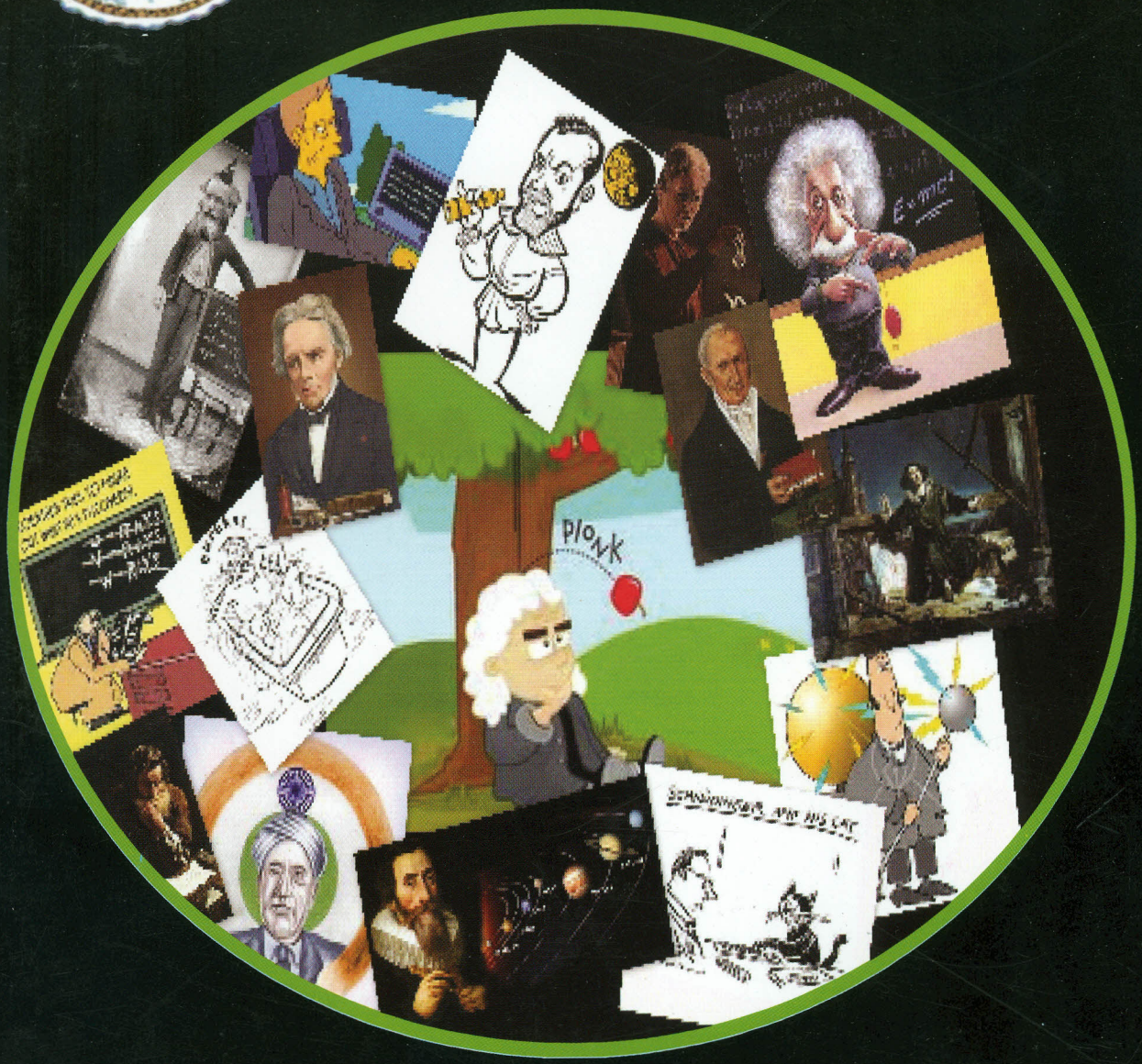
# DEPARTMENT OF PHYSICS
# STELLA MARIS COLLEGE - 2011




# PHYSIK!

# Greetings from the Department of Physics !

Editorial Board

Ansel Mely.L  Arul Sylvia  Sr.Nirmala  Annet Serena  Sr.Sagaya Mary

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# PHYSIK ! - 2011

# The Editorial Board reveals their delightful thoughts!

You can't always tell a book by its cover, but you can often tell a lot about a magazine by it's cover page and qualification of its content writers. Their knowledge of the subject added to their ability to communicate and share their topics with the readers is what makes PHYSIK! Magazine.

PHYSIK! is an annual publication by the Department a physics – Stella Maris College (Autonomus) Chennai. The magazine has had a successful run for five years and this is the sixth issue to be published. It has been received with overwhelming response from the students and the faculty of various colleges.

Physics is a subject which has deep root in our day to day life. New ideas in physics often explains the fundamental mechanism of other sciences while opening to new research areas.

On behalf of the Department of Physics – Stella Maris College (Autonomous) Chennai, the Editorial Board takes immense pleasure to thank His Grace Most Rev Dr A.M. Chinnappa, SDB, DD, PhD – Archbishop of Madras – Mylapore, Our Principal Dr. Sr. Jasintha Quadras, fmm, Rev. Sr. Susan Matheikal, fmm, Secretary – Stella Maris College for their honorable blessings and wishes.

We are indeed grateful to the Head of our Department Ms. Suganthi Lark and all the Faculty members for their guidance and support. Our heartfelt thanks to Rev. Sr. Nirmala- Faculty Department of Physics, for her constant and timely help rendered towards this magazine. We are also thankful to all our sponsors so as to mention Mr.K.Lawrence, Editor & Publisher of Mangai Chirappithazh and his staff, who all contributed towards making this magazine a great success.

We hope that this magazine proves to be a source of entertainment and rekindles the physics in you!

Most Rev Dr A M CHINNAPPA SDB, DD, Ph.D.
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01. 01. 2011

The Staff and Students
Dept of Physics,
Stella Maris College
17, Cathedral Road,
Chennai 600 086

Dear Staff and Students,

Greetings and New Year wishes from the Archbishop's House, Chennai!

I am delighted to know your department is going to release the "**PHYSIK!**" **2011** soon. This issue offers knowledge in current discoveries in technological areas enabling everyone to keep updating in the field. I wish the department all the best in its efforts to promoting such event.

Your Servant in Christ

+

+ Most Rev Dr A M Chinnappa, SDB, DD, PhD
Archbishop of Madras-Mylapore

ARCHDIOCESE OF MADRAS-MYLAPORE
St. Thomas the Apostle The Patron
CHENNAI-600 004

STELLA MARIS COLLEGE
(AUTONOMOUS)
17, CATHEDRAL ROAD
CHENNAI - 600 086.

Stella Maris College has always encouraged creative programmes and the dissemination of knowledge. This magazine of the Department of Physics, 'Physik', is one such attempt to create awareness and disseminate knowledge on the recent advances made in the field of Basic Sciences. Today more than ever the world is in need of going back to the roots and the neglected group of basic sciences. The sciences form the groundwork for all other technologies and only when the foundation is right will the newer technologies survive and grow.

My congratulations to the faculty and the students of the Department of Physics in bringing out this publication. I wish the magazine all success.

J Quadras fmm

Dr. Sr. Jasintha Quadras, fmm
Principal

**STELLA MARIS COLLEGE**
(AUTONOMOUS)
**17, CATHEDRAL ROAD**
**CHENNAI - 600 086.**

Hearty Congratulations to the staff and students of the Physics Department for bringing out their annual magazine 'Physik'. Today when the Basic Sciences are losing their popularity, I am happy to see the various articles in upcoming trends in Physics written by our students. The Editorial Board has taken pains to put together all the articles. It is a very time consuming job. I appreciate their hard work done with love and dedication. I can say with full confidence that you are the potential Scientists of the future.

I wish the magazine all the best. May God bless you and your efforts.

Sr. Susan Matheikal, fmm
Secretary

# FACULTY SPEAK

It gives me immense joy at the glad tidings that our department is bringing out an annual magazine . Congratulations to the editorial team and the students who had contributed their mite to bring out this magazine.

**I am delighted that the students have made an effort to present what they had learnt and experienced as budding scientists .Your articles surely spell out your innate potential and is an assurance that you are creative and capable .**

"Anyone who has never made a mistake has never tried anything new."

**- Albert Einstein**

**Yes your work may not be perfect but it is the beginning of a journey towards perfection . My sincere wish for each and every student is that you keep your eyes and minds open to learn and unlearn to become renowned scientists and committed citizens.**

**With best wishes**

**Mrs. Suganthi Lark .A.**
**Head of the Department**
**Department of physics**

# Light who shows everyone the way...

**(A tribute to our retired faculty)**

A special word of thanks I have to say,
Your thoughtful, kind gesture makes me write this poem today;
With a wonderful gift of teaching
And a heart that deeply cared,
You added a lot of love
To everything you shared.
You sparked the creativity
Among all the students you taught,
And encouraged us to strive for goals
That could never be bought;
.
You are such a special teacher!
Yes, I just want it to be known;
I always had fun in your class
And how the time has flown!

**Ms. Gigie A. Varghese**

Though you now must leave, and we must part,
I thank you for the times you made me feel high;
*Held with gratitude within my heart,*
Upon these bright memories I lay my good-bye!

**Annet Serena**
III Year

# ELECTRA '10-'11

*- feel the power…*

The department of physics , STELLA MARIS COLLEGE is privileged to share that ELECTRA'10-'11 an intercollegiate physics fest was a grand success and experienced a lot of new dimensions too.

A fortnight long preparations for ELECTRA got staged on the 14th of October 2010, by all dignitaries and officials related to the college and department. We were overwhelmed to say that, we had *Prof.Dr.D.ARIVUOLI* , Director, Crystal Growth Centre, Anna University amongst us as our Chief Guest.

The sought after person in the field of nano science and crystal structures also delivered us the inaugural address.

The event witnessed active participation of students from colleges around the city, with a lot of vigor and interest towards the subject. We almost had around 110 students involving themselves into different events of the day.

Apart from the usual set of On & Off Stage events, the dept also organized a few other events which could make the students score up points for their respective colleges. This included demonstrations of physics concepts, to explain the principle behind the working of common things around us, about different physicists and their contributions etc.

The other usual set of events that took place were Paper Presentation, Quiz, Fun With Physics, and Variety Entertainment as On Stage events and Treasure Hunt, Textile Collage, Physcape, Photohunt, Poster Designing and Puzzles as the other Off Stage events.

After about 8 hours of continuous events and participation by Co-students from different colleges, The Women's Christian College, Chennai. emerged as the winners. We once again have got a lot of appreciation and applause for them.

As the Fest Coordinator I am indeed grateful to my College, the Department Staff and all my friends and juniors who extended their great support and involvement in making ELECTRA a great event and also a benchmark in the history of our Department.

**PARVATHY RAJAM. N**

III year

# The Physics of Thoughts

Have we ever thought in the wildest of our dreams that ***Physics and our thoughts or consciousness*** could be inter related and inter connected? The fact is that they are, but still it is needed to be proved strongly and scientifically.

Hope all of us have experienced this. Whenever we concentrate and closely watch the flame of a candle it tends to elongate and we have also heard of spoon bending experiments. How does this happen? It can have two possibilities either the flame of light or the spoon should have sense as what we have, or on the other hand , our wave thoughts go and interfere with the molecules of these substance. According to my insight **both are happening** ! I feel that all molecules have some peculiar properties within them as which can interact with our waves of thoughts. This is what we the aspiring physicists need to analyze about. This could be greatly analyzed and researched using **Quantum Mechanics**.

Then there aroused another thought within me that if an inanimate object like a mobile SIM and many other systems could work through wireless transmissions why cant the human brain do it like how the **Pandora people were depicted in the film Avatar** . This is what happening as the ESP power in many people without their knowledge. By deeply analyzing these things scientifically using chaos and Quantum theories we will come to know about various happenings of the nature.

I strongly believe in this because, it was noted that on a particular day the total equilibrium state of the earth was reported to have undergone a great change by the **NASA observatory**. That was the day (**9/11)** when the twin towers were destroyed. The effect was created mostly due to the **wavelength of thoughts** that was given out by people of US . So does this mean that with the kind of wavelengths we create can actually change how the whole world exists? But for that we should know how to analyze the kind, type and nature of wavelengths we are producing through our thoughts and this can be done scientifically.

As the Bible says, '**what you sow, so shall you reap**' I strongly believe that by creating positive thoughts throughout the world we can definitely avoid all those disaster which are expected to happen in 2012. But the question is, can the connection between our thoughts and nature be approached using Quantum Physics.?

**What is Quantum Physics?**

Quantum physics is simply a science that studies and explains how everything in our world comes into existence starting from the physical aspect of the events, conditions, and circumstances of everything in the Universe and breaking them down into their most basic form, attempting to discover the Source from where they are derived from.

Whether or not we may currently be aware, **Quantum Physics**, **Spirituality, our thoughts, emotions, and success or lack of success in life are ALL closely intertwined or interconnected**. In fact as the modern day quantum physics has discovered, they're much more interconnected than we may realize.

Ok, to solve this wave/particle dilemma regarding energy, let us consider the brilliant

scientist, Neils Bohr, who was the Nobel Prize winner in 1922 and through his work and study of subatomic structure added a whole new twist to Einstein's theory regarding energy existing as particles. Unlike Einstein, Neils Bohr believed...or at least had a strong "hunch" that energy could be both waves OR particles. In fact Einstein and Bohr debated over this quite often for years.

Based on the work Bohr had done, he believed that matter could be separately analyzed as having several contradictory properties. In other words that's the scientific mumbo jumbo that says energy could be both **waves and particles**.

At that point though it still wasn't proven but the **fact that everything is ENERGY was.**

To put it another way, **ANYTHING** and **EVERYTHING** which exists in the entire cosmos, when broken down and analyzed into it's purest and most basic form utilizing sophisticated scientific tools and instruments, is merely a vibrating frequency of energy which joins together with energies of the same harmonious frequency to form what we "perceive" to be reality and as a result determines what we experience in the physical world.

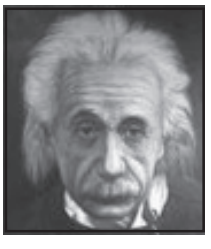
This isn't MY findings. It's not something that I've concocted out of thin air. This is a PROVEN and well documented science discovered by Nobel Prize laureates and the truth concerning it has been taught in spiritual circles and has been around for countless thousands of years.

This scientific validation which was made possible through Quantum Physics ,the ability for scientists to observe and validate these ancient spiritual teachings in a physical sense has been around for well OVER 80 years. Yet the sages, mystics and masters of the past have spoken of what quantum physicists have recently discovered regarding quantum mechanics and taught it in their own way before the technology existed to prove it in a "tangible" and physical kind of way.

These are some verses uttered from great physicists giving us an idea that the laws of physics could be interlinked to our existence in this world.

