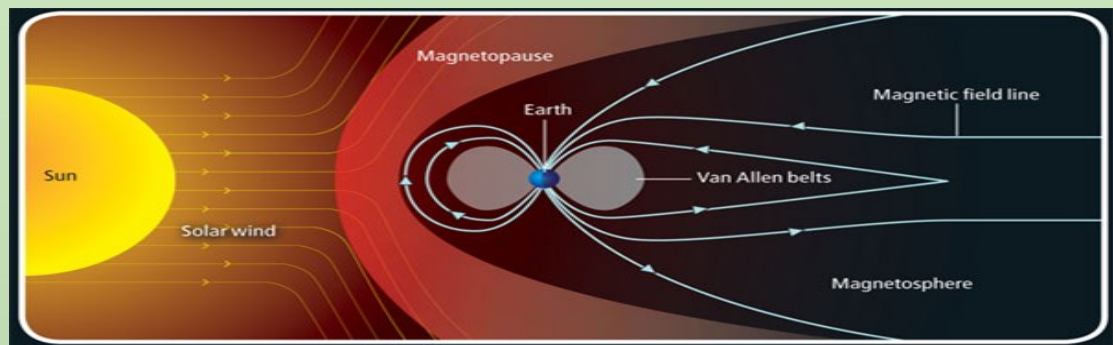




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**The Magnetic Connection.**



**M**agnets are so fascinating right? Those two small pieces that attract and repel each other, align themselves in N-S, and do a lot of other fun stuff. No one really knows how important magnetism is to life in general. But magnets are far more important than we think, magnetic fields and related phenomena play a pivotal role in determining the working of our universe. We will focus on that part of the universe, which is relevant to us, yes, you got it right, our Earth.

Ever heard of the **Magnetosphere**? Well after reading this, you will know. The magnetosphere is the region of space surrounding Earth where the dominant magnetic field is the magnetic field of Earth, rather than the magnetic field of interplanetary space. The Earth has two layers of protection Atmosphere and the Magnetosphere, so that when one is going through a change, the other protects our planet. So **how exactly does the magnetosphere protect us?** The harmful space radiations, mostly from solar wind and solar flare (consisting of highly energized particles) are forced by the magnetic field to move around the Earth, hence preventing them from entering the atmosphere. Particles do enter at the funnels over the poles or they gain entry far downstream from the Earth. The particles that enter downstream or at the magnetotail cause the aurora lights. Other higher energy particle radiation that could endanger life on Earth is forced to drift around the Earth

within two large donut-shaped regions called the radiation belts. Invisible magnetic fields are the reason that particle radiation moves in this way.

**Now the important question. What's the problem?** Scientists understand that Earth's magnetic field has flipped its polarity many times over the millennia. This suggestion mistakenly assumes that a pole reversal would momentarily leave Earth without the magnetic field that protects us from solar flares and coronal mass ejections from the sun. But, while Earth's magnetic field can indeed weaken and strengthen over time, there is no indication that it has ever disappeared completely.

Presenting at the annual Living Planet Symposium in Prague last week, ESA researchers showed that “the magnetic field has weakened by about 3.5 percent over the top of North America since 1999, but has strengthened by roughly 2 percent over Asia in that same time period.” A weaker field would certainly lead to a small increase in solar radiation on Earth – as well as a beautiful display of aurora at lower latitudes - but nothing deadly. In the absence of this magnetic field, or magnetosphere, these cosmic rays would bombard the entire Earth with a higher intensity than today. The effects of cosmic rays on life in general are not known for sure, but it is expected that they would cause tissue damage similar to the effects of x-rays.

**Trending**

- **The ozone hole is at its smallest size since 1988, thanks to hot air and a massive international effort, reported NASA and NOAA**
- **Researchers in the Cockrell School of Engineering at The University of Texas at Austin have discovered a family of anode materials that can double the charge capacity of lithium-ion battery anodes**

Source: Published journal by Adrian K Kertan



## Lakshadweep Island - Parali I has vanished

**“GLOBAL WARMING IS PRESENT TENSE NOT FUTURE.”**

The above quote appears to be perfectly true as the recent incident that happened at one of the uninhabited island of LAKSHDWEEP - “PARALI-I” proves it. The island has vanished due to coastal erosion and another four such territories in the sea are shrinking fast, claims a new study.

A researcher from Androth in Lakshadweep claimed that coastal erosion had sunk an island in the archipelago and another four are vanishing fast. According to R M Hidayathulla, who studied the vulnerability of the islands, Parali-I island, part of Bangaram Atoll, which had an area of 0.032 sq km in 1968 disappeared due to coastal erosion.

