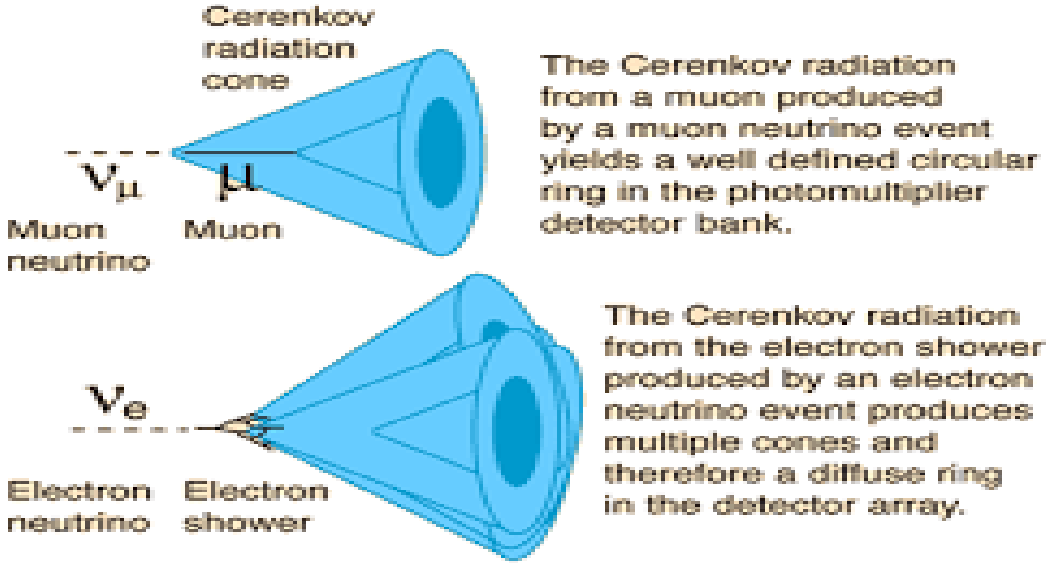

Fig 25 Cerenkov Radiation Cone

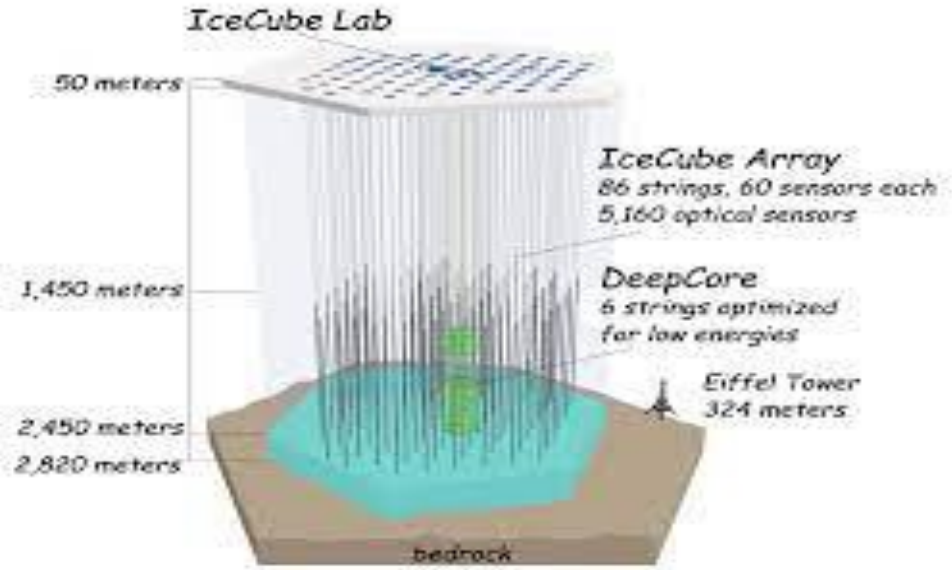

Fig 26 Ice Cube Lab

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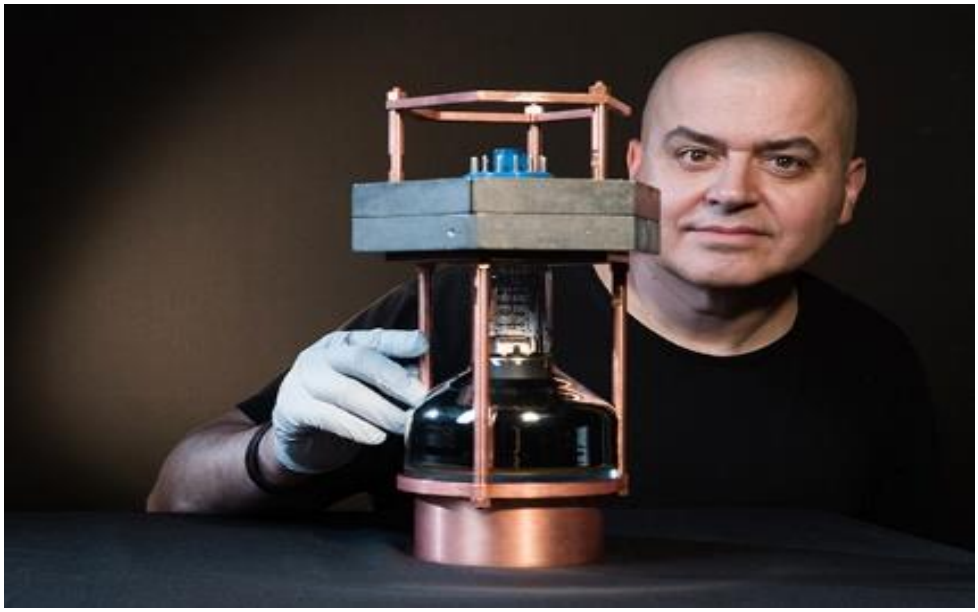