**Let's all try solving this mystery**. !

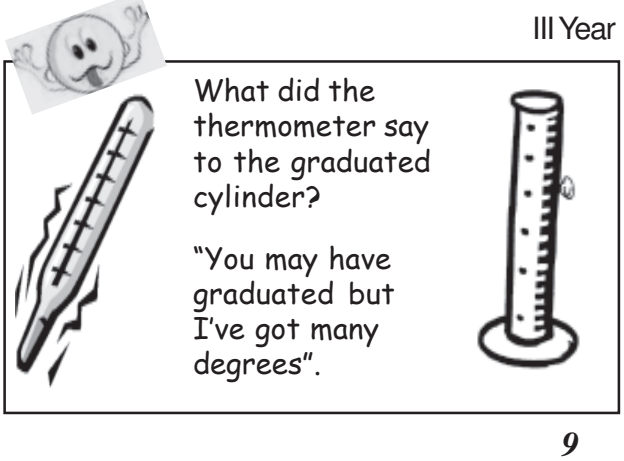
***"Science without religion is lame, religion without science is blind."- Albert Einstein***



***"All matter originates and exists only by virtue of a force... We must assume behind this force the existence of a conscious and intelligent Mind. This Mind is the matrix of all matter." - Max Planck***

***"Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are a part of the mystery that we are trying to solve." - Max Planck***

**PARVATHY RAJAM .N**
III Year



# The Amazing Physics in Music !

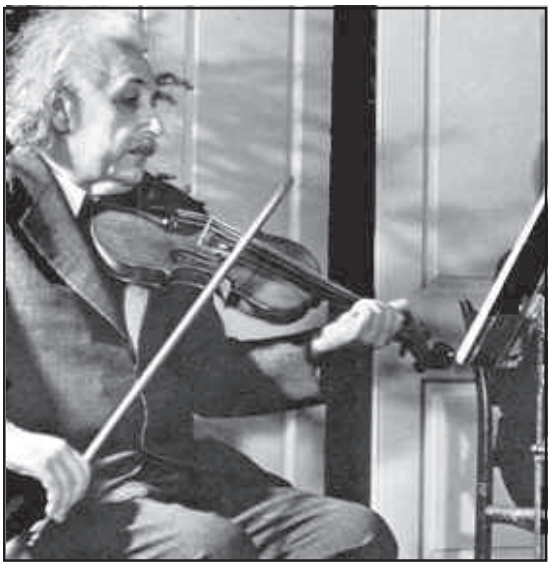
Albert Einstein is recognized as one of the smartest men who has ever lived. A little known fact about Einstein is that when he was young he did extremely poor in school. His grade school teachers told his parents to take him out of school because he was "too stupid to learn" and it would be a waste of resources for the school to invest time and energy on his education. The school suggested that his parents get Albert an easy, manual labor job as soon as they could. His mother did not think that Albert was "stupid". Instead of following the school's advice, Albert's parents bought him a *violin.* Albert became good at the violin. *Music was the key that helped Albert Einstein become one of the smartest men who has ever lived*. Einstein himself says that the reason he was so smart is because he played the violin. He loved the music of Mozart and Bach the most. A friend of Einstein, G.J. Withrow, said that the way *Einstein figured out his problems and equations was by improvising on the violin.*

**The Power of Music on Memory and Learning**

The power of music to affect memory is quite intriguing. Mozart's music and baroque music, with a 60 beats per minute beat pattern, activate the left and right brain. *The simultaneous left and right brain action maximizes learning and retention of information*. The information being studied activates the left brain while the music activates the right brain. Also, activities which engage both sides of the brain at the same time, such as playing an instrument or singing, causes the brain to be more capable of processing information.

According to The Center for New Discoveries in Learning, learning potential can be increased a minimum of five times by using this 60 beats per minute music.

*One simple way students can improve test scores is by listening to certain types of music such as Mozart's Sonata for Two*

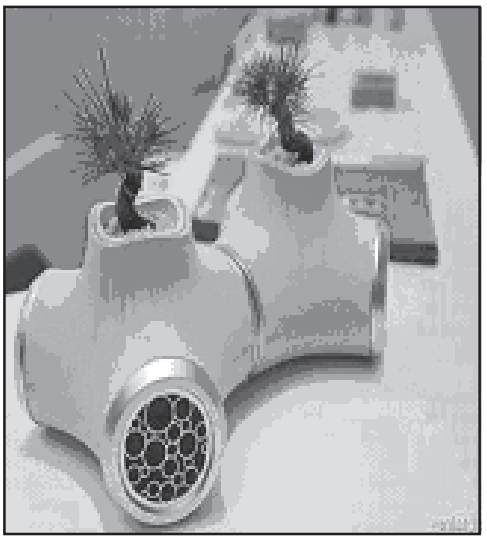


*Piano's in D Major*. This type of music releases neurons in the brain which help the body to relax.

Many revealing scientific experiments, studies, and research projects have been performed to try and discover the extent of the power of music. Up until 1970, most of the research done on music had to do with studying the effects of the beat of the music. It was found that *slow music could slow the heartbeat and the breathing rate as well as bring down blood pressure. Faster music was found to speed up these same body measurements*.

The key component of music that makes it beneficial is order. The order of the music from the baroque and classical periods causes the brain to respond in special ways. This is realized by the body and the human mind performs better when listening to this ordered music.

Bob Larson, a Christian minister and former rock musician, remembers that in the 70's teens would bring raw eggs to a rock concert and put them on the front of the stage. The eggs would be hard boiled by the music before the end of the concert and could be eaten.



**On Animals and Plants, Too!**

Tests on the effects of music on living organisms besides humans have shown that special pieces of music (including The Blue Danube) aid hens in laying more eggs. *Music can also help cows to yield more milk*. Researchers from Canada and the former Soviet Union found that wheat will grow faster when exposed to special ultrasonic and musical sounds.

Rats tested by psychologists were attracted to Bach music (the pied piper)

Retallack tested the effects of music on plant growth by using music styles including classical, jazz, pop, rock, acid rock, East Indian, and country. She found that the plants grew well for almost every type of music except rock and acid rock. Jazz, classical, and East Indian turned out to be the most helpful to the plants. However, the plants tested with the rock music withered and died.

**Conclusion**: One cannot deny the power of music. Responses to music can be observed. It has been proven that music influences humans both in good and bad ways. These effects are instant and long lasting. Music is thought to link the entire emotional, spiritual, and physical elements of the universe. Albert Einstein understood the enormous power of music. He summed it up by saying,

' If I were not a physicist, I would probably be a musician. I often think in music. I live my daydreams in music. I see my life in terms of music. ... I get most joy in life out of music.'

**Magdalene Lycia**

I year

# ASTRONOMY AND THE BIBLE

We find that every time a scientific fact arises in the Bible, it has been proven true, as it ever shall be. So, what does the Bible tells us about Astronomy? Let us take a look at what God tells us about the stars and the universe around us.

Compare the Bible's statements with other ancient views & with modern science

Our topics:

- Size of universe
- Number of stars
- Support of earth
- Shape of earth

The universe is first mentioned in the very first verse of God's Word. *Genesis 1:1* declares, "**In the beginning God created the heavens and the earth**." Some may get confused what it means by "**heavens**." The phrase itself is referring to the Universe - the universe and the earth.

There are technically three :

The first heaven, called the firmament - which is the Earth's Atmosphere

The Second - Outer Space, the starry heavens

The Third Heaven, THE Heaven the saved go when they die, God's Abode, where Jesus reigns. *(Genesis 2:19; 7:3, 23; Psalms 8:8, 115:16, 148:4; Deuteronomy 10:14, 17:3; Jeremiah 8:2; Matthew 24:29; 1 Kings 8:27; 2nd Corinthians 12:2)*

The universe is talked about all throughout the Bible, especially in the Psalms. *Psalm 33:6,9* says, "**By the word of the Lord the heavens were made, their starry host by the breath of his mouth... For he spoke, and it came to be; he commanded, and it stood firm**." By the Word of God, he created. Psalm 104:19, **"He made the moon to mark the seasons, and the sun knows when to go down**." Psalm 136:7-9, "**who made the great lights.... the sun to govern the day... the moon and stars to govern the night**."

**Size according to Psalm 8**

*O LORD, our Lord, how majestic is your name in all the earth!… When I consider your heavens, the work of your fingers, the moon and the stars, which you have set in place, what is man that you are mindful of him, the son of man that you care for him?*

**Size according to Modern Science**

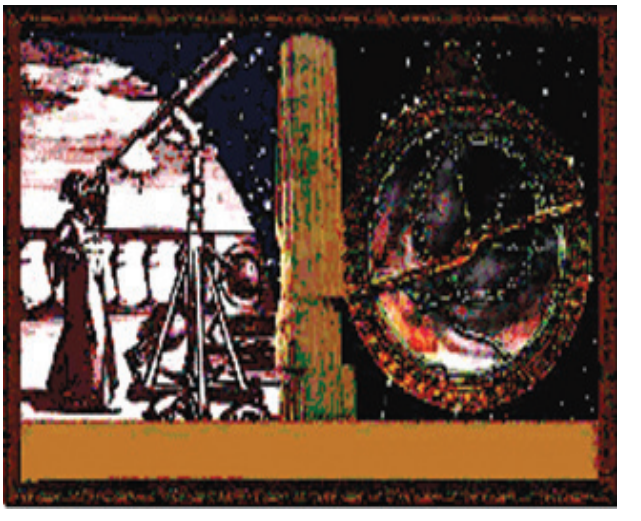
- We still don't know how large the universe is, as we have not found any ends!
- It is about 25 trillion miles (4 light-years) to the nearest star beyond the sun.
- It is about 2 million light-years (12 quintillion miles) to the next large galaxy.
- The most distant known objects are about 10 billion light-years away.

**Number according to Genesis 22**

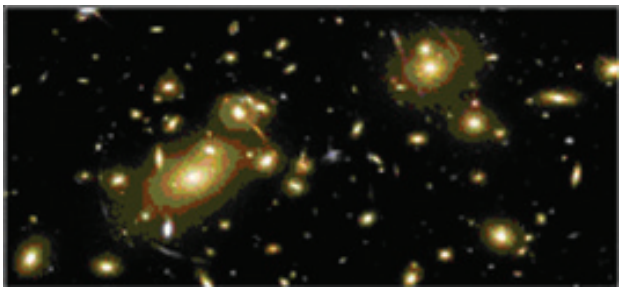
The angel of the LORD called to Abraham from heaven a second time and said, **'I swear by myself, declares the LORD, that because you have done this and have not withheld your son, your only son, I will surely bless you and make your descendants as numerous as the stars in the sky and as the sand on the seashore**.'

## Astronomy in the Bible

The Size of the Universe

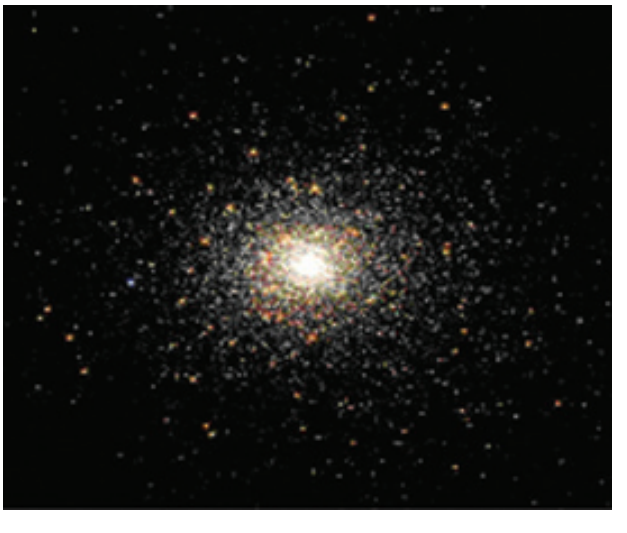


Earth Support in Modern Science



The Number of Stars

Shape in Modern Science



**Number according to the Bible**

This promise must have seemed strange to Abraham:

- *He came from Ur, with a 100,000+ population.*
- *As a shepherd he probably spent hours looking at the stars above and the sand below.*
- *He must have realized that he could only see a few thousand stars, less than a good handful of sand.*

**Number by Modern Science**

- We can see millions of stars with even a moderate telescope.
- Our galaxy the Milky Way has perhaps 200 billion stars.
- There are estimated to be some 100 billion galaxies in our universe.

**Earth Support in Job 26**

*[God] spreads out the northern skies over empty space; he suspends the earth over nothing.*

**Earth Support in Modern Science**

- Indeed, the earth is held up by no material support.
- The earth's support is immaterial, a balance between the earth's inertia & the gravity of the sun.

**The Shape of the Earth**

*Isaiah 40:22* refers to the "**circle of the earth**." Science of the time believed that the Earth was flat, and some claim that this is what the Bible teaches. On the contrary, we see that the Bible shows the Earth to be a circle - this is what inspired Christopher Columbus to sail around the world. It was the science of the time that believed the earth to be a flat disk - yet the Bible maintained that it was round, and this was discovered by man 2,400 years later.

**Shape in Isaiah 40**

*[God] sits enthroned above the circle of the earth, and its people are like grasshoppers. He stretches out the heavens like a canopy, and spreads them out like a tent to live in.*

**Shape in Job 26**

*[God] has described a circle on the face of the waters, at the boundary between light and darkness.*

**Shape in Matthew 24, Luke 17**

The passages describing the 2nd coming picture events characteristic of different times of day:

- *Sleeping*
- *Working in the fields*
- *Grinding grain*

This fits well with a round earth, on which it is day or night depending on location.

**Shape in Modern Science**

- Earth is pretty close to spherical
- Slightly flattened at poles
- Equatorial diameter about 20 miles longer than polar, less than 1/10" on a 20" globe

The line marking off day and night is thus very nearly a circle.

We find that Science expresses our Universe in these five terms: **time, space, matter, power, and motion**. The Hebrews understood this from *Genesis 1:1-2* in 1450 B.C.: "**In the beginning [time] God created [power] the heaven [space] and the earth [matter] . . . And the Spirit of God moved [motion] upon the face of the waters**."

The Bible's explanation is that it is a revelation from the God who made the universe.

**S. SHARON TAMIL SELVI**

III year

# THE FILM REVIEW

**Movie: INCEPTION**

**Directed & Written by: Christopher Nolan**

**Cast: Leonardo DiCaprio , Joseph Gordon-Levitt, Ken Watabe, Ellen**

Inception,the movie that would deserve undivided, intense viewers concentration for understanding centers on a team of individuals led by an "extractor" named Cobb (Leonardo DiCaprio) who, through the use of a special device, construct the dreams of an individual and use those dreams to implant an idea so that the person will make a decision beneficial to the individual who hired the team.

The film layers dreams on top of dreams to the point where a unique memoir called a "totem" is required in order to inform a character as to whether or not ,he or she is still dreaming .For almost an hour the film moves covering the basic requisites that would make the movie comprehensible to the viewers atleast to some extent.

There are certain constraints in this dreaming process :

- The dreamer cannot continue dreaming if he/she dies in their dream
- The dreamer will be put to an eternal slumber if he/she enters deeply into their target's conscience
- Memories should not be used to create situations or places in dreams because it would lead to more of confusions between reality and dreams.

The action scenes are much more like "*MATRIX*" where gravity is denied –hotels fly ,roads along with the buildings are vertical and even then people and things go about normally as though the laws of nature don't even exist ! The climax is really pulse –pounding as on would be lead astray that the entire team is about to die because unless and until one watches the movie with strong concentration one will not know if the team is dying in reality or in dreams.

The climax takes hold of the concept of **time dilation** which was cleverly crafted by the director. In a world where technology exists to enter the human mind through dream invasion, a single idea within one's mind can be the most dangerous weapon and no longer secrets will remain as secrets. This is portrayed through the two and a half an hour techno trailer .

