

# SCIENCE CENTRE NEWS LETTER

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M.Nagarajan  
I.A.S.  
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**Editor**  
D.B. Mistry  
Dy. Municipal Commissioner

**Sub Editor**  
Divyesh Gameti  
I/C Chief Curator

**Co-ordinator**  
Dr. Pruthul Desai  
Principal  
P. T. Science College



## SCIENCE CENTRE

Volume 10, Issue 11

### WHAT'S NEW IN SCIENCE?

#### Scientists Discover Super Earth GJ 251 c Just 20 Light Years Away

Astronomers have identified a promising new exoplanet, GJ 251 c, located just 20 light-years from Earth, which may possess characteristics conducive to supporting life. The discovery, made by an international team including Researchers from Penn State University, Pennsylvania, United States represents a major advancement in the ongoing search for Earth-like planets within our galactic neighbourhood.

##### Discovery of GJ 251 c

GJ 251 c is classified as a "super-Earth" — a type of exoplanet larger than Earth but smaller than gas giants such as Neptune. Preliminary data suggests the planet is nearly four times as massive as Earth and is likely composed of rocky material. Scientists believe its proximity to its host star places it within the "habitable zone," also known as the Goldilocks Zone, where liquid water could potentially exist on its surface.

##### Potential for Life and Future Observations

According to Suvrath Mahadevan, Verne M.

Willaman, Professor of Astronomy at Penn State University and co-author of the study published in "The Astronomical Journal", GJ 251 c could be one of the most promising candidates yet for atmospheric study. They noted that planets of this type offer the best opportunity to detect signs of life, as their size and location make it possible for water and stable climates to exist.

##### Breakthrough Technology Behind the Discovery

The exoplanet was discovered using the Habitable-Zone Planet Finder (HPF), a sophisticated near-infrared spectrograph mounted on the Hobby-Eberly Telescope at the McDonald Observatory in Texas. Developed

by Researchers at Penn State, University, the HPF is specifically designed to detect small, Earth-like planets orbiting nearby stars. This finding stems from over two decades of precise starlight observation and spectral analysis.

**Courtesy:** Joyous English School

**Source:-** [www.gktoday.in/scientists-discover-super-earth-GJ-251-c-just-20-light-years-Away](http://www.gktoday.in/scientists-discover-super-earth-GJ-251-c-just-20-light-years-Away)



### SCIENTIST OF THE MONTH

#### Dr. Kshitish Ranjan Chakravorty

Dr. Kshitish Ranjan Chakravorty was born on February 1, 1916 at Bhola in East Bengal. He did his graduation in science with honors from the Ripon College, Kolkata in 1938 Masters in science from the University College of Science, Kolkata in 1940. He did D. Sc. in 1946 and Ph.D. from the Imperial College of Science and Technology in 1948.

Dr. Chakravorty discovered the tervalency of silver and the preparation of several tervalent compounds of silver. He along with his associates developed technologies for-rejuvenation of poisoned/spent water gas shift catalyst, the manufacture of water gas shift catalyst, which included designing, engineering, installation and commissioning of the plants, and catalysts for the



He was an Indian engineer, fertilizer scientist and the head of the Planning and Development Division of the Fertilizer Corporation of India (FCI). He was credited with the establishment of Planning and Development Division of FCI and of development indigenous fertilizer plants in India.

Dr. Chakravorty received the Padma Shri award in 1954, the Shanti Swarup Bhatnagar Prize in 1968, the Acharya J.C. Ghosh Memorial Award in 1978, the Eminent Scientist Award in 1987. He passed away on September 29, 1994.

**Main Source:** 101, Great Indian Scientists Book, By Shyam Dum



## 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



1 February 1952	: American Chemist Roger Y. Tsien (Co-winner of the 2008 Nobel