Fig 27 Neutrino Detector

IV. 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??

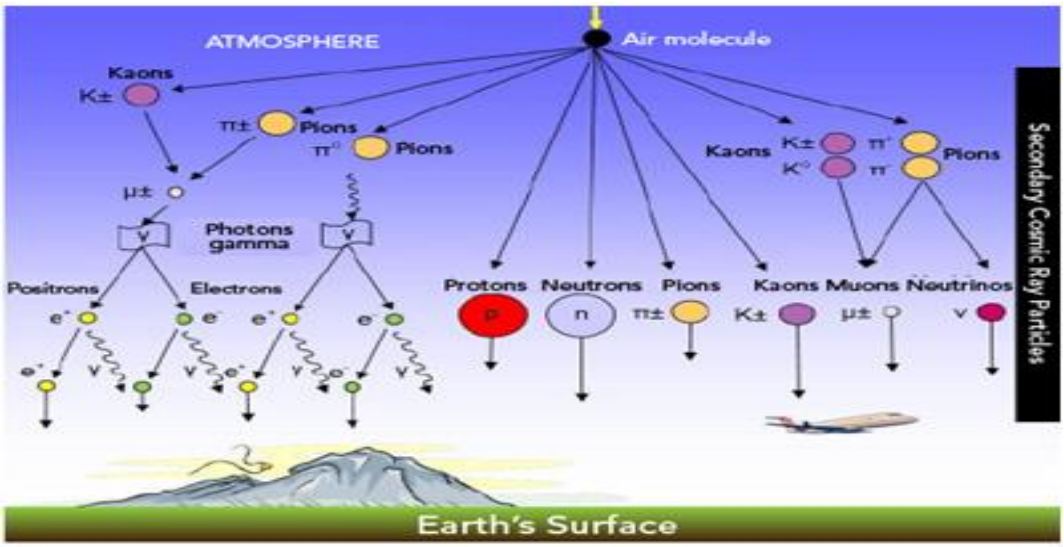

Fig 28 Cosmic Ray Shower in Earth Atmosphere

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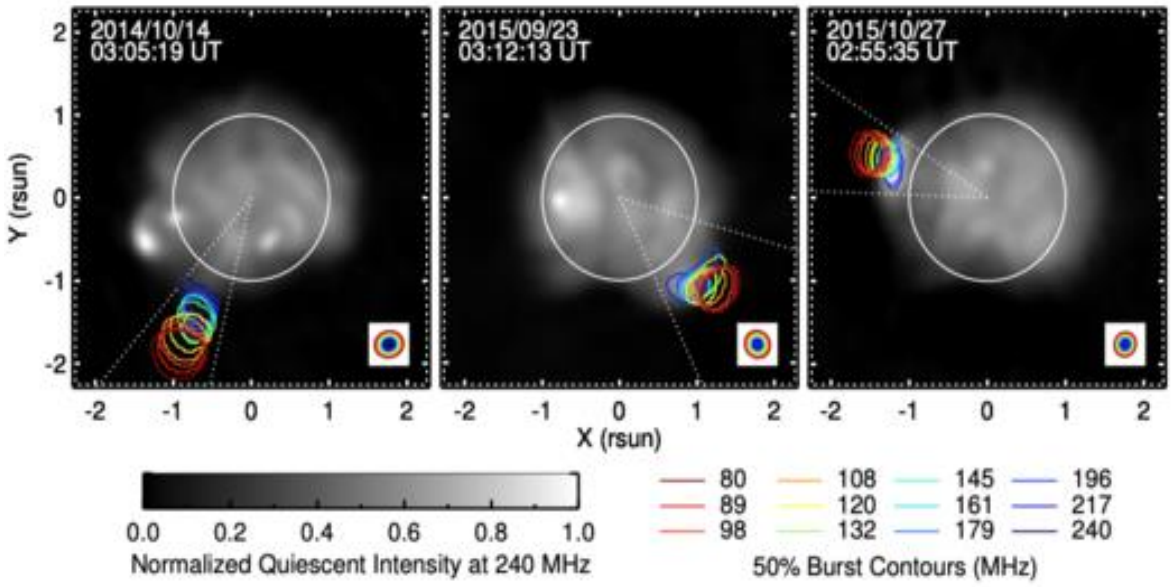

