

SCIENCE CENTRE NEWS LETTER

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I.A.S.
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SCIENCE CENTRE

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WHAT'S NEW IN SCIENCE?

Scientist Solve Solar Secret

The further we move away from a heat source, the cooler the air gets. Bizarrely, the same can't be said for the Sun, but Scientists of University of Otago, New Zealand may have just explained a key part of why.

Study leader Dr Jonathan Squire, from Department of Physics, says the surface of the Sun starts at 6000 degree Celsius, but over a short distance of only a few hundred kilometres, it suddenly heats up to more than a million degrees Celsius, becoming its atmosphere, or corona. "This is so hot that the gas escapes the Sun's gravity as 'solar wind', and flies into space, smashing into Earth and other planets. We know from measurements and theory that the sudden temperature jump is related to magnetic fields which thread out of the Sun's surface. But, exactly how this work to heat the gas is not well understood - this is known as the Coronal Heating Problem.

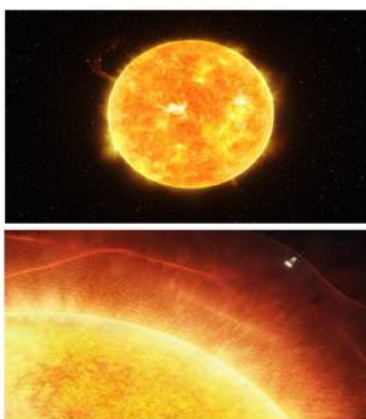
Astrophysicists have several different ideas about how the magnetic-field energy could be converted into heat to explain the heating, but most have difficulty explaining some aspect of observations," he says.

Dr Squire and co-author Dr Romain Meyrand have been working with Scientists at Princeton University, United States (US) and the University of Oxford, United Kingdom (UK) and found that two

previous theories can be merged into one to solve a key piece of the 'problem'. The group's finding was published in the Journal 'Nature Astronomy', California.

The popular theories are based on heating caused by turbulence, and heating caused by a type of magnetic wave called ion cyclotron waves. "Both, however, have some problem -- turbulence struggles to explain why Hydrogen, Helium and Oxygen in the gas become as hot as they do, while electrons remain surprisingly cold; while the magnetic waves theory could explain this feature, there doesn't seem to be enough of the waves coming off the Sun's surface to heat up the gas," Dr Meyrand says.

The group used six-dimensional Supercomputer simulations of the coronal gas to show how these two theories are actually part of the same process, linked together by a bizarre effect called



the 'helicity barrier'.

"If we imagine plasma heating as occurring a bit like water flowing down a hill, with electrons heated right at the bottom, then the helicity barrier acts like a dam, stopping the flow and diverting its energy into ion cyclotron waves. In this way, the helicity barrier links the two theories and resolves each of their individual problems," Dr. Meyrand explains.

SCIENTIST OF THE MONTH

Animesh Chakravorty

Animesh Chakravorty was born on 30 June 1935 in Calcutta, Bengal Presidency (now Kolkata, West Bengal). After his graduation from the Scottish Church College, he did his post-graduation and doctorate in Chemistry from the renowned Rajabazar Science College, University of Calcutta, Kolkata.

He had started his career as a Research Associate at the MIT (Massachusetts Institute of Technology) and Harvard University, Cambridge, Massachusetts. He had also served as professor and head of the Department of Chemistry at the Indian Institute of Technology, Kanpur, and as

Professor and Head of the Department of Inorganic Chemistry at the Indian Association for the Cultivation of Science at the University of Calcutta, Kolkata and as a Visiting Professor at the Texas A&M (Agricultural and Mechanical) University. He was also the Hindustan Lever Research Professor at the Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore.

He was awarded Shanti Swarup Bhatnagar Prize for Science and Technology and Honorary doctorate

from University of Burdwan, West Bengal.