**Movie**: **ENDHIRAN**

**Genre**: Sci-fi

**Starring**: Rajinikanth, Aishwarya Rai Bachan

The movie revolves around the Chennai based scientist Dr.Vasi and his brain child Chitti, a humanoid robot which does everything from normal to abnormal human activities like dancing to molding itself like an anaconda - a concept merged with stunning visual effects and captivating action scenes. The robot not only follows the master's orders but also scans books within seconds and replicates in a very exotic manner .

Despite the movie not matching upto the hype it still stands a strong hold on the technological side with the All-FAMOUS Stan Winston Studio having done the animation job. They have their credits for giving stunning movies like *Jurassic park ,Predator ,Terminator* and the most evoking *Avatar* !

Sure the movie strikes a Techno –Tsunami which has enabled the Study of **Robotics** to resurface and have stung many students to give a second thought for this subject but the first priority . When it comes to the moral side ,the first half of the movie explores and exploits the positives of the robotics mechanism sending positive vibes to the viewers. But to say the second half where the technology takes the villain role contrasts the thoughts of the viewers on the technology bantering a big NO for such techno-crafts in future. As far as Visual effects is concerned, just one word: **Mindblowing !**




**Arul Sylvia**
III year

# LAPTOPS WILL BE COOLER NOW!

Many times, we face the heating up of our laptops, but now it will become a story of the past. Some scientists and researchers are on the verge of developing a new technology which is going to help the laptops cool down.

In a recent study published in a renowned Physics Journal, **Nature Physics**, Jairo Sinova, who is a Physics professor has explained that laptops are excessively heating up due to their smaller size that are coming into existence, while they are becoming more and more powerful. Hence the strength of laptops is increasing while the sizes of the laptops are decreasing, thus creating excessive heating up.

Some times you will feel that your lap is almost heating up, as if you are sitting on a gas stove. Jairo says that although laptops usually use flows of electric charge while processing information, it should not produce heat; but sometimes the flow of electric charges itself produces heat. There are speculations that excessive heat can also melt down your laptop!

So as per the journal, the research done by Sinova and his colleagues will develop a new approach towards processing the information, so that the laptops remain away from the heating aspect . Actually heating up of laptops normally waste a good amount of energy too, thus the relevant research will help in saving energy as well.

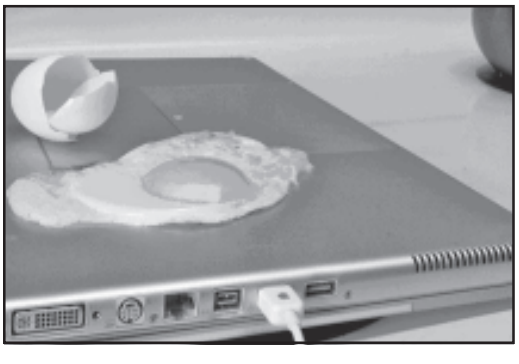
As per Jairo Sinova, their research will consider electrons for the flow of information. According to him, electrons can not be seen through naked eyes and their spin will process the information. Till now, we are not yet aware about the process through which information is processed, but here is a brief note on the same:

1. **Creation of Information**: The first step of processing the information is to create the information or data.

2. **Transmission of Information**: The second step is to transmit the information or data.

3. **Collection of Information**: The final step of processing the information is to collect the information or data so that the user can read it.

According to Sinova, no one is aware as to how these three steps are commenced. Sinova and his colleagues are sure that their spin-based device will solve the problem of excessive heating up of the laptops. The major challenge which his team might face is of distance, which according to Sinova is not a problem at all. According to him, transmission is no problem, as if the old devices can transfer the data to hundreds of feet than his new device and technology will transfer it to hundreds of miles for sure and efficiently.



I still remember one picture which I saw a few months back on the excessive heating of laptops; I would like to share the image over here with my readers:

I hope with the new technology developed by Sinova and team will make this as the thing of the past.

**Arul Sylvia**
III year

# Spotting fake bank notes with butterfly colour

***Papilio blumei* reflects colours to striking effect**

When it comes to head-turning fashion the animal kingdom often steals the show with its fantastic "structural colors" that can manipulate light in some weird and wonderful ways. One such beauty is *Papilio blumei*, a butterfly native to Indonesia, whose wings manage to combine green and blue in varying mixes depending on your viewing angle. This particular effect has now been mimicked by a group of researchers in the UK who say that their man-made structural colors could be added to bank notes to help prevent forgery.

At first glance the wings of *Papilio blumei* appear to be dominated by bright green colored areas. Closer inspection, however, reveals that the wings are speckled with cavities that are yellow at the centre, gradually blending into blue at the tips. Light from the centre of the cavity is directly reflected whereas light hitting the edges is initially deflected towards a substructure in the cavity, which consists of alternating layers of cuticle and air. When it finally re-emerges, the light has been partially polarized and comprises a mixture of wavelengths, creating the effect of structural color.

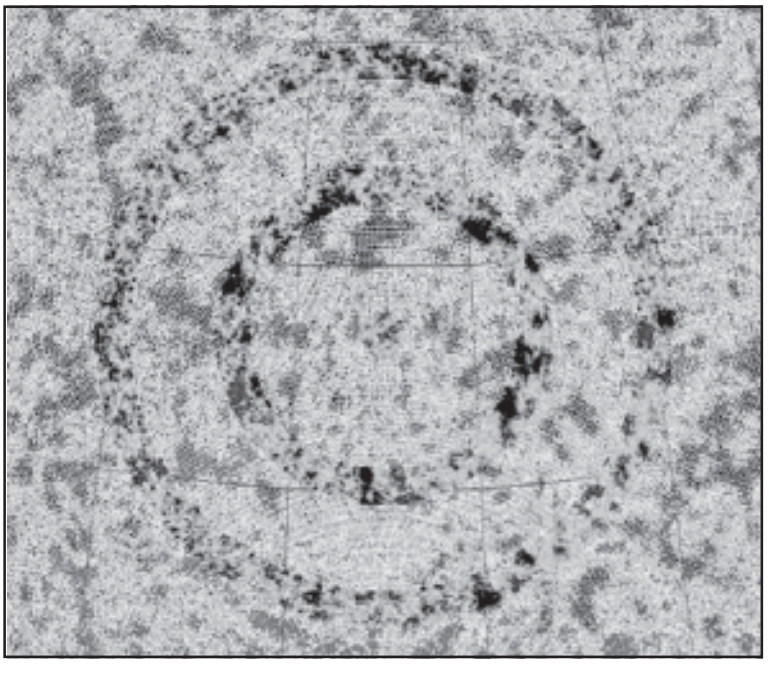
Years ago, researchers from the University of Cambridge teamed up to recreate this effect in the laboratory. The researchers implanted plastic spheres, with diameters of just 5 μm, into a gold-coated silicon substrate, before blasting them away using an ultrasound etching technique. This left a number of dimples in the gold surface, which simulates the butterfly's wing cavities. The researchers then used atomic layer deposition to overlay 11 alternating layers of alumina and titania, which recreates the multilayer structures within the butterfly's cavities. Each layer of titania was approximately 60 nm thick and each layer of alumina was approximately 80 nm, where the sizes were chosen to match the green-yellow reflectance band of *Papilio blumei*.

If these structured materials could be mass-produced they could be used to prevent forgery because many items now require some kind of official marker, from bank notes and credit cards to tickets for events. Researchers believe that marking items with structural colors could offer tighter security than some of the established methods, such as watermarking and holograms, which have become easier to forge in recent years.

**Maria Vinosel**

III year

# COSMIC REBIRTH



**M**ost cosmologists trace the birth of the universe to the "Big Bang", 13.7 million years ago. But a new analysis of the radiation generated by that explosive event suggests that the universe got its start, eons earlier and has cycled through myriad episodes of birth and death, with the Big Bang merely the most recent in a series of starting guns.

Researchers base their findings on circular patterns they discovered in the *cosmic microwave background*, the microwave glow left over from the Big Bang. "The circular features indicate that the cosmos itself circles through epochs of endings and beginnings", says Roger Penrose, theoretical physicist at the University of Oxford in England.

Penrose interprets the circles as proceeding a look back, past the glass wall of the most recent Big Bang, into the universe's premiers episode, or "aeon", as he calls it. The circles, he suggests were generated by collisions between super massive black holes that occurred during this earlier aeon. The colliding black holes would have created a cacophony of gravitational waves – ripples in space time due to the acceleration of the giant masses. Those waves would have been spherical and uniformly distributed.

The dark matter material along the burst therefore has this uniform character, and this is what is seen as a circle in our cosmic microwave background sky, and it should look like a fairly uniform circle. Penrose says his team found similar circular features with two different detectors, so its unlikely he and his colleagues are being fooled by instrumental noise a other artifacts.

Penrose says that a new, more detailed map of the cosmic microwave background, now bring conducted by the European space Agency's Planck mission, could provide a more definitive test of the theory.

**Roslin Thomas**
**Jennifer Neecia**
II Year

*Nothing in life is to be feared. It is only to be understood.*
- **Marie Curie**

*I need physics more than friends.*
- **J Robert Oppenheimer**

*No burden is so heavy for a man to bear as a succession of happy days*
- **Max Planck**

# PHYSICS IN THE MEDICAL FIELD

**New glasses use tongue to help blind see**

David Rathband lost his sight when he was shot in the face while on patrol in July of this year. The 42 year old is now into a trial usuage of what we call the **Brainport device**. He said, "The thought of being able to see my wife and children again is just amazing!"

The device involves a camera mounted on a pair of glasses being connected to a sensor on the patient's tongue, which then sends signals from the camera to the brain, bypassing the user's damaged eyesight.

A camera attached to the glasses captures a moving image via a cable to a lollipop attachment on the tongue. Electrodes tingle on the tongue to reflect the image with darker areas creating stronger pulses.

**View from the Third 'I'**

New York university photography professor Wafaa Bilal built digital camera attached to the mount implanted at the back of his head, developed a wonderful viewing concept.

The concept of the project which titled "the 3rd I" is based on the idea of capturing things subjectively, without the interference of a view finder.

**Sci-fi- to reality : Material that can heal itself Created**

It's not uncommon for us to see self-healing Robots like 'Terminator' but only in movies. Now researchers at Arizona state university have created a material with self-healing properties. It uses "shape memory" polymer with embedded fiber-optic network that functions as both the damage detection sensor and thermal stimulus delivery system to produce a response that mimics the advanced sensory and healing traits shown in biological systems. An infrared laser transmits light through the fiber – optic system to locally heat the material, stimulating healing mechanisms.

**MRI of baby at moment of birth**

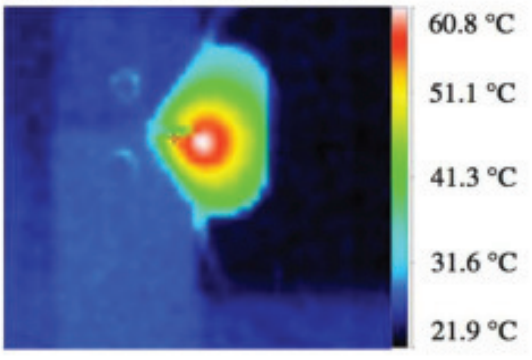
German doctors claim to have made a medical breath through by capturing live MRI scan images of a baby at the moment of birth, which may provide new insights into the process of delivery and allow future lives to be saved. A German mother agreed to give birth to a child inside a **Magnetic Resonance Imaging (MRI)** scan machine. The birth proceeded "normally" and the machine could film all the movements and processes that went on inside the womb.

**(iii) Tweaking bacteria to make cells act like mini computers**

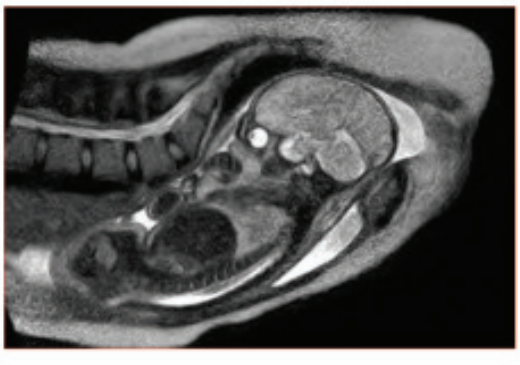
A team of researches at UCSF has engineered Ecoli with the key molecular circuitry that will enable genetic engineers to program cells to behave like computers.

Third 'I'

Cancers imaged using firefly glow




MRI of baby at moment of birth



Hybrid Assistive Limb (HAL)


E coli

Brainport device

New vaccination strategy

The work builds into cells the same logic gates found in electronic computers and develops a method to create circuits by "rewiring" communications between cells.

**(iv) On Strong Footing**

The "HAL" (Hybrid Assistive Limb) robot suit developed to help the disabled move around. The suit 'learns' the user's gait and assists movement. A full-body version, which will assist both arms and legs, will be out soon.

**Physicists put forward new vaccination strategy**

Michael Khasin and Mark Dykman of Michigan State University and Baruch Meerson of the Hebrew University of Jerusalem have worked out that just a small amount of vaccine can have a major impact in halting the spread of a disease.

If vaccine is in short supply then it should be given out at well-defined, regular intervals. That is the conclusion of a group of physicists in the US and Israel, who have borrowed from the ideas of quantum mechanics to show that a periodic release of vaccine could significantly reduce the time it takes to wipe out a disease. Their preliminary results suggest that vaccinating just a small portion of the population could cut this time by 40% or more, depending on the population size.

With an unlimited amount of vaccine an infectious disease can be eradicated with certainty. However, a vaccine can be in short supply if it is expensive to produce, difficult to store or short lived due to the disease being able to mutate quickly

**Cancers imaged and monitored using firefly glow**

US scientists have developed a new glowing probe that can signal the presence of hydrogen peroxide in the body, an indicator of tumours or disease. The advance could allow the progression of tumours to be tracked in living animals.

Hydrogen peroxide is widely used in the body for signalling phways, but is also given off by many cancers. Christopher Chang and colleagues at the University of California, Berkeley have been working on molecules that indicate the presence of hydrogen peroxide for a few years, and have looked to nature to improve their previous work by taking inspiration from fireflies.

The new probe is made of a luciferin molecule, a pigment found in bioluminescent organisms like fireflies, caged with a boronate ester protecting group. The probe selectively reacts with hydrogen peroxide, cleaving the protecting group and releasing the luciferin. In mouse models, the luciferin then reacts with the firefly enzyme luciferase that the mouse has been genetically engineered to produce, and the luciferin-luciferase system gives off a photon that triggers a bioluminescent glow.

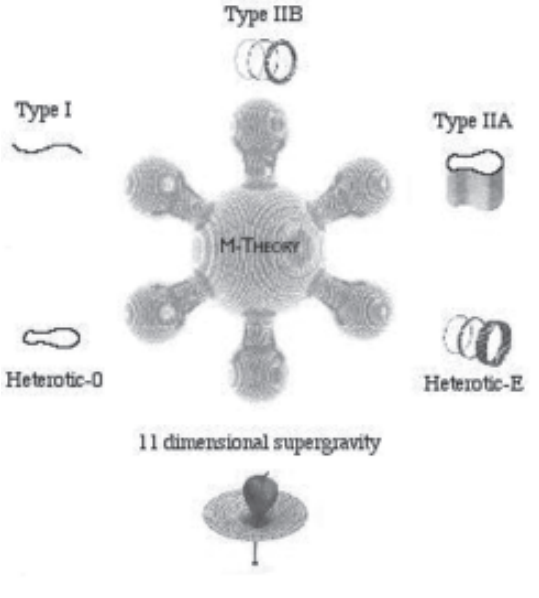
**Sr. Gracy SMMI**
III year

# THE UNFASHIONABLE UNIVERSE

Astronomers recently tried to calculate the average colour of the universe, by adding up all the star light in it, and found it is not sunshine yellow (or) pink (or) pale blue, but a rather depressing beige. In billion of years, when entropy finally wins out over gravity, the universe will become a uniform sea of beige.