He was awarded PhD in July this year by Calicut University in Kerala for his work - "Studies on Coastal Erosion in selected uninhabited Islands of Lakshadweep archipelago with special reference to biodiversity conservation." He conducted



ed studies on assessment of the biodiversity confining to five uninhabited islands - Bangaram, Thinnakara, Parali-I, Parali-II and Parali-III, of which Parali-I has been inundated of Bangaram atoll, an archipelago of 36 islands in the Lakshadweep sea. The data required for the study was obtained using remote sensing and GIS (geographical information system) software.

The study said the complete erosion and inundation of Parali-I was pointing to the gravity of issues associated with coastal erosion within the atoll. Hidayathulla, in his study, said a general trend in erosion has been noticed in almost all islands he studied.

The results are indicative of the urgent measures to be implemented on each islet of the atoll to check further erosion. It is also required to check the feasibility of bio protection strategy using mangroves, in addition to the conventional physical protection measures.

It is now widely recognised that islands and coastal areas are going to get eroded and inundated due to rising sea levels because of increasing global temperature. India's coasts and islands, which are densely populated, are highly vulnerable. It appears to be a warning sign for humans who are yet busy in resource exploitation and are negligent towards its ill-effect.

**“NOW LAKSHDWEEP IS NO MORE AN ARCHIPELAGO OF 36 ISLANDS”**

Sounds painful but who cares.

Lets enjoy our life.....

Source : THE HINDU

## NGT order changes everything about cleaning river Ganga

In a significant order seeking a fundamental change in strategy in cleaning the river Ganga, the National Green Tribunal has directed that 100 meters from the edge of Ganga between Haridwar in Uttarakhand and Unnao in Uttar Pradesh should be treated as "no construction or no development zones." The NGT observed that all the government schemes in the past that have spent hundreds of crores in Ganga cleanup have not only failed but led to an increase in pollution levels, which is why Ganga now needed a change in strategy. It also directed that an environmental compensation of Rs 50,000 be imposed on anybody who is found dumping any kind of waste in the river.

In a judgement on advocate MC Mehta's petition against pollution in river Ganga that ran into 543 pages, NGT directed that there will be no dumping or landfill sites of any kind within 500 meters from the edge of the river or any of its tributaries. Its judgement was pertinent-



ing to Haridwar to Unnao stretch. There will be complete prohibition on disposing of municipal solid waste, electronic-waste or bio-medical waste on the floodplains or into Ganga or its tributaries falling in the same stretch. The tribunal pointed that Rs 2961 crores had already been spent under National Mission for Clean Ganga since 2011. "The state of the river is a sufficient indicator that the stakeholders must adopt an innovative approach quite different to the orthodoxical and uncertain approach," adding that NGT in its judgment is therefore adopting a "hotspot and river basin approach" with focus on "end of pipeline treatment." Explaining how past schemes have failed,

the judgement said "For instance, the discharge flow of river Ganga from sewage was 2683.6 million liters per day (MLD) and from the industrial effluent it is 285.9 MLD in 2009. While as per CPCB in 2012 it was reported to be 6966.3 MLD from sewage and 501 MLD from industrial effluent," It added that the right to decent and clean environment is an integral part of Article 21 and by law, the industry is mandated to adhere to the prescribed standards for discharge of trade effluents.

Among other important directions, NGT directed the creation of a special monitoring cell in the Uttarakhand and UP Pollution Control Boards for keeping track of water quality, it also directed creation of supervisory and implementation committees with both senior central and state government officials as members. It ordered that extraction of groundwater by any industry will be only after seeking permission from the Central Ground Water Authority (CGWA).

## Latest Innovative Ideas - Explore yourself



Grove Ecosystem : uses aquaponics to grow salad indoors



Rawlemon's Spherical Solar Generator



Avani Eco's plant based bio-degradable plastic made from cassava

### New green solvent could help clean our air

Eco-friendly mixture made from choline salt and urea could absorb harmful gaseous pollutants. The non-flammable solvent contains urea and choline salt, a common ingredient in chicken feed, says Leila Moura of the Unité de Chimie Environnementale et Interactions sur le Vivant in France. To find an improved absorbent for cleaning the air, the researchers focused their attention on deep eutectic solvents. These mixtures have recently emerged as a greener alternative to many of the liquids that are used to absorb volatile organic compounds.

(source : Springer )

### Methane emissions tackled with gas-guzzling bacteria

An international research team co-led by a Monash biologist has shown that methane-oxidising bacteria -- key organisms responsible for greenhouse gas mitigation -- are more flexible and resilient than previously thought. "This study is significant because it shows that key consumers of methane emissions are also able to grow on inorganic compounds such as hydrogen," Dr Greening said.

"This new knowledge helps us to reduce emissions of greenhouse gases. "

(source : Monash University )

### Transparent solar technology 'wave of the future'

See-through solar materials that can be applied to windows represent a massive source of untapped energy and could harvest as much power as bigger, bulkier rooftop solar units, scientists report in *Nature Energy*. Led by engineering researchers at Michigan State University, the authors argue that widespread use of such highly transparent solar applications, together with the rooftop units, could nearly meet U.S. electricity demand and drastically reduce the use of fossil fuels.