Timings

Tuesday to Sunday
& Public Holidays
9.30 am to 4.30 pm

Address

Science Centre
City Light Road,
Surat - 395 007

Contact

0261 - 2255947
+91 97277 40807

Fax No.
91-261-2255946

E mail
sciencecentre@suratmunicipal.org

Web Site
www.suratmunicipal.gov.in



SCIENCE FACTS JUNE 2022

1st June	"International Children's Day"
5th June	"World Environment Day"
5th June 1783	Discovery and first launching of primary Balloon
6th June 2012	The astronomical event "Transit of Venus" happened.
7th June 1811	Mr. James Young Simpson (who invented Chloroform) was born
7th June 1979	India Launched first low orbit Earth observation Satellite - "Bhaskar" into the Space
8th June	"World Brain Tumour day"
8th June	"World Ocean day"
8th June 1936	Indian state Broadcasting Service (ISBS) was renamed as "All India Radio" (AIR) on this day
10th June	"Ballpoint Pen Day"
11th June 1963	First Lady Astronomer "Valentina " came back from journey to Space
12th June	" World Day against child labour"
12th June 1872	Railway train started in Japan
14th June	"World Blood Donor Day (WHO)"
15th June 1752	Well-known Scientist Mr. Benjamin Franklin had done experiment of kite.
16th June 2019	The third Sunday of June is celebrated as " International father's Day"
19th June	World Sickle cell Anaemia Awareness Day
21st June	It is the longest day of the year in Northern Hemisphere and longest night of the year in Southern Hemisphere because Sun's rays strikes normally in Northern Hemisphere
22nd June 1973	Successful landing of the astronomer of Skylab in Pacific Ocean after revolving around the earth for 28 days
23rd June	United Nations Public Service Day (UN)
24th June 1961	Successful launching of first Indian "Super Sonic Fighter A"
30th June 1880	Longest total Solar Eclipse of millennium
U. N. : United Nations WHO : World Health Organization	

Answers: 1) b, 2) d, 3) b, 4) d, 5) d, 6) c, 7) a, 8) a

SCIENTIFIC QUESTION

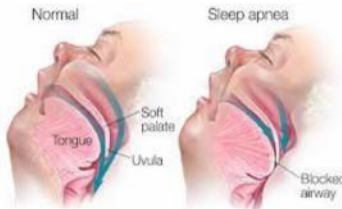
OSA (Obstructive Sleep Apnea)

Obstructive Sleep Apnea (OSA) is the most common sleep-related breathing disorder and is characterized by recurrent episodes of complete or partial obstruction of the upper airway leading to reduced or absent breathing during sleep. These episodes are termed "Apneas" with complete or near-complete cessation of breathing, or "Hypopneas" when the reduction in breathing is partial. In either case, a fall in blood oxygen saturation, a disruption in sleep, or both may result.

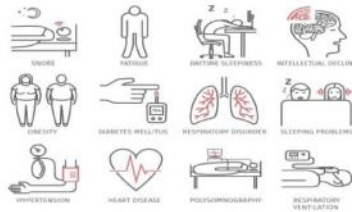
Most individuals with OSA are unaware of disturbances in breathing while sleeping, even after awakening. A bed partner or family member may observe an individual snoring or appear to stop breathing, gasp, or choke while sleeping.

Signs and Symptoms: A common symptom of OSA syndrome includes unexplained daytime sleepiness, restless sleep and loud snoring. Less common symptoms are morning headaches, insomnia, trouble concentrating, mood changes such as irritability, anxiety, and depression, forgetfulness, increased heart rate or blood pressure, unexplained weight gain, increased urinary frequency or nocturia (complaint that the individual has to wake at night one or more times to urinate); frequent heartburn or gastroesophageal reflux (in which stomach contents and acid rise up into esophagus) and heavy night sweats.

Diagnosis: The diagnosis of OSA syndrome is made when the patient shows recurrent episodes of partial or complete collapse of the upper airway during sleep resulting in Apneas or Hypopneas, respectively. Criteria defining an Apnea or Hypopnea vary. The American Academy of Sleep Medicine (AASM) defines an Apnea as a reduction in airflow of 90% or more lasting at least 10 seconds. A Hypopnea is defined as a reduction in airflow of 30% or more



SLEEP APNEA



lasting at least 10 seconds and associated with a 4% or more decrease in pulse oxygenation, or as a 30% or more reduction in airflow lasting at least 10 seconds and associated either with a 3% or more decrease in pulse oxygenation or with an arousal.