**M-theory**

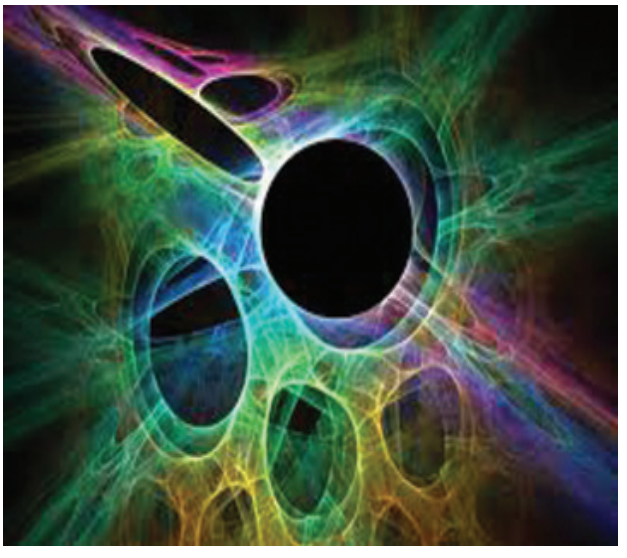
Strings are essentially lines. But in multi-dimensional space they are a limiting case of geometries that might include sheets and other many – dimension shapes. This generalized theory is called M-theory. There is no single word that the 'M' stands for; but it could be membrane, or mystery. A particle moving through space srawls out a line. If the point-like particle is dipped in ink, it traces out a linear path, that we call its **world line**. A string say a loop, would trace out a cylinder. So we say it has a **world sheet**. Where these sheets intersect, and where the strings break and recombine, interactions occur. So M-theory is really a study of the shapes of all these sheets in a 11-dimensional space.

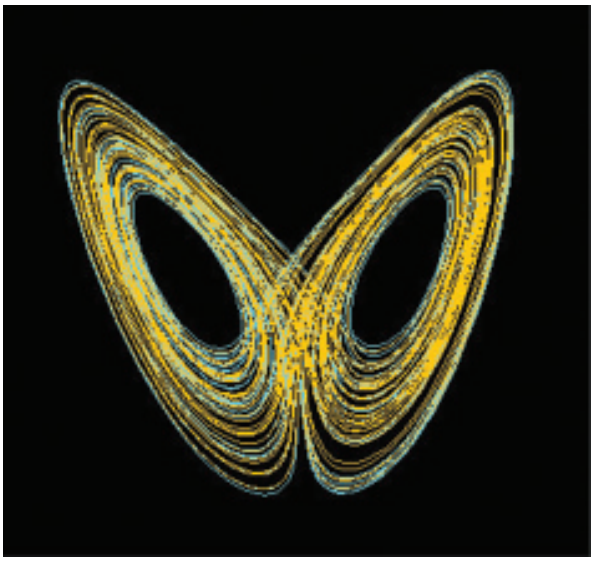



**The butterfly effect**

The main idea of chaos, that small changes can have big ramifications later on, is often referred to as the 'butterfly effect' after Lorenz's vision of the creature flapping pts wings and causing a for nado. This idea, especially involving time travel, has been used widely in films and popular culture, including a film called the '**Butterfly effect**' and even in Jurassic Park.

In the 1946 film. '**It's a wonderful life'**, the main character, George is shown by an angel how his home town would have been a more miserable place had he not been born. The angel says, "You've been given a great gift, George, a chance to see what the world would be like without you!". George finds out that his very existence saved a man from drowning, and it was really is a wonderful life!

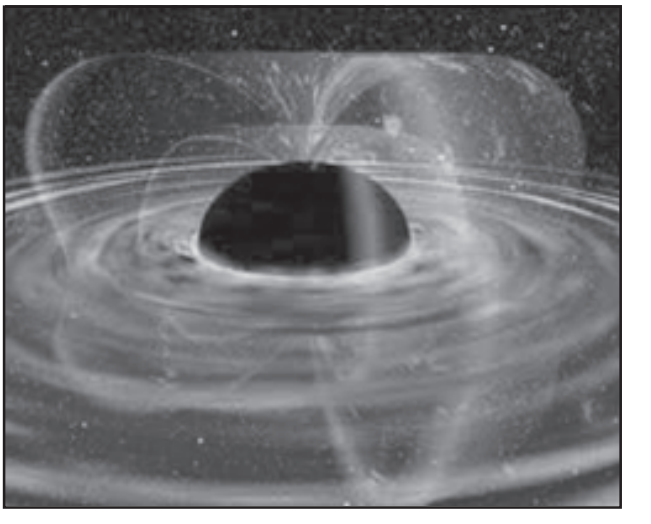




**Sr. Julie Adaikala Mary**
II year

# BLACK HOLE AND HAWKING RADIATION

Have you ever imagined a region in space where mass is so much concentrated that even light or electromagnetic radiations cannot enter? Yes … you are right. It is the black hole. **It is nothing with everything**. It absorbs all the light that hits it and reflects nothing. The idea of black hole was suggested by geologist John Michelle.



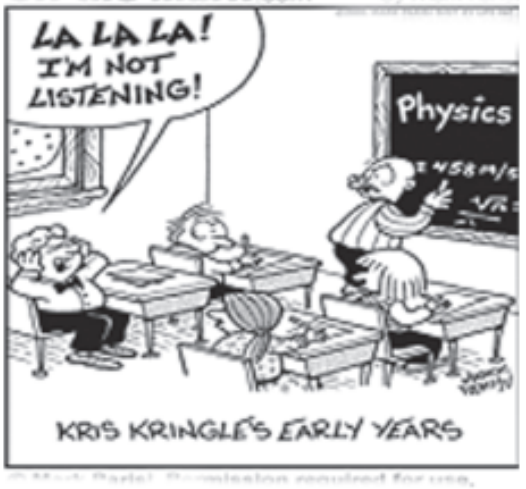
The black hole can be observe a through its interaction with the matter. As most of them are produced from the death of massive stars, it is generally suggested that the mass of black hole is the same as that of the massive star. But what would happen if the matter remained as such in the black hole? In quantum mechanics, it is suggested that these black holes emit "**Hawking radiation**". These Hawking radiation are the thermal radiation emitted by black holes due to quantum effects. According to Hawking's prediction, energy fluctuation from the vacuum generates particle – antiparticle fluctuations. Near the event horizon.

Event horizon is the region surrounding the black hole which marks the point of **no return**. One of the particle enters the black hole while the other escapes. The particle emitted has positive charge and the one which enters the black hole has negative charge. This results in black hole losing mass and energy. If this doesn't happen, we would not be where we are !

**Bhavana.J.**
**II year**

# CARICATURE



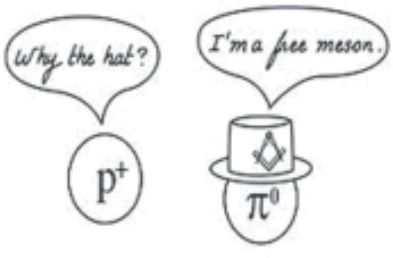


Jobs in which nobody understands what you do.

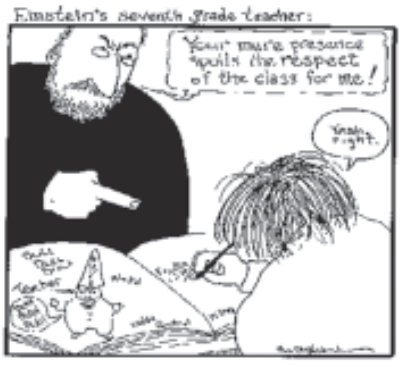

**Sunitha Merlin**
I year

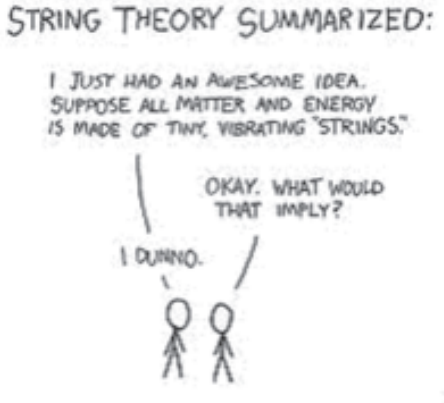
"Today in class we're going to create a physics teacher."

# IN PHYSICS






"That's what you get for discovering gravity, Sir Isaac."



**Surekha & Maria Merlin**
III year

# At the Party with the Physicists

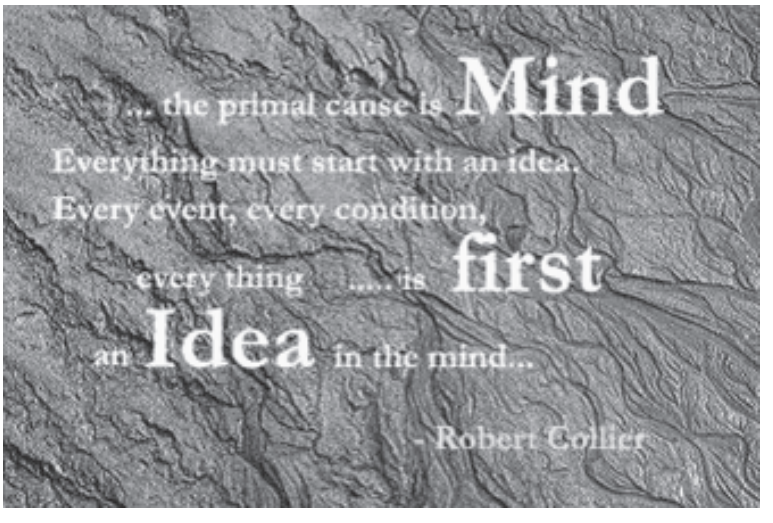
One day, all of the world's famous physicists decided to get together for a party (ok, there were some non-physicists too who crashed the party). Fortunately, the doorman was a grad student, and able to observe some of the guests...

- Everyone gravitated toward Newton, but he just kept moving around at a constant velocity and showed no reaction.
- Einstein thought it was a relatively good time.
- Coulomb got a real charge out of the whole thing.
- Cauchy, being the mathematician, still managed to integrate well with everyone.
- Thompson enjoyed the plum pudding.
- Pauli came late, but was mostly excluded from things, so he split.
- Pascal was under too much pressure to enjoy himself.
- Ohm spent most of the time resisting Ampere's opinions on current events.
- Hamilton went to the buffet tables exactly once.
- Volta thought the social had a lot of potential.
- Hilbert was pretty spaced out for most of it.
- Heisenberg may or may not have been there.
- Feynman got from the door to the buffet table by taking every possible path
- The Curies were there and just glowed the whole time.
- van der Waals forced himeself to mingle.
- Wien radiated a colourful personality.
- Millikan dropped his Italian oil dressing.
- de Broglie mostly just stood in the corner and waved.
- Hollerith liked the hole idea.
- Stefan and Boltzman got into some hot debates.
- Everyone was attracted to Tesla's magnetic personality.
- Compton was a little scatter-brained at times.
- Bohr ate too much and got atomic ache.
- Watt turned out to be a powerful speaker.
- Hertz went back to the buffet table several times a minute.
- Faraday had quite a capacity for food.
- Oppenheimer got bombed.
- The microwave started radiating in the background when Penzias and Wilson showed up.
- After one bite Chandrasekhar reached his limit.
- Gamow left the party early with a big bang while Hoyle stayed late in a steady state.
- For Schrodinger this was more a wave function rather than a social function.
- Erdos was sad no epsilons were invited.
- Instead of coming through the front door Josephson tunnelled through.
- Pauling wanted to bond with everyone.
- Keynes was keen to question the marginal utility of this party.
- John Forbes Nash wanted to play a n-person zero sum game.
- Pavlov brought his dog; which promptly chased after Schrodinger's cat.
- Zeno of Elea came with two friends - Achilles and the tortoise.
- Bill Gates came to install windows.
- Bertrand Russell kept wondering if the cook only cooks for the guests, who cooks for the cook?
- Witten bought a present all tied up with superstrings.
- The food was beautifully laid out by Mendeleyev on the periodic table.
- Riemann hypothesised about who would arrive next; to which Newton retorted, ' hypotheses non fingo.'
- Chadwick was handing out neutrons free of charge.
- Everyone was amazed at Bell's inequality.
- Watson and Crick danced the Double Helix.
- While Fermat sang, 'Save the Last Theorem for me.'
- Maxwell's demon argued with Dawkin's friend, the selfish Gene.
- Epimenides the Cretan announced that only non-Cretans spoke the truth.
- Rontgen saw through everybody.
- Descartes cogitated, 'I think I am drunk. Therefore I am at the party.'

**Magdalene Lycia**
I year

# ELECTRA '10 - '11


# Understanding The Mind Power Secrets- From Quantum Physics Perspective




The myths of the mind power secrets have finally emerged from the murky water of scientific skepticism.

Over the years of research and developments, quantum physics have found convincing evidences to explain the many "whys' and "how" concerning the mystery of our greatest asset – **the mind power secrets**.

Quantum physics, originated in the early 20th century as a sub-group of science, is the study of the subatomic particles that make up the universe. Many scientists, including Albert Einstein, Max Planck, and Niels Bohr, have discovered that these particles demonstrate unique behavioral patterns, toggling between matter and energy waves. While these microscopic particles are behaving like energy, they exist as a phenomenon of **mind illusions**. How is it so? When these particles are observed, they act like solid matter localized in time and space. To the human senses, it is like a mind illusion. What we perceive to be hard matter is nothing but a cluster of condensed energy.

Albert Einstein has come out with his famous formula to explain the relationship between matter and energy: $\mathbf{E = mc^2}$. Under this formula, energy is equal to mass (matter) multiplied by the square of the speed of light. Hence, matter is condensed energy. The converse is true - Matter can be turned into energy and energy can be turned into matter!

Another misconception is: Despite some matter being rock solid like iron and steel, every particle of that matter is composed of more than 99.999 percent empty space. If you can understand this concept, you will understand why in some Chinese martial art performance, the master is able to break bricks with bare hand or bend a sharp long rod with his throat. The secret lies in the "Qi" in the master's body, which when being concentrated, makes the body fresh (with 99.99 percent empty space packed with the "Qi") as hard as steel.

**The Implication of Quantum Physics**

**On Your Mind Power**

Many Nobel Prize winning physicists have (starting in the 1920s) proved beyond doubt that the physical world is one large sea of energy that flashes into and out of being in a fraction of a second, over and over again. Nothing is solid. This is the world of Quantum Physics. They have proved that thoughts are the original architects that put together and hold together this ever-changing energy field into the 'objects' that we see.

So are we tricked by our own mind illusions?

Why do we see a person instead of a flashing cluster of energy?

A good analogy would be the movie reel. A movie is a collection of about 24 frames a minute. Each frame is separated by a gap. However, because of the speed at which one frame replaces another, our eyes get cheated into thinking that we see a continuous and moving picture. Next, think of television. A TV tube is simply a tube with heaps of electrons hitting the screen in a certain way, creating the illusion of form and motion. This is what all objects are anyway.