Fig 29 Searching Glaxay

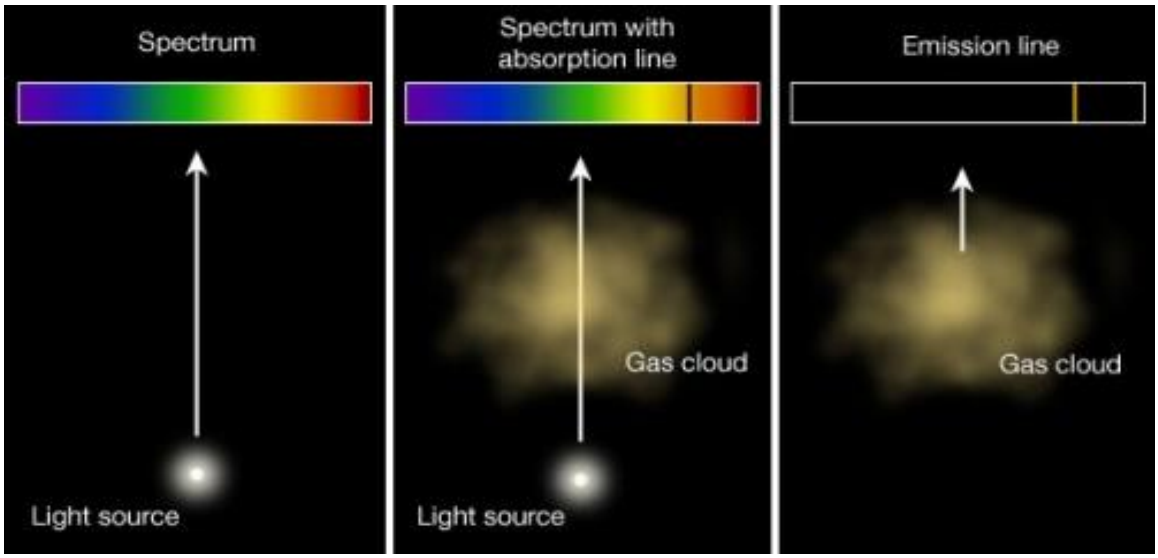

Fig 30 Searching ET through Spectrum analysis

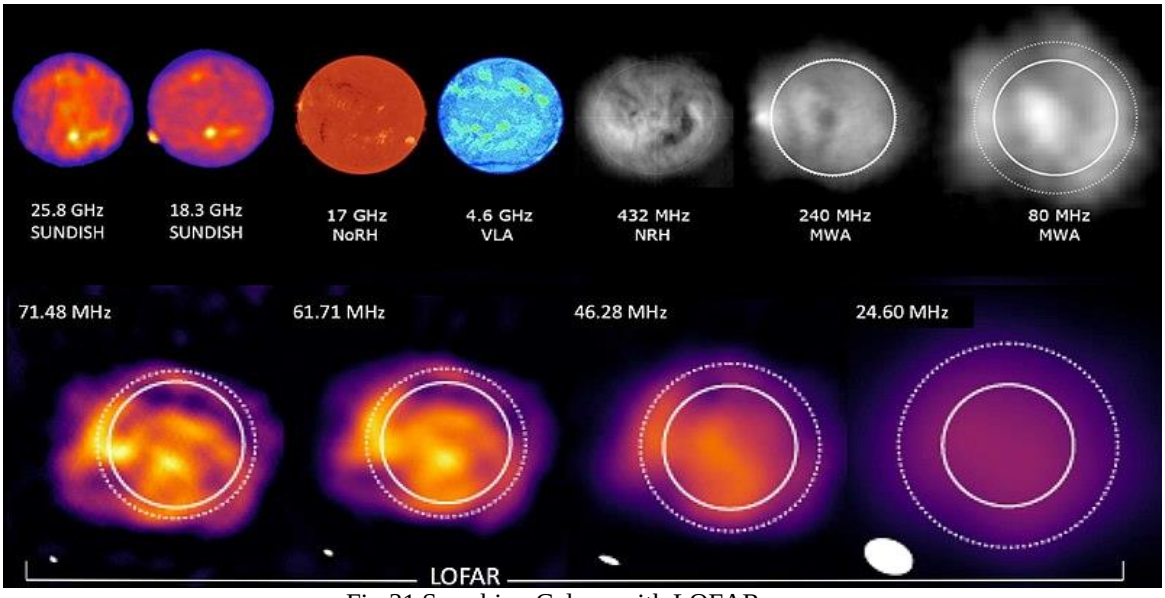

Fig 31 Searching Galaxy with LOFAR

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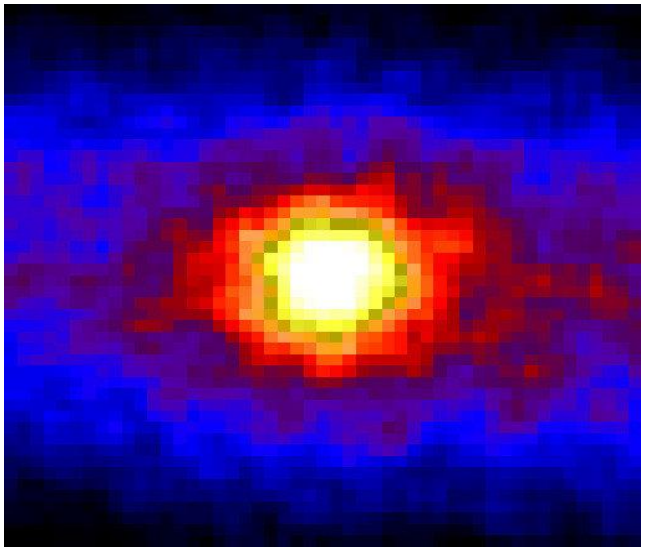