(source : Michigan State University)

### Scientists elevate quantum dot solar cell world record

Researchers at the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL) established a new world efficiency record for quantum dot solar cells, at 13.4 percent. Because of their astonishingly small size (typically 3-20 nanometers in dimension) colloidal quantum dots possess fascinating optical properties. The new quantum dot leader material is cesium lead triiodide (CsPbI<sub>3</sub>), and is within the recently emerging family of halide perovskite materials. This latest advance, titled "Enhanced mobility CsPbI<sub>3</sub> quantum dot arrays for record-efficiency, high-voltage photovoltaic cells," is published in *Science Advances*.

(source : DOE/National Renewable Energy Laboratory)

### New nanomaterial can extract hydrogen fuel from seawater

It's possible to produce hydrogen to power fuel cells by extracting the gas from seawater, but the electricity required to do it makes the process costly. UCF researcher Yang Yang has come up with a new hybrid nanomaterial that harnesses solar energy and uses it to generate hydrogen from seawater more cheaply and efficiently than current materials. Yang developed a method of fabricating a photocatalyst composed of a hybrid material. Tiny nanocavities were chemically etched onto the surface of an ultrathin film of titanium dioxide, the most common photocatalyst. Those nanocavity indentations were coated with nanoflakes of molybdenum disulfide, a two-dimensional material with the thickness of a single atom.

(source : University of central Florida)

### Breaking the chain : catalyzing a green future for chemistry

Researchers create catalyst for refining chemicals in plant waste, allowing a green way to produce valuable raw materials. A Research team at Osaka University has discovered how to create valuable chemicals from clean sources. They used biomass, essentially waste from plant materials. The method developed at Osaka is based on a new catalyst - it consists of atomically small particles of ruthenium, a metal related to iron, sitting on a material called cerium oxide. "This is the first time that 2-butanol has been made in this green way, using LA," study first author Tomoo Mizugaki explains. "Traditionally, it is made from butene, which comes from highly polluting oil refineries."

(source : Osaka University)

## Sustainable Energy and Environment Quiz (S.E.E.Q.)

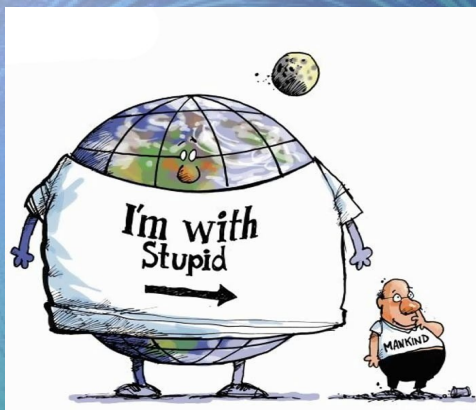


Energy Club had organised 10th SEEQ, 2017 which was a big success with an overwhelming participation of different colleges all over Rajasthan. The prestigious quizzing event of college came with a twist this year .Breaking the pattern event came up with heart-beating rounds like Battles and Showdown. Teams and audiences enjoyed and appreciated the effort a lot.

### Winning teams with faculty advisor of Energy Club

From left : Navneet Shah, Abhighyan Biswas (5th place), Puru Mittal, Vishal Soni (3rd place), Dr. Kapil Pareek (Faculty co-ordinator), Yash Patel(2nd place), Aditya Bansal, Shrishti Thakur (4th place), Shubham Kumar(2nd place) . In front from left : R. N. Payal , Ram Govind Yadav (WINNERS)

### COMIC SENSE



### ISHRAE MNIT CHAPTER

Energy club, MNIT Jaipur has reinstalled ISHRAE (Indian Society of Heating Refrigerating and Air Conditioning Engineers) student chapter in college. Interested student can mail to student chapter secretary Mr. Anish Raj at 2015uee1411@mnit.ac.in or contact Energy club members for more information.

### FUN-QUIZ

1. Name the affordable fully electric car launched by Mahindra in October 2016.
2. The capacity of the largest completed Hydropower plant in India is how much less than the capacity of the worlds largest completed hydropower plant (in MW) ?
3. Name the second Green airport of India , seen in the movie Secret-Superstar.

### CREDITS

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- Prof. Ing. Jyotirmay Mathur
  - Dr. Kapil Pareek (Faculty co-ordinators).

### Disclaimer:

This newsletter is for internal circulation within MNIT. All information/articles have been compiled from newspapers, technical magazines and other sources. For quiz answers, suggestions, feedback, and any other article you want to read on some particular topic or want us to publish in our reader's column then mail us to [energyclub@mnit.ac.in](mailto:energyclub@mnit.ac.in) or write to us on our blog <http://www.theehblogmnit.blogspot.com>

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