We all have five physical senses (sight, sound, touch, smell, taste). Each of those senses has a specific spectrum (for example, a dog hears a different range of sound than you do; a snake sees a different spectrum of light than you do; and so on). In other words, your set of senses perceives the sea of energy from a certain limited standpoint and makes up an image from that. It is not complete, nor is it accurate. It is just an interpretation. Our thoughts are linked to this energy and they determine what the energy forms. This explains things such as positive thinking, prayer, faith, creativity, goal-setting, disease, and much more in a very scientific way. Your thoughts literally shift the universe on a particle-by-particle basis to create your physical life. Look around you. Everything you see started as an idea, an idea that grew as it was shared and expressed, until it grew enough into a physical object through any number of 'manufacturing' or 'growth' steps.

From the scientific evidences provided by quantum physics, we know that:

1. Everything in our universe is composed of energy.

2. That is the same energy that makes up all things in the universe.

3. Scientists have discovered that subatomic particles act and respond in exact proportion to the thoughts or expectations of the people who were conducting the studies.

4. We are immersed in a quantum mass of energy that responds to our mind's vibration energy. Your mind can initiate the inertia for the quantum energy in the universe to set into motion.

5. By focusing your mind on a desired outcome, your vibration energy can attract the same kind of energy from the universe, and transform the ever-changing sea of energy into observable reality.

**Arul Sylvia**
III year

# The Department of Physics - Staff

# The Department of Physics-III Years

# USING MOON TO TRAP ELUSIVE COSMIC PARTICLES

A team of astronomers used the moon as part of an innovative telescope system to detect mysterious, ultra – high – energy neutrinos from distant regions of space.

Their work gave new insight on the possible origin of the elusive subatomic particles and points the way to opening a new view of the Universe in the future.

Neutrinos are fast – moving subatomic particles (with no electrical charge) that readily pass unimpeded through ordinary matter.

Though plentiful in the Universe, they are notoriously difficult to detect. Experiments to detect neutrinos from the sun and supernova explosions have used large volumes of materials such as water or chlorine to capture the rare interaction of the particles with ordinary matter.

**Special equipments**

The team used special – purpose electronic equipment brought to the National Science Foundation's Very Large Array (VLA) radio telescope and took advantage of new, more – sensitive radio receivers installed as part of the expanded VLA (EVLA) project.

**Cores of galaxies**

The ultra – high – energy neutrinos the astronomers sought are postulated to be produced by the energetic, black – hole – powered cores of distant galazies, massive stellar explosions, annihilation of dark matter, cosmic – ray particles interacting with photons of the cosmic microwave background, tears in the fabric of space time, and collisions of the ultra – high – energy neutrinos with lower – energy neutrinos left over from the Big – Bang.

Radio telescopes cannot detect neutrinos, but the scientists pointed sets of VLA antennas around the edge of the moon in hopes of seeing brief bursts of radio waves emitted when the neutrinos they sought passed through the moon and interacted with lunar material.

Such interactions, they calculated, should send the radio bursts towards the Earth. This unique technique was first used in 1995 and has been used several times since then, with no detections recorded.

The latest VLA observations have been the most sensitive, yet done, according to a National Science Foundation Press release.

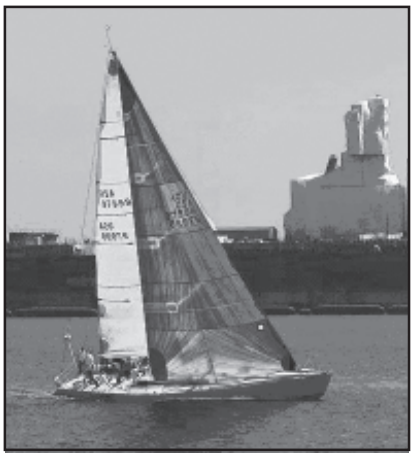
**K. Bhuvaneswari**
**II year**

# THE PHYSICS OF SPORTS

**The Physics Of Sailing- Using Principle Of Lift**

The physics of sailing is very interesting. It uses **The Principle Of Lift To Sail Faster.** The sailboats do not need the wind to push from behind in order to move. The wind can be blowing from the side and the sailboat can still move forward. How is this possible?

The answer lies in the well-known principle of aerodynamic lift. Imagine you are a passenger in a



car as it's moving along, and you place your right hand out the window. If you tilt your hand in the clockwise direction , your hand will be pushed backwards and up. This is due to the force of the air which has a sideways component and an upwards component (therefore your hand is pushed backwards and up)

**The Physics Of Snowboarding- Frictional Resistance**

An understanding of the physics of snowboarding is useful to snowboarders of all skill levels because it allows them to identify those key physics principles enabling them to properly execute certain moves, which is useful from a performance point of view.

A snowboarder typically gains speed by converting gravitational potential energy into kinetic energy of motion. So the more a snowboarder descends down a hill, the faster he goes.

The picture above shows a snowboarder going down a mountain. However, since the side of the mountain is very steep, the snowboarder must prevent himself from going too fast and losing control. He skids his board on the snow, in a controlled zig-zag pattern. This creates frictional resistance with the snow and prevents his speed from reaching dangerously high levels.

A common snowboarder stunt is to jump off an helicopter and land on the side of a mountain, before racing down. The landing force experienced by the snowboarder is reduced because his normal velocity component relative to the mountain surface, just before landing, is small. This is a result of the side of the mountain being at an inclination (i.e. not flat).

**The Physics Of Skydiving- Terminal Speed**

The physics of skydiving involves the interaction between gravity and air resistance. When a skydiver jumps out of a plane he starts accelerating downwards, until he reaches terminal speed. This is the speed at which the drag from air resistance exactly balances the force of gravity pulling him down.

**The Physics Of Billiards- Ball Collision**

The physics of billiards (sometimes called the physics of pool), in large part, involves collisions between billiard balls. When two billiard balls

collide the collision is nearly elastic. An elastic collision is one in which the kinetic energy of the system is conserved before and after impact. Therefore, for simplicity one can assume that for collisions involving billiard balls, the collision is perfectly elastic.

For the physics of billiards, where we have collisions between balls, momentum is always conserved (just like in any other collision). We can combine this fact with the elastic-collision assumption to find the trajectory of two colliding billiard balls after impact.

**The Physics Of Basketball- Hang Time**

Jumping is a major component of the physics of basketball. When a basketball player jumps in the air to make a shot he can appear to be suspended in mid-air during the high point of the jump. This is a consequence of projectile motion. When an object is thrown in the air it will spend a large percentage of time in the top part of the throw.

A basketball player can jump as much as 4 feet in the air (vertically). And the higher he jumps the greater the hang time (the total time he is airborne), and the greater the time he will appear suspended in mid-air during the high point of the jump.

**The Physics Of Gymnastics- THE TORQUE**

When a gymnast performs a somersault or twist on the floor, she usually does a round off or back handspring to give herself more speed to initiate them. These lever-like movements are defined as the perpendicular distance from the axis of rotation to a line along which the force acts. The amount of force produced and the lever-like movements in twists and somersaults is called the torque. The greater the torque, the greater the change or number of somersaults a gymnast will be able to perform in one series. Therefore, the torque plays the role of rotational motion in somersaults and twists.

**Sr. Sagaya Mary FSJ**
III year

# Metamaterials That Make Matter Invisible, Silent or Blindingly Fast

Step aside, nanotechnology, the buzzword for today's material scientist is "metamaterials." These substances are tiny engineered structures from existing composite that are used to manipulate light, sound and radiowaves. Researchers are just starting to find applications for this research and may soon come out with products that can cloak military vehicles, make stronger microscopes and faster computer chips.

The availability of these products in the market could possibly be as little as five years.

**Super Cellphones**

Rayspan Corp. of San Diego is using metamaterials to make stronger, smaller antennas. Although they measure just a few millimeters long and are as flat as paper, the new multiband antennas could double the range, reliability and battery life of cellular phones, Wi-Fi routers and wireless modems.

**Everyday WMD Detectors**

Army researchers are using meta-materials to build biological- and chemical-agent detectors. Metallic nanostructures react electromagnetically to incoming molecules, revealing their identities through a variety of responses. This method can detect single molecules, which could be of great use for passenger or cargo screening.

**Tools for the Silent Service**

Sound has a larger wavelength than light, so it's easier to build meta-materi-als to manipulate it. An Office of Naval Research program is funding a prototype that bends sound around a submarine to make it invisible to enemy sonar. Civilian spin-offs could produce total soundproofing and rooms with perfect acoustics.

**Viewers of the Unseen**

Microscope power is restricted by diffraction limit-—anything smaller than about half the wavelength of the illuminating light can't be seen. A University of Michigan team created a lens with metallic resonators that focus microwaves 10 times more than diffraction limit allows. These lenses could be used to make smaller, faster computer chips.

**Revolutionary Electronics**

Future circuits may use light rather than electricity, so Army engineers are building a meta-material switching device, fundamental for building small, fast photonic equipment. The device combines a metamaterial with a semiconductor, so the ability to trap light can be turned on and off. Such photonic computer chips could be 10 times faster than current chips.

**When nature can't supply** raw ingredients for next-generation hardware, scientists create their own. Man-made "metamaterials" are going beyond the lab and into real-world applications. Scientists use existing composite materials, like the gold and gallium-arsenide mixes used in electronics, to create complex, though tiny, structures. These nano-size bumps, crosses, holes or ridges manipulate electromagnetic waves that hit them.

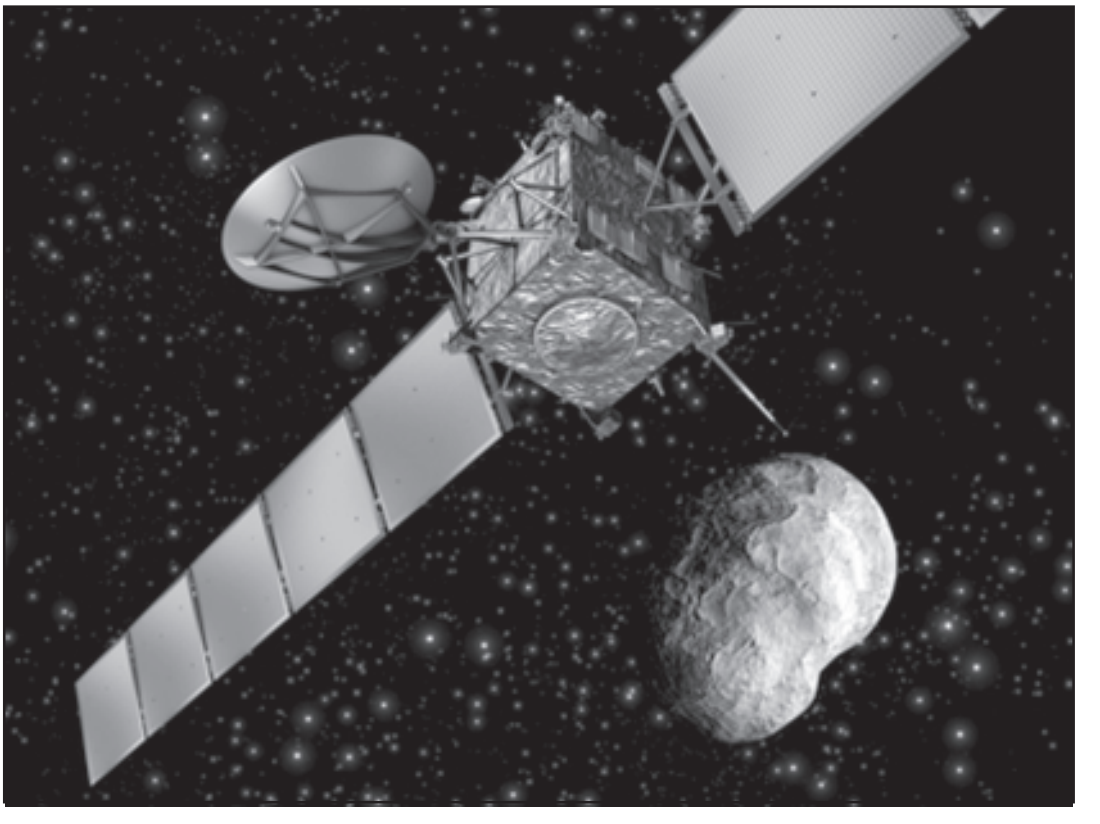
Early prototypes of invisibility cloaks, which would guide light around an object to be shielded, have generated some techno-buzz. But researchers have quietly been inventing more near-term materials that will soon appear in the pockets of consumers and in the hands of military users. !

**Annet Serena**
III year

***We can extract energy from the tides but where does that energy come from?***

Tidal energy can be obtained from the changing sea levels. In other words, tidal energy is a direct result of tide shifting from low to high. It relies purely on the orbital kinetic energy that the sun exerts as the earth orbits around it. The same goes with the moon and earth orbital system. As the moon orbits around the earth, a gravitational force is experienced by both bodies. Consequently, all of the forces that work within the orbital systems create an imbalance in the earth's water levels Thus some places have higher water levels while other places have decreased water levels.

# THE ROSETTA SPACECRAFT



The Rosetta Spacecraft of the European Space Agency (ESA) performed a fly by of a massive asteroid on July 10, 2010. During the successful exercise, the spacecraft took images that could one day help the Earth defend itself from destruction. Racing through the asteroid belt between Mars and Jupiter at a speed of 47,800 Kmph, the $ 1.25 billion probe flew within 3,200 km of huge potato-shaped rock **Luletia**.

The aim of the fly-by of the asteroid, measuring 134 km in diameter, was to measure Lutetia's mass and then calculate its density. This particular knowledge could one day be a lifesaver, if an asteroid enters on a collision course with the Earth. Knowing its density will help scientists determine whether they should try to deflect the rock or, instead, blow it up !

**Evelyn Derina Pinherio**
I Year

# SOLAR TSUNAMI- A REALITY CONFIRMED!

Sometimes you really can believe your eyes! That's what NASA's Solar Terrestrial Relations Observatory (STEREO) is telling researchers about a controversial phenomenon on the sun known as the **"solar tsunami.**"

Years ago, when solar physicists first witnessed a towering wave of hot plasma racing across the sun's surface, they doubted their senses. The scale of the wave was staggering: It rose up higher than Earth itself and rippled out from a central point in a circular pattern millions of kilometers in circumference. Skeptical observers suggested it might be a shadow of some kind—a trick of the satellite's eye—but surely not a real wave.

Solar tsunamis were discovered in 1997 by the Solar and Heliospheric Observatory (SOHO). In May of that year, a CME came blasting up from an active region on the sun's surface, and SOHO recorded a tsunami rippling away from the blast site.

SOHO's single point of view was not enough to answer the question—neither for that first wave nor for many similar events recorded by SOHO in years that followed.

The question remained open until after the launch of twin STEREO ( A and B ) . At the time of the February 2009 eruption, STEREO-B was directly over the blast site, while STEREO-A was stationed at a right angle —perfect geometry for cracking the mystery.

The twin STEREO spacecraft confirmed their reality in February 2009 when sunspot 11012 unexpectedly erupted. The blast hurled a billion-ton cloud of gas (a coronal mass ejection, or CME) into space and sent a tsunami racing along the sun's surface. STEREO recorded the wave from two positions separated by 90 degrees, giving researchers an unprecedented view of the event.