Fig 32 Solar Radio bursts

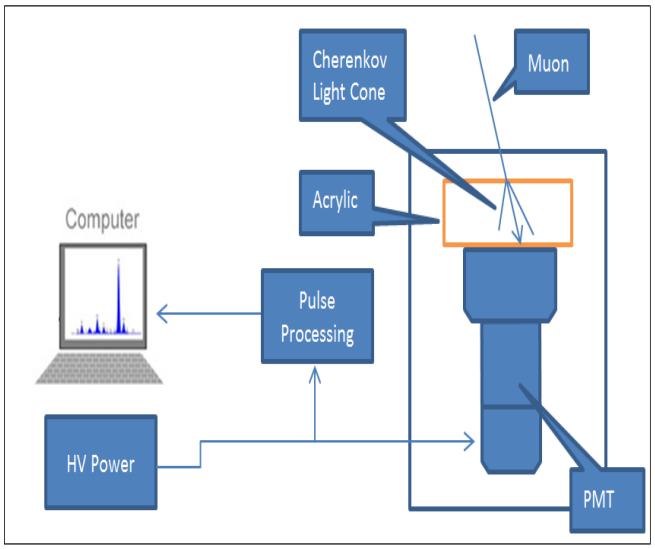

Fig 33 Instrument Procedure of Crenkov Effect in Ice Cube Detector

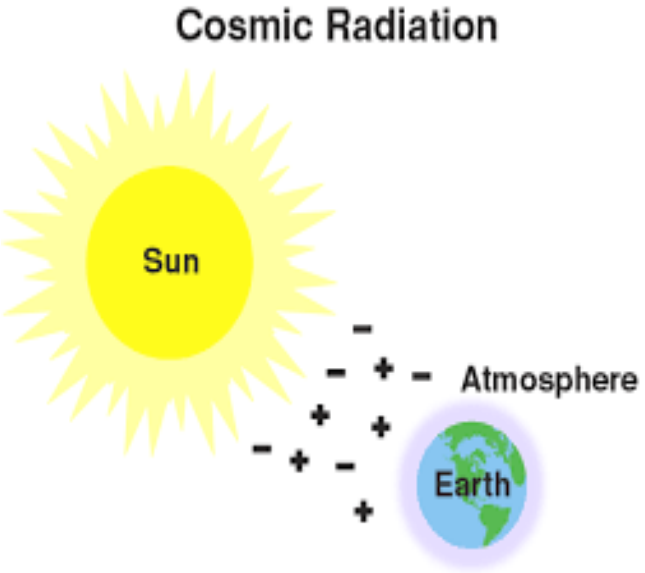

Fig 34 of Solar Neutrino

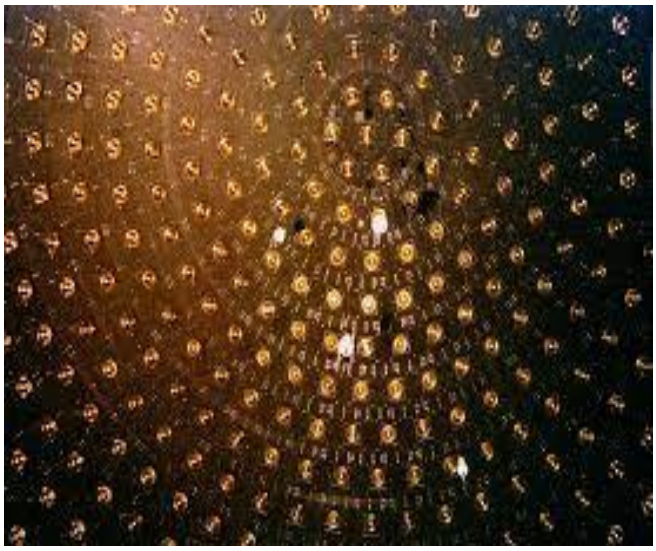

Fig 36 Kamiokande Water Detector Use to Detects Muon Particle

Fig 35 Neutrino detector

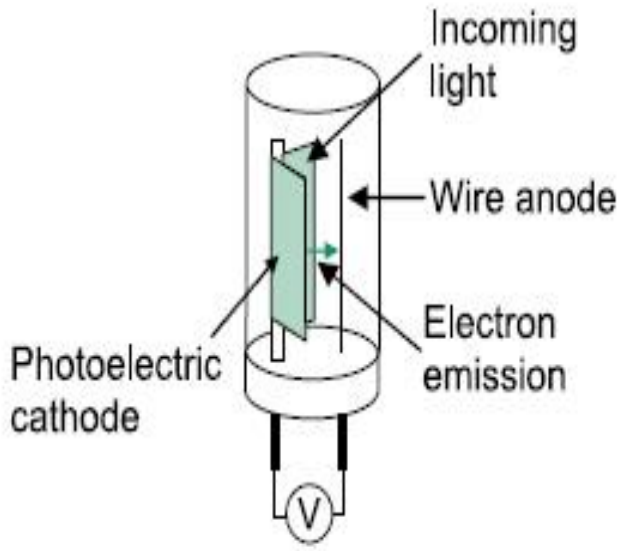

Fig 37 Photodiode are Use to Detects Muons

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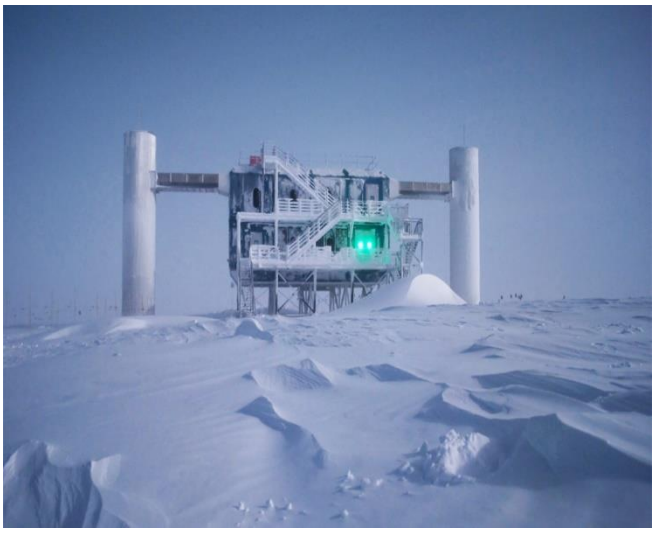