Criteria: According to the International Classification of Sleep Disorders, there are 4 types of criteria. The first one concerns sleep excessive sleepiness, non-restorative sleep, fatigue or insomnia symptoms. The second and third criteria are about respiration waking with breath holding, gasping, or choking; snoring, breathing interruptions or both during sleep. The last criterion revolved around medical issues as hypertension, coronary artery disease, stroke, heart failure, atrial fibrillation (an irregular, often rapid heart rate that commonly causes poor blood flow), type 2 diabetes mellitus, mood disorder or cognitive impairment.

Treatment: Numerous treatment options are used in Obstructive Sleep Apnea. Avoiding alcohol and smoking is recommended, as is avoiding medications that relax the central nervous system (for example, sedatives and muscle relaxants). Weight loss is recommended in those who are overweight. Continuous Positive Airway Pressure (CPAP) and Mandibular

Advancement Devices are often used and found to be equally effective.

Prognosis: Stroke and other Cardiovascular diseases are related to OSA, and those under the age of 70 have an increased risk of early death. Persons with Sleep Apnea have a 30% higher risk of heart attack or death than those unaffected. In severe and prolonged cases, increased pulmonary pressures are transmitted to the right side of the heart. This can result in a severe form of congestive heart failure known as cor pulmonale.

KNOW THE EXHIBIT

Early Rockets: Episode-1: They Imaging Flying

This Exhibit is situated at "Entering Space Gallery" between Fun Science Gallery and Power of Play Gallery at the first floor of Science Centre.

Since the earliest days people have looked up at the heavens and dreamed of flying there. They expressed their inherent wish through several stories or mythological texts. They put wings to Greek Gods like Eros (The God of Love), Nike (The Goddess of Victory), Hermes (The Messenger of the Gods) and Apollo (God of the Arts) and associated flying chariots (Vimana) with Indian Gods like Shiva, Vishnu, Brahma, Kuber and Indra.

Ancient Greek writers like Lucian wrote the stories of flying to Moon and even to the extent of colonising there. Through scrupulously depicted, these concepts of wings or viman as were nothing but poetic imaginations. The first Scientific evidence to shape the concept of flying is found much later. During the time of Jesus Christ, A young guy, named Hero, from Alexandria, made the first Scientific Rocket like Engine. He mounted a sphere on top of a water kettle. A fire below the kettle turned the water into steam and the L-shaped tubes on opposite sides of the Sphere allowed the vapour to escape and in doing so gave a thrust to the Sphere that caused it to rotate. Hero named this engine as Aeolipile after the God of Winds. Hero's engine displayed during ancient time was known as a temple wonder.



SUMMER CAMP-2022

Surat Municipal Corporation had organized 'Summer Camp' at first floor of Museum, Science Centre from 10th to 20th May 2022. Students had learnt about Craft, Astronomy and Science. In this summer camp two groups were made according to the age. Group 'A' was for children of the age group 7 to 12 years and Group 'B' were for 13 to 17 years in which students performed various activities.



QUIZ

1. What helps to produce Alcohol?
a) Sodium Chloride b) Yeast c) Nitrogen d) Carbon
2. Which of the following is not a fossil fuel?
a) Coal b) Petroleum c) Natural Gas d) Water Gas
3. Which of the following is a liquid at room temperature?
a) Iron b) Bromine c) Iodine d) Phosphorus
4. Which metal reacts readily with cold water?
a) Gold b) Silver c) Magnesium d) Calcium
5. What is made with Wood Pulp?
a) Plastic b) Wool c) Jute d) Rayon
6. Which term is used for polymers made up with a large number of glucose units?
a) Protein b) Fructose c) Cellulose d) Polyester
7. Which of the following is a bad conductor of electricity?
a) Distilled Water b) Silver Nitrate c) Sulphuric Acid d) Copper Sulphate
8. Which part of the human body gets affected by the illness called osteoporosis?
a) Bones b) Lungs c) Kidney d) Brain