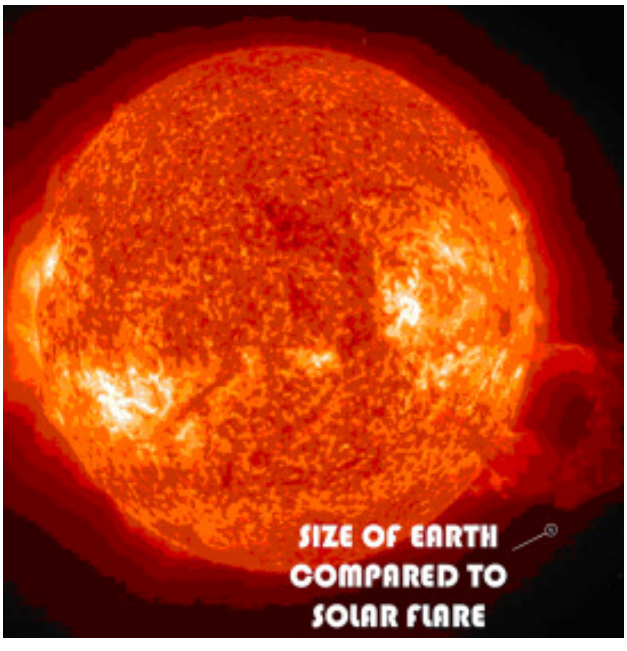
The technical name given to solar tsunami is "fast-mode magnetohydrodynamical wave," or "MHD wave" for short. The one STEREO saw reared up about 100,000 kilometers high, raced outward at 250 km/second (560,000 mph), and packed as much energy as 2.4 million megatons of TNT ($10^{29}$ ergs).

The Sun's Solar activity has a regular cycle, called "The Solar Cycle" with peaks approximately every 11 years. These peaks are called the "Solar maximum". Near these activity peaks, solar tsunamis occur in the form of solar flares or solar prominences.

A solar flare is a magnetic storm of high-energy and gases that are tremendously hot (from 3.6 million to 24 million °F).They are ejected thousands of miles from the surface of the Sun.

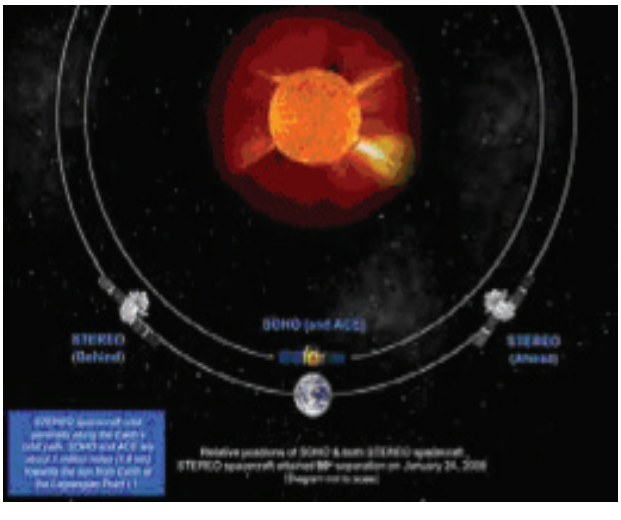
A solar prominence (also known as a filament) is an arc of gas that can loop thousands of miles into space. Prominences are held above the Sun's surface by strong magnetic fields and can last for many months.

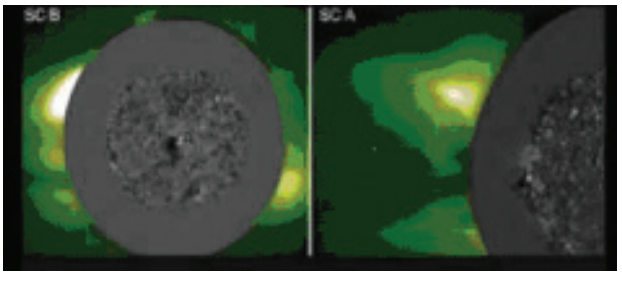
Recently, Solar Tsunamis occurred during august of 2010. This lit up the northern skies of U.S which sparkled into "CURTAINS" of red and green lights (auroras).




Scientists have assured that the solar tsunami poses no direct threat to earth and life on the planet. Besides, they are rejoicing the fact that this tsunami will help them study the phenomenon better and also diagnose conditions of the Sun.

The next solar maximum will occur in the time frame of 2012-2014 and is predicted to be an average solar cycle. The occurrence of Solar Tsunami in 2012 is confirmed but there is no special risk associated with 2012.The consequences and effects of this solar tsunami would be limited to blackouts, disruption in the communication systems and a rather desirable effect of brighter auroras or the northern lights in the sky.




**Annet Serena**
III year

# A BRIEF HISTORY OF PHYSICS

| | |
|---|---|
| 265 BC | Archimedes discovers his principle of buoyancy while having a bath. |
| 1020 BC | Alhazen, the greatest scientist of the so-called Dark Ages, explains the workings of lenses and parabolic mirrors. |
| 1490 AD | Leonardo da vinci studies the capillary action of liquids. |
| 1550 | The reflecting telescope and later the refracting telescope pioneered by Leonard Digges. |
| 1669-19 | Johannes Kepler publishes his laws of planetary motion. |
| 1610 | Galileo Galilei observes the moons of Jupiter through a telescope. |
| 1643 | Mercury barometer invented by Evangelista Torricelli. |
| 1668 | A functional reflecting telescope is made by Isaac Newton, unaware of Digger's earlier work. |
| 1675 | Ole Roemer measures the speed of light by timing eclipser of the moon of Jupiter. |
| 1678 | Publication of Newton's principia, which includes his laws of gravitation. |
| 1760 | John Michell explains earth quakes. |
| 1783 | John Michell is the first person to suggest the existence of 'dark stars' now known as 'black holes'. |
| 1798 | Henry Cavendish determines the mass of the earth. |
| 1802 | Thomas Young publishes his first paper on the wave theory of light. |

| | |
|---|---|
| 1803 | John Dalton proposes the atomic theory of matter. |
| 1816 | Augustin Fresnel develops his version of the wave theory of light. |
| 1831 | Michael Faraday and Joseph Henry discover electromagnetic induction. |
| 1864 | James Clerk Maxwell formulates equations describing all electric and magnetic phenomena, and shows that light is an electromagnetic waves. |
| 1896 | Antoine Becquerel discovers radioactivity. |
| 1897 | Electron identified by Joseph Thomson. |
| 1898 | Marie and Pierre Curie discover radium. |
| 1905 | Einstein's special theory of relativity published. |
| 1912 | Discovery of cosmic rays by victor Hess. |
| 1913 | Discovery of the ozone layer by Charles Fabry. |


**S. Tamilarasi**
**Sr. George Anto Brahe**
**P. Srinidhi**
II year

***What is the difference between a physicist, an engineer, and a mathematician?***

If an engineer walks into a room and sees a fire in the middle and a bucket of water in the corner, he takes the bucket of water and pours it on the fire and puts it out.

If a physicist walks into a room and sees a fire in the middle and a bucket of water in the corner, he takes the bucket of water and pours it eloquently around the fire and lets the fire put itself out.

If a mathematician walks into a room and sees a fire in the middle and a bucket of water in the corner, he convinces himself there is a solution and leaves.

# வானம் ஏன் நீல நிறமாக தெரிகின்றது?

ஏன்? எதற்கு? என்ற கேள்விகள் எழும் போது தான் மனித அறிவும் மூட நம்பிக்கைகள் பலவற்றிலிருந்தும் விடுபடும். பல அடிப்படை கேள்விகள் மனித மனங்களுக்குள் இருந்து வருவேத இல்லை. அவற்றில் ஒன்று தான் இது. ஏன் வானம் நீலம் ?

சூரியனில் இருந்தோ அல்லது மின் குமிழில் இருந்தோ வரும் ஒளி வெள்ளை நிறமாக இருக்கும். ஆனால் பல நிறங்களை உள்ளடக்கியது. இதனை வானவில்லில் அவதானிக்கலா வாயுமண்டலத்தில் (atmosphere) கூடுதலான சகவிகிதம் (78%நைட்ரஜன், 21% ஆக்சிஜன்) வாயுக்களும் மிகுதி நீராவியும் மாசுத்துணிக்கைகளும் உண்டு. அவற்றினூடே ஒளி பூமியை வந்தடைகிறது.

ஒளி அலைகள் வேறுபட்ட அலை நீளத்தை உடையவை. சிவப்பு நிறம் கூடிய அலை நீளம் கொண்டது. நீல நிறம் குறைந்த அலை நீளம் உடையது. கூடிய அலை நீளம் உடைய ஒளி அலைகள் வந்தடைகின்றன. குறுகிய அலைநீளம் உடைய நீல நிற ஒளி வாயுத்துணிக்கைகளால் உறிஞ்சப்படுகிறது. உறிஞ்சிய துணிக்கைகள் அதை கதிர்கின்றன. அவை தெறிப்பு அடைந்து நீல நிறமாக வானம் தோன்றுகிறது.

ஒளி காற்று மண்டலத்தில் இடையூறில்லாமல் பயணம் செய்தாலும் காற்றிலுள்ள அணு மூலக் கூறுகள் நீர்த்துளிகள் பனி மூட்டம் போன்றவை ஒளியைச் சிதறடிக்கின்றன. சிதறிய ஒளி மேலும் மேலும் சிதறடிக்கப்படுகிறது. இவ்வாறு நடைபெறும் போது மிக அதிகத்துடிப்புடைய நீல நிறம் மிக அதிகமாக சிதறடிக்கப்படுகிறது. (சிவப்பு மிகக்குறைவாக சிதறுகிறது).

நாம் பார்க்கும் போது அவ்வொளி அலைகள் கண்ணை வந்தடைகின்றன. அதனாலேயே பகலில் வானம் நீல நிறமாக இருப்பது போல தோன்றுகிறது. வானம் என்பது வெறுமனே வாயுத்துணிக்கைகள், மாசுக்களால் மேலே கூறப்பட்ட ஒளியால் ஆனதே தவிர அப்படி ஒன்றும் இல்லை என்பதே உண்மை. பௌதீக விதிப்படி ஒரு நிறத்தின் ஒளி அலைகளின் நீளம் அதிகமாக இருந்தால் அவை நம் பார்வைக்கு கிடைக்காமலே போய்விடும்.

நீல நிறத்தின் ஒளி அலைகள் குறைவாக இருப்பதால் அது நம் கண்களுக்குள் மாட்டிக்கொள்கிறது. வானம் நீல நிறமாக இருப்பதால் அதை பிரதிபலிக்கும் கடலும் நீல நிறமாக இருக்கிறது. காலை மாலை சூரிய உதயம் அஸ்தமனம் போது மட்டும் அந்தப் பகுதி சிவப்பாக தெரியக் காரணம். சூரியக்கதிர்களில் உள்ள சிவப்பு நிறத்தின் ஒளியலைகளின் நீளம் அப்பொழுது மட்டும் குறைவதுதானாம்.

பூமியின் மேலுள்ள காற்று மண்டலம் தான் காரணம். சூரிய ஒளி அனைத்து வண்ணங்களையும் உள்ளடக்கியது. வானவில்லில் அது தன் தோகையை விரித்து ஏழு வர்ணங்களைக் காட்டுகிறதே அதனுள் மற்ற வர்ணங்களும் அடக்கம். அவை அனைத்தும் ஒளியே ஆயினும் வர்ண வேறுபாடுகளுக்கு காரணம் அந்த ஒளியின் அலை நீளம் மற்றும் துடிப்பு வானவில்லின் வண்ணங்களில் நீல நிறம் மிக அதிகத் துடிப்புடனும் சிவப்பு மிகக் குறைந்த துடிப்புடனும் இருப்பவை.

நாம் பார்ப்பது என்பது ஒளி நமது கண்ணில் வந்து படும் போது மட்டுமே. பார்க்கும் பொருட்கள் எல்லாமே அதில் பட்டு திரும்பும் ஒளி நமது கண்ணை வந்தடைவதால் தான் காற்று மண்டலத்தில் பலமாக சிதறடிக்கப்படும் நீல நிறமே மற்ற நிறங்களை விட பெருமளவில் நமது கண்ணில் வந்து விழுகிறது. ஆகவே தான் வானம் நீல நிறம்.

**அருட் சகோதரி. சகாயமேரி வ.பி.ச**
மூன்றாம் ஆண்டு

# விண்ணும் வியக்கும்

**வெ**ட்ட வெளியில் பட்டம் விட்ட
காலம் கணிந்து செவ்வாயில் தடம்
பதித்த நிலை கண்டு சூரியனும்
சுருங்கிக் கொள்ளும் ஒரு நிமிடம் !

வானில் வட்டமிடும் விண்மீன்கள் கூட
அறிவியல் வளர்ச்சிக் கண்டு தன்
நிலை மறந்து ஒளிர்ந்திட
மறந்து நிற்கும் ஒரு நிமிடம் !

விண்ணில் வலம் வரும் வட்ட நிலவும்
வியந்திட வைக்கும் அறிவியல்
திறன் கண்டு மூடிக்கொள்ளும்
தன் முகத்தினை ஒரு நிமிடம் !

அளவற்ற அறிவியல் கண்டுபடிப்புகளும்
அத்துறையில் கண்டிட்ட வளர்ச்சி
கண்டு கோள்களும் கோபித்துக்
கொள்ளும் ஒரு நிமிடம் !

ஐசன் நியூட்டன், ஆல்வா எடிசனின்
திறமைதனில் பொறாமை கொண்டு
மின்னலும் மின்னிட மறுத்து
நின்றுவிடும் ஒரு நிமிடம் !

அன்னை தந்த அப்துல்கலாமும்,
ஆருயிர் ஈந்த கல்பனா சால்வா
'நாசா' வின் அற்புத படைப்பென்று
அடங்கிடும் இடியும் ஒரு நிமிடம்

அறிவியல் வளர்ச்சியால் உலகம்
அடங்கியது நம் கைகளில் என்று
ஆனந்தம் கொண்டே அமைதியானது
அந்த வானம் ஒரு நிமிடம் !

அருட் சகோதரி. **அனிதா**
மூன்றாம் ஆண்டு

# இயற்பியலை கற்போம் ஆர்வமாய் ...

இயற்பியல் என்பதும் அறிவியலே
இறைவன் படைத்ததை அறியும் ஒரு கலையே
இயற்பியல் படிக்கும் மாணவர் நாம்
இவ்வுலகில் வாழ்வோம் இலக்கணமாய்

இவ்வுலக உருண்டை சுழல்வதுவும்
இரவு பகல் என வருவதற்கும்
இயற்கை கொடுத்த அருங்கொடை தான்
இயற்பியல் என்னும் தனிப்பாடம்

இவ்வுலகில் உள்ள அனைத்துக்கும்
இயற்பியலே உண்மை கருவாகும்
இதை உணரா மாந்தர் அனைவர்க்கும்
இயற்பியலை நாம் புரியவைப்போம்

இன்று நேற்று என்றல்ல
இம்மியளவும் இது பொய்யல்ல
இயற்பியலே வாழ்வின் வழிகாட்டி
இதை புரியாட்டி நாம் வெறும் தலையாட்டி

இன்றைய வாழ்வை வகுத்திடவும்
இயற்கை வளங்களை அறிந்திடவும்
இறுதியில் உலகம் முடிவதுவும்
இயற்பியல் மூலம் நடப்பது தான்

இயற்பியல் படிக்கும் நாம் அனைவரும்
இறைவனை முதலில் தியானித்து
இயன்றவரை நாம் ஒன்றித்து
இயற்பியல் வளர உதவிடுவோம்

**ஆன்சல் மிலி. லா**
மூன்றாம் ஆண்டு இயற்பியல் மாணவி

# சாதனை உனக்கு புதிரல்ல ...

பூமியே !
உன்னில் என்ன
காந்தத்தையா வைத்திருக்கிறாய் ?
உன்னை நோக்கி
அனைத்தையும் ஈர்க்கின்றாயே !!