Fig 38 Ice Cube Lab to Detect Neutrino Through Cherenkov Effect

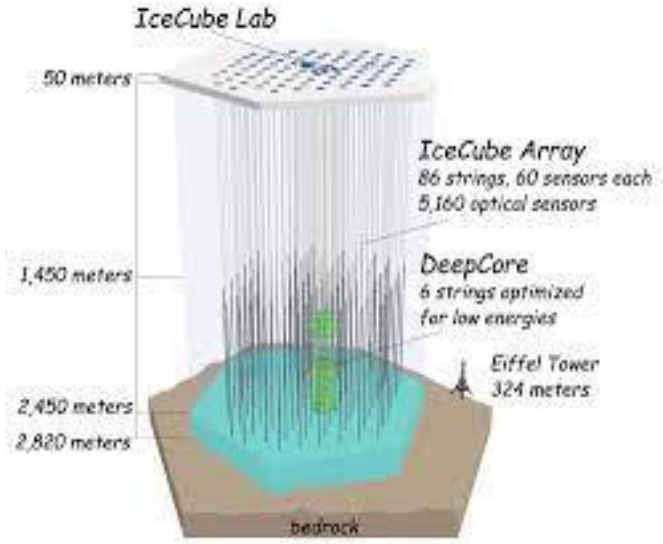

Fig 39 Ice cube Working procedure image

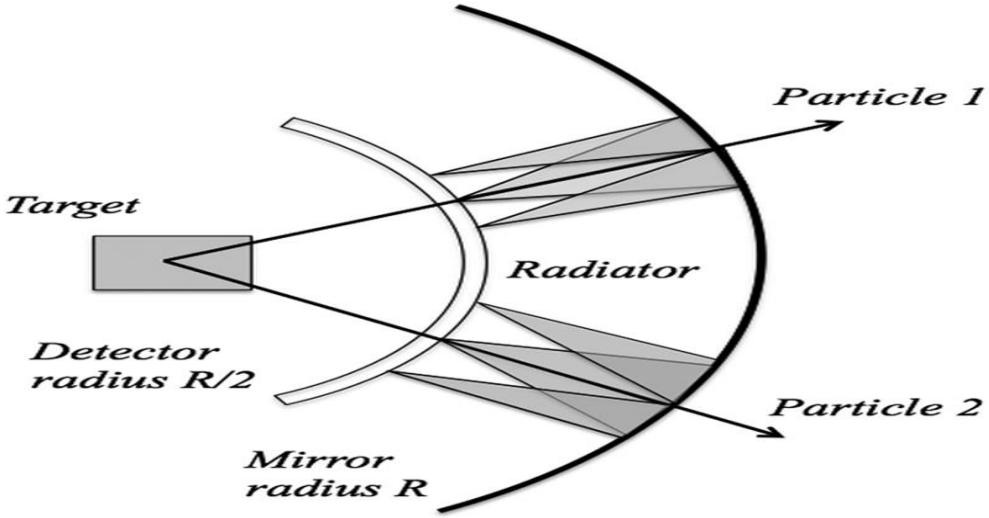

Fig 40 Working diagram of Neutrino detector