மூளையை நீ
எந்த திசையில்
திருப்பிப் போட்டாலும்
அது மிதவை தானே !

ஒன்று சேரும் வெப்பம்
தீயாய் மாறுகிறது ...
வெளிச்சம் தருகிறது ...
கண்ணுக்கும் தைரியாமல்
காட்சிக்கும் விழையாமல்
அனைவரையும் இயக்கும்
ஆற்றலே ! இயற்பயலின்
சக்தியே !!

நீரோடு இருந்தபோது
மரம் என்றாய் ...
நீர்த்துப் போனதும்
கரி என்றாய் ...
இறப்பு எனக்கு ஏது?
மனிதர்கள் ஒருமுறை
எரிந்து போனால்
சாம்பல் தான் மிஞ்சும் !
இனியாவது புரியட்டும்
கரிக்கட்டை காலம் வாழும் !!

உலகத்தில் உய்கின்ற
உயிர்களுக்கெல்லாம்
உயிரான காற்றே !
இயற்பியலின் இயல்பே !!

விழுவது இயல்பு,
வீழ்ந்தே கிடப்பது அறிவீனம்,
வீழ்ந்தும் எழுவது எழுச்சி !
சோதனை என்பது
சாதனைக்கு புதிதல்ல !

சாதனை உனக்கு புதிரல்ல !
சோதனையைக் கொன்றுவிடு !
சாதனையை வென்றுவிடு !

தடைகள் என்றுமே தடைக்கற்களே
அவற்றைப் படிக்கற்களாக நீ மாற்றும் வரை !
வெற்றிகளைக் கேட்டுப்பார். அவைகள்
சந்தித்த தடைகள் உனக்குத் தெரியும்
தடைகளை உணர்ந்து பார் – உன்
இலட்சியக் கனவு உன் முன் மலரும் !!

**K.J. ஷீலா காருண்யா**
மூன்றாம் ஆண்டு

# அதிசய இயற்பியல்

மடியில் வந்து விழுந்தது பழம்
மனம் தேடி சென்றது காரணம்
தாடியை தடவினான் நியூட்டன்ஸ் – கண்டான்
தரணியின் புவியீர்பூ சக்தி – இதனை
படி மனிதா என்று கொடுத்தார்
பார் போற்றும் இயற்பியலில்

விண்ணில் பறக்கும் பறவையை கண்டு
விண்ணை முட்டும் விமானம் தந்தது இதுவே
மண்ணில் ஊறும் பூச்சியை கண்டு
மனிதனை சுமக்கும் இரயிலை தந்தது இதுவே
தண்ணீரில் நீந்தும் மீனை கண்டு
தழைத்தோங்க படகை தந்தது இதுவே
எண்ணில்லா எந்திரத்தை தந்தது இதுவே
அதுவே நம் இயற்பயல் !!!!

ஒரு செயலுக்கு எதிரும் சமமுமான
ஒரு பரதிபலிப்புன்றென் சொன்னது இயற்கை
மறு முறை இதனை கண்டறிந்து
மாற்றி சொன்னது நியூட்டனின் செயற்கை
திரு மனிதன் வாழ்வில் இருந்த கடினங்களை
திருத்தியது நம் இயற்பயல் சேர்க்கை
கரு உருவாகி கல்லறைக்கு போகும் வரை
கடைசி வரையில் உதவுவது இயற்பயலே

எத்தனையோ ஆயிரம் விதிகள் !!
அத்தனையும் மனித வழிகள் !!
இத்தனையும் தந்தது நம் இயற்பயல் !!!

**குளோரினா**
முதலாம் ஆண்டு

# *HUMOUR IN PHYSICS*

Why do munivars have so much resistance to Worldly pleasures? Because they constantly keep saying ohm ohm ohm which is the unit of resistance
Eppadi namma physics?

A neutron walks into a bar and orders a beer.
"How much for the beer?"
the neutron asks the bartender.
"For you?" replies the bartender,"no charge."

A scientist disconnected his Door bell ... Can you guese why ???? Try thinking !!! Becuase he wanted to win the No bell prize?

Does light have mass?
No..its not even a Catholic !!

Physics would have been so much easier if the "Tree" had fallen on Newton's head instead of the Apple!

What happens when electrons lose their energy?
They get Bohr'ed.

Why did the chicken cross the road? Albert Einstein: Whether the chicken crossed the road or the road crossed the chicken depends on your frame of reference.

# ஆட்டோமேட்டிக் கூலிங்கிளாஸ்கள் எப்படி நிறம் மாறுகிறது?

**க**ண் கண்ணாடிகளில் லென்ஸ் உள்ள கண்ணாடிகளில் கூட இந்த ஆட்டோமேட்டிக் கண்ணாடிகள் மிகவும் சாதாரணமாகி விட்டன. போட்டோ க்ரோமாடிக் கிளாஸ்கள் என்ற பெயர் கொண்ட வெயிலில் நிறம் மாறும் கண்ணாடிகள் கண் கண்ணாடிகள் மட்டுமல்லாது சில கார்களின் சன் ப்ரூஃப் எனும் கூரைக் கண்ணாடிகளில் கூட உபயோகப்படுத்தப்படுகிறது. இது நிறம் மாற ஒரு சில நிமிடங்களே எடுத்துக்கொண்டாலும் அந்த வேகம் போதாது என்பதாலும் கண்ணாடியின் கருமை அளவைத் தேவைக்கேற்ப கட்டுப்படுத்த இயலாது என்பதாலும் கார்களின் பக்கக் கண்ணாடிகளில் உபயோகத்திற்கு வரவில்லை.

**உருவாக்கியவர்** : கார்னிங் க்ளாஸ் ஒர்க்ஸ் நிறுவனத்தைச் சேர்ந்த ஸ்டான்லி ஸ்டுக்கி என்பவர் அறுபதுகளில் உருவாக்கிய கண்ணாடி செய்முறை இது. இவருடைய இந்த கண்டுபிடிப்புக்காக அமெரிக்க தேசிய தொழில்நுட்ப மெடல் 1986ம் ஆண்டு வழங்கப்பட்டது.

**உருவாகும் விதம்** : கண்ணாடிக் குழம்பில் 0.01 முதல் 0.01 சதவீதும் வரை சில்வர் க்ளோரைட் சேர்க்கப்படும். சிறு அளவு காப்பர் (1) க்ளோரைடும் சேர்க்கப்படும். இது மிகச் சிறிய சில்வர் க்ளோரைட் க்றிஸ்டல்களாக கண்ணாடிக்குள் அமையுமாறு குளிர்விக்கப்படுகின்றன.

**கருமையாகும் விதம்** : சன் கிளாஸ் சில்வர் க்ளோரைட் க்றிஸ்டல்கள் பாஸிடிவ் சார்ஜ் கொண்ட சில்வர் அயன்களாலும் நெகடிவ் சார்ஜ் கொண்ட க்ளோரைட் அயன்களாலும் இணைந்தவை. புற ஊதாக் கதிர்கள் இந்தக் க்றிஸ்டல்களைப் பிரித்து சார்ஜ் இல்லாத சில்வர் மற்றும் க்ளோரைட் அணுக்களாக மாற்றுகிறது. சார்ஜ் இல்லாத சில்வர் அணுக்களின் இணைந்த தோற்றம் கண்ணாடியின் ஒளி ஊடுருவலைத் தடுக்காத அளவில் இருந்து கொண்டு கண்ணாடியை சாம்பல் அல்லது ப்ரௌன் நிறமாக காட்டுகிறது. லென்ஸ் கண்ணாடிகளில் மிகுந்த தூரப்பார்வை உடையவர்களுக்கு இந்த போட்டோ கண்ணாடிகள் ஒத்து வராது. இவர்களுடைய கண்ணாடியில் லென்ஸ் நடுவில் தடிமனாக இருப்பதால் போட்டோ கண்ணாடி உபயோகித்தால் அங்கு மட்டும் மிகக் கருமையாகவும் ஒளி குறைவாக புகுமாறும் இருக்கும்.

**கருமை நீங்கும் விதம்** : சூரிய ஒளி குறையும் போது தான் கண்ணாடியில் சிறிதளவு சேர்த்த காப்பர் க்ளோரைடுக்கு வேலை. புற ஊதாக் கதிர்கள் குறையும் போது காப்பர் அயன்கள் சார்ஜ் இல்லாத க்ளோரின் அணுக்களை க்ளோரைட் அயன்களாக மாற்றுகிறது. அதே சமயம் அதுவும் காப்பர் அயன்களாக மாறுகிறது. இது பின்னர் சில்வர் அணுக்களை ஆக்ஸிடைஸ் செய்து சில்வர் அயன்களாக மாற்றிவிடுகிறது. பின் பாஸிட்டிவ் சார்ஜ் கொண்ட சில்வர் அயன்கள் க்ளோரைட் அயன்களுடன் கூட்டு சேர்ந்து பழையபடி சில்வர் க்ளோரைட் க்றிஸ்டல்களாக மாறுகிறது. கண்ணாடியும் கருமை நீங்கி தெளிவாகிறது.

**கு. குழந்தை தெரசா**
மூன்றாம் ஆண்டு

# FUN WITH PHYSICS

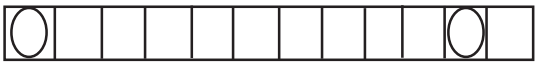
## I. Puzzles

**Figure out the following questions in the boxes provided. Use the letters in the circled boxes to find out an apparatus (final answer).**

**1. a.**  rays can be deflected by electric and magnetic field.

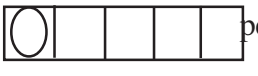
**b.**  of a lens is the capacity of a lens to gather light from the object.

**c.**  of a sound depends upon its frequency.

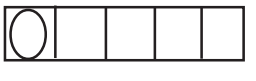
**d.** The region of the atmosphere above troposphere is 

**e.** The spectrum of the sun is a  spectrum.

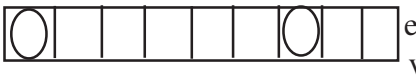
**Final answer :** 

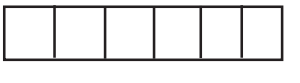
**2. a.**  performs functions of both modulator and demodulator.

**b.** Very small stars having diameter 1/50$^{th}$ that of the sun are called 

**c.** The ratio of normal stress to volume strain within the elastic limits is called as  modulus

**d.** Cathode ray consists of 

**e.**  energy is the energy possessed by a body by virtueof its position

**Final answer :** 

**3**. **a**. A kilowatthour is a unit of

**b.** The minimum measurement that can be measured accurately by an instrument is called the

**c.** When a lens is thicker in the middle than the edges it is called a lens.

**d**. The unit of resistance is

**e**. Permanent magnet is made from substances.

**Final answer :**

## DID YOU KNOW ?

***ψ Can you cool down the kitchen by opening the door of the fridge?***

*No. Refrigirators don't actually make things cold, the just remove the heat from them. All the heat energy has to go somewhere. So it is dissipated back into the room.*

*If you leave the door open, the refrigerator will have to work harder because it will have to remove the heat from the entire room, not just inside of the refrigerator. It will put the heat right back into the room, making it hotter.*

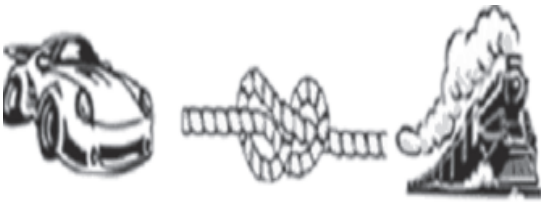
***ψ How does real submarine conrol whether it floats or sinks?***

*They have large tanks (ballast tanks) on their sides which they can fill with water to increase the submarine's density and sink, or to surface the core of the submarine, it lets out air into the tank making water to rush out through the flood ports making the submarine more bouyant.*

***L. Ansel Mely***
*III year*

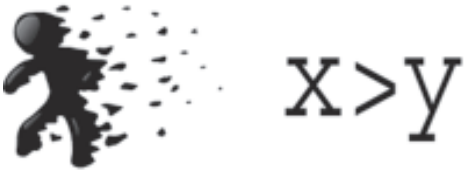
**II) Connect the figures and find out the words**

a.



b.

c.



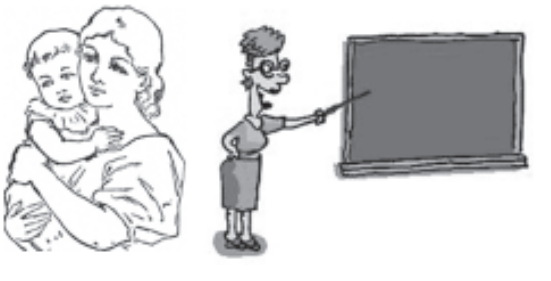

d.

e.

f.


g.

h.



# Riddles

1. Find out a wave from the given elements. **Americium & Fermium**

2. A bear walked south for 1 km, then west for 1 km, then north for 1 km and ends up in the same point from which it started. What color was the bear?

3. This type of display illuminates tiny colored fluorescent lights to form an image. Each pixel is made up of three fluorescent lights — a red light, a green light and a blue light. Just like a CRT television, this display varies the intensities of the different lights to produce a full range of colors. What type of display is it?

4. I am a quantity of distance but my name might mislead you to think that I'm a quantity of time. Who am I?

5. For me the shortest length of the pipe is ë/4, where ë is the wavelength.The fundamental and the overtones emitted by me form the odd members of a harmonic series.Who am I?

6. What is similar between gold and the distance between the sun and the earth?

7. I am built using Thermodynamic principles. I am used in every house to keep items fresh. Who am I?

8. These waves are produced by electric oscillators and can be detected by resonant RLC circuits. These waves are used for wireless communication. What are they?

9. I am a small mass of rock like materials. I am surrounded by vapours of large masses and I revolve in highly elliptical orbit. Who am I?