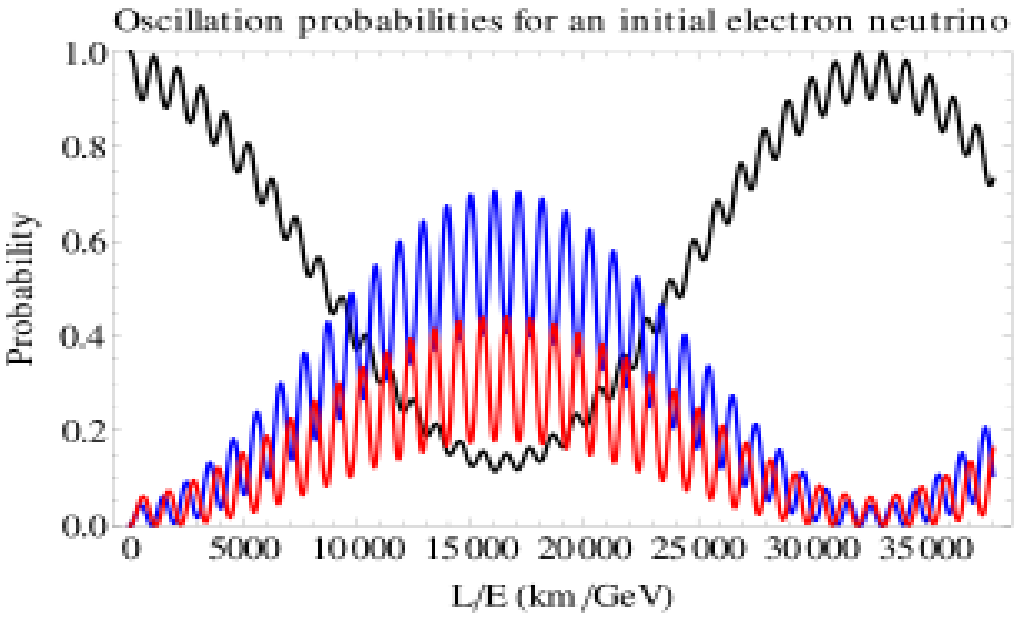

Fig 41 Neutrino Oscillation Through Oscillation Neutrino Particle Change Flavor Or Change Behaviour

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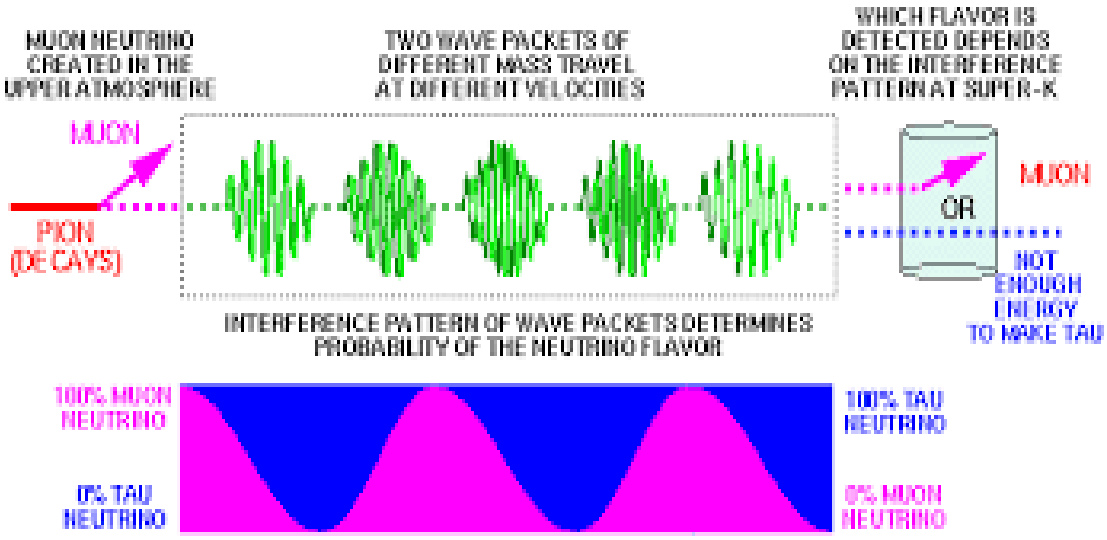

Fig 42 Ray Diagram of Chrenkov Effect

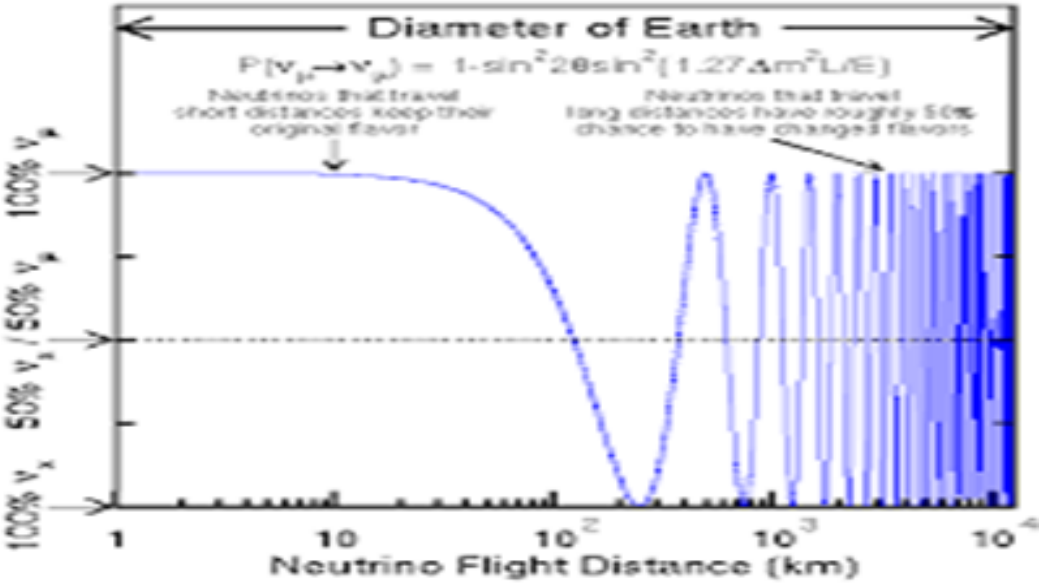

Fig 43 Neutrino Flight Changes in Flavour

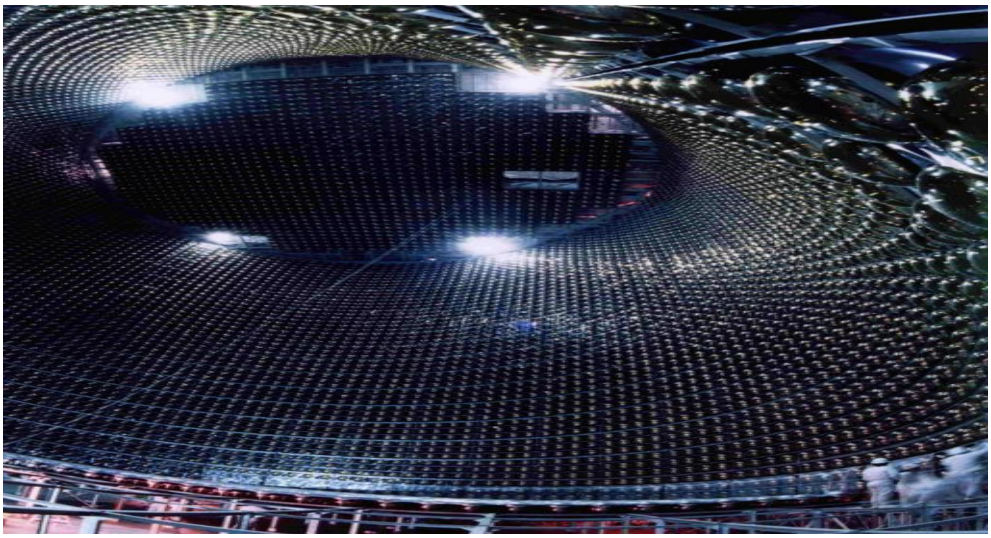

Fig 44 shows Super- Kamiokande Detector coutesy kamioka Observatory, ICRR(Institute for Cosmic Rays Research), the University of Tokyo. Is kind of Neutrino detector Super Kamiokande which detect muons in the Water.