10. I am inherent in any lens. You cannot separate me from a lens even if you manufacture it with utmost care. Who am I?

## DID YOU KNOW ?

***ψ How did spectacles originate ?***

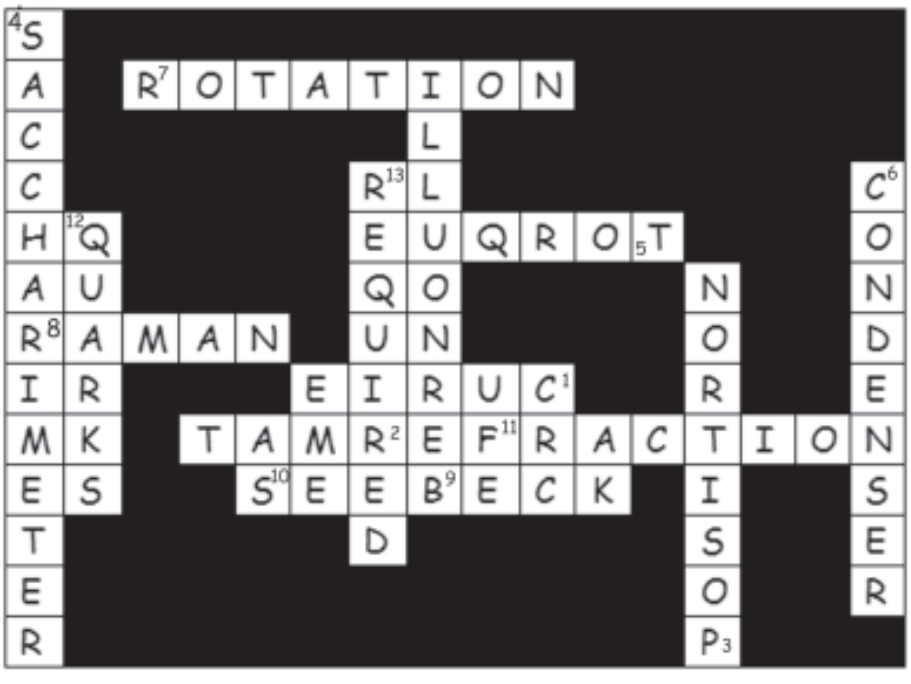
*Lenses are the key components of spectacles. It was discovered around 1000 AD that a glass sphere, when placed on the surface enlarged the contents of the surface beneath them. The first wearable eye glasses were made by an Italian, Salvino D'Armate, in the 13$^{th}$ century AD.*

***ψ How did iphone get its name ?***

***i****phone can be customized to suit the user and hence it gets its name and can be altered to individual taste like ipod. Ithighlights the 'I' – individuality of the users.*

***Bhavana J.***
*II year*

# Complete the crossword puzzle using the clues given.




CLUES :

**Left to Right :**

2. Stars twinkle due to _____
7. The moment of inertia is measured with respect to the axis of _____
8. ____ Spectroscopy is due to inelastic collision of molecules.
10. The thermocouple is based on the principle of _____ effect.

**Right to Left :**

1. The temperature above which a ferromagnet becomes a paramagnets called ___ temperature.
5. It is also called as couple.
11. This principle is otherwise known as Principle of Least Time.

**Top to Bottom :**

4. It is a device used to measure the optical rotation of sugar solution.
6. The Work done in charging a ____ is stored up in the form of electric potential energy.
12. Mesons and Baryons are made up of sub units called _____.
13. When a bigger drop splits into smaller drops energy is _____.

**Bottom to Top :**

3. ____ is an anti particle of electron.
9. P+1/2 v + gh= constant is _____equation in Fluid dynamics.

a.

b.

c.

d.

# GUESS WHO?

e.

f.

g.

**Ansel Mely.L**
III year

# TRAP YOUR UNIT

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| r | n | e | h | a | z | i | t | t |
| y | s | v | o | l | t | m | g | m |
| e | e | f | h | e | r | o | u | v |
| l | c | a | m | d | k | i | l | o |
| u | o | r | e | n | e | h | i | g |
| o | n | a | t | a | l | o | j | r |
| j | d | d | r | c | v | g | k | a |
| m | o | l | e | n | l | r | o | m |
| k | g | r | a | o | e | r | e | p |

What is the following find out :

1. unit of potential difference?
2. unit of length?
3. unit of mass?
4. unit of time?
5. unit of electric current?
6. unit of temperature?
7. unit of luminous intensity?
8. unit of amount of substance?
9. unit of capacitance?
10. unit of conductance?
11. unit of resistance?
12. unit of electric energy?
13. unit of self inductance?
14. unit of co-efficient of mutual inductance?
15. unit of frequency?

**Answers**

1. Volt
2. meter
3. kilogram
4. second
5. ampere
6. Kelvin
7. candela
8. mole
9. farad
10. mho
11. ohm
12. Joule
13. Henry
14. Henry
15. Hertz

**S. Uma**
**C. Indumathy**
**P. Nirmala**
**II year**

# Answers

## I. Puzzles

1. (a) Cathode (b) Aperture (c) Pitch (d) Stratosphere (e) Continuous
   Final Answer : TRANSISTOR

2. (a) Modem (b) White Dwarfs (c) Bulk (d) Electrons (e) Potential
   Final Answer : BIPRISM

3. (a) Energy (b) Least count (c) Convex (d) Ohm (e) Ferromagnetic
   Final Answer : CALORIMETER

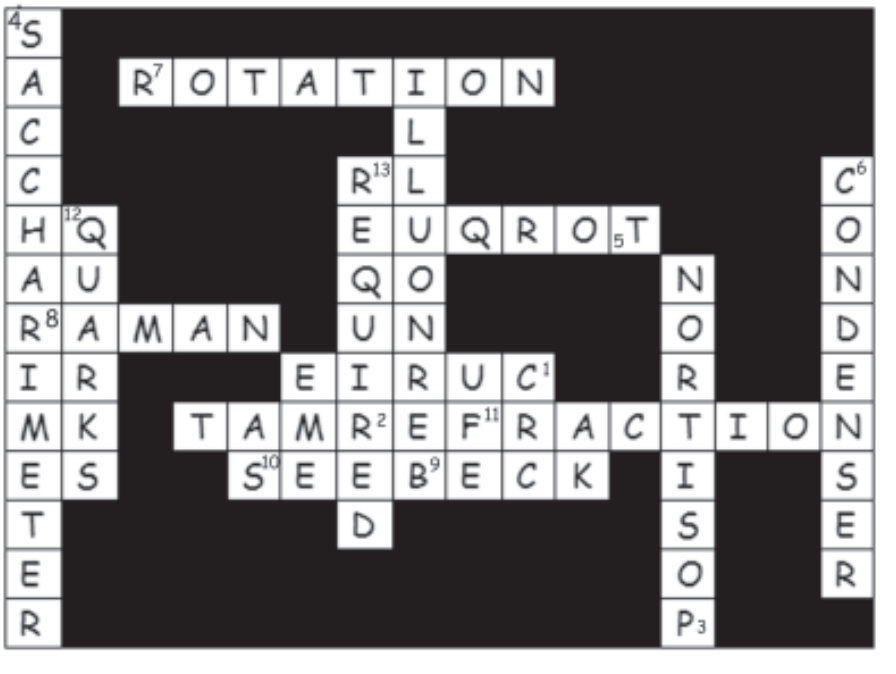
## II. Connect the figures

(a) Carnot engine (b) Bunsen burner (c) Air conditioner (d) Lightning arrester
(e) Overhead projector (OHP) (f) Newton's rings (g) Wheatstone's bridge
(h) Motherboard

## III. Riddles

(1) AM / FM (2) White (because polar bear since the bear would be making a circle around the north pole) (3) Plasma display (4) Light year (5) Closed pipe or flute (6) Au (gold - symbol, distance - unit - Astronimical Unit (AU)) (7) Refrigerator (8) Radiowaves (9) Comet (10) Aberration

## IV. Crossword




## V. Guess Who?

a. William Rowan Hamilton
b. Georg Ohm
c. Michael Faraday
d. Albert Einstein
e. Edwin Herbert Hall
f. J.J. Thompson
g. Christian Doppler

# Graphene scoops the physics Nobel- 2010

This year's Nobel prize for physics has been awarded to Andre Geim and Kostya Novoselov for the discovery of graphene - single-atom-thick layers of carbon. The researchers from the University of Manchester, UK, were awarded the prize, worth SEK10 million (£937,000), for their finding that flakes of the material can be pulled from graphite using sticky tape.

The discovery was made by chance in what Novoselev describes as a **'fun Friday afternoon project'**. But it quickly spawned a huge field of research, as the unique properties of graphene were explored and exploited. ***'Graphene is a marvellous material to work with***,' says Novoselov. ***'Anybody can do it - which is probably why it has spread so widely so quickly.'***

Graphene combines a huge variety of physical and chemical properties in a single material. This makes it suitable for a wide range of applications - not least in electronics, sensing and fundamental studies of the way electrons behave when confined in two dimensions.

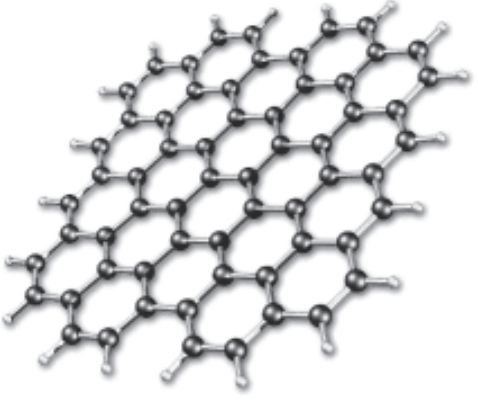
Alan Usher, director of the Centre for Graphene Research in the UK, says he is not surprised by the award. ***'For decades graphene was seen as a purely theoretical interest because in the 1930s it was predicted that it couldn't be stable***,' he says. But Geim and Novoselov decided not to believe the theory and just tried it for themselves.'He adds that the simplicity of the **'sticky-tape'** technique they employed only makes the discovery more remarkable: **'That's the kind of science that really deserves recognition.'**

Novosolev and Usher agree that the future of graphene technology lies in being able to make large scale devices. They point towards work by Jong-Hyun Ahn and Byung Hee Hong of Sungkyunkwan University, Korea, who made a **30-inch transparent graphene film** and a **functional touchscreen display** earlier this year.

Novoselov is enthusiastic about the future for graphene research:' ***'We have a fantastic time playing with graphene***,' he says. ***'Every day we go into the laboratory something new comes out.***'

**Jaicy Evanglin Rinu**
III year

Andre Geim and Kostya Novoselov



# Laurels to the Department (2010 – 2011)

**Third Years**

| | |
|---|---|
| Annet Serena | → 1st place – Fashion Show (Stella Maris – Inter years)<br>→ 1st place – Slogan writing (SIET College – Physics Fest)<br>→ 3rd place - Paper presentation (Anna Adarsh College – Physics Fest) |
| Sr. Sahaya Mary | → 2nd place – Sci-Fi writing (Loyola College – Physics Fest) |
| J. Arul Sylvia | → 2nd place – Slogan writing (SIET College – Physics Fest) |
| S. Sahana | → 1st place – Western Dance (Stella Maris – Inter years) |
| Jean Victoria | → Represented Tamil Nadu for the Firing Cadre in the All India Level Vayu Sanik Camp (NCC) |
| Devi Chandana | → Represented Tamil Nadu for the Republic Day Parade - New Delhi<br>→ Nominated for International Youth Exchange Program (NCC) |
| Sharon Tamilselvi | → Selected for Workshop in Physics Education & Research (WPER) at IIT - Madras. |

**Second Years**

| | |
|---|---|
| Jennifer Neecia.C | → 3rd place (Bronze) - Best Cadet Award (NCC)<br>→ 2nd place - Fashion Show (Stella Maris - Inter years) |
| Janani | → Selected for Workshop in Physics Education & Research (WPER) at IIT - Madras. |
| Jennifer | → Tournament Winner (Stella Maris - Sports Team) |

**First Year**

| | |
|---|---|
| Glorina | → 2nd place - Ice Breaker (Stella Maris - Inter years)<br>3rd place - Folk Dance (Stella Maris - Inter years) |
| Hanna | → 2nd place - Ice Breaker (Stella Maris - Inter years) |
| Sharmila | → 2nd place - Ice Breaker (Stella Maris - Inter years)<br>3rd place - Folk Dance (Stella Maris - Inter years) |
| Magdalene Lycia | → 1st place - Collage (SIET College - Physics Fest)<br>→ 1st place - Kite Making (Stella Maris - Inter years)<br>→ 1st place - "THEME contest" for Stella Maris Youth Convention |
| Merlin Sunitha | →1st place - Collage (SIET College - Physics Fest) |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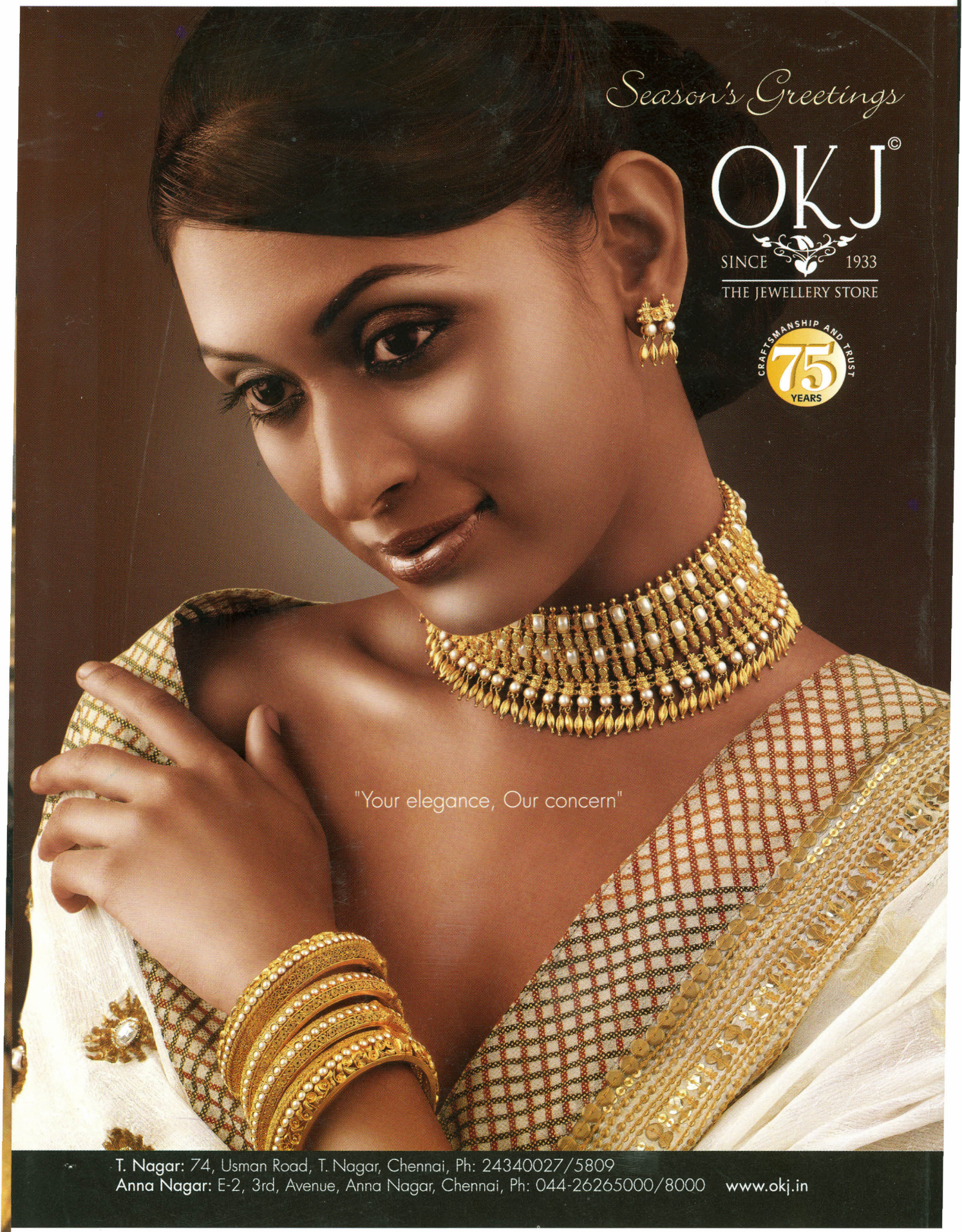


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