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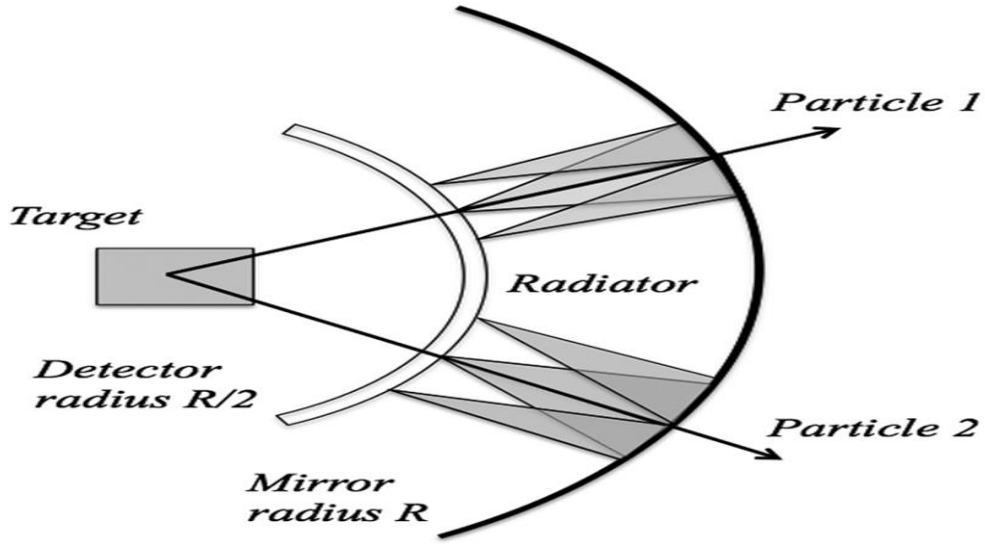

Fig 45 Working Diagram of Neutrino Detector Figure of the Inside of the Mini Kamiokande Detector

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

Fig 46 neutrino detectors

V. 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 reacter 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 Antarctica that has detect extremely beginning energy neutrinos.Communication with extraterrestrial Life. Beam of Neutrinos have Ability to detect alien life and receiving end would be able to decode message .Neutrino-anti neutrino annihilation 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 physicist 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.

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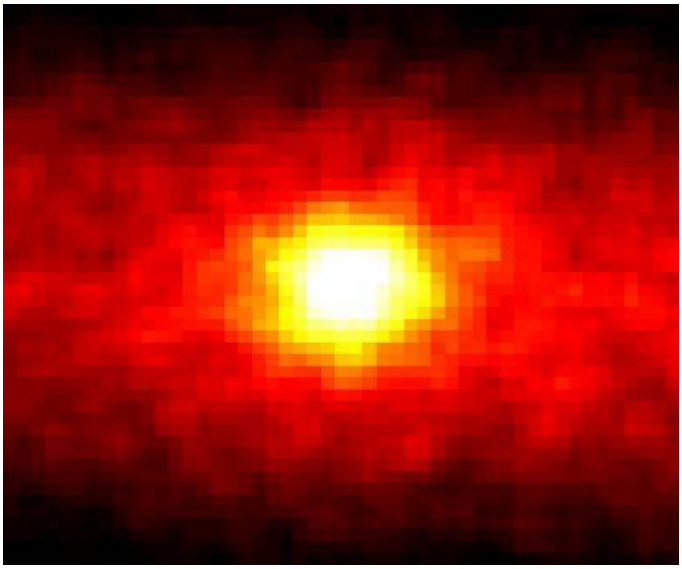

Fig 47 Picture of the Sun Made from Looking at Direction of Solar Neutrinos Courtesy of (NASA APOD).

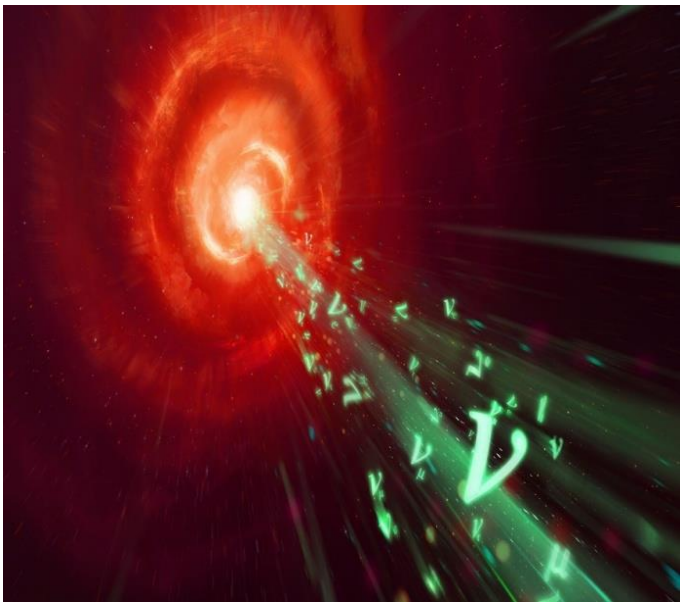

Fig 48 Neutrino

VI. 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 Glactic energetic particles and Neutrinos or radio Bursts particles?? How they effect in Earth enviriounment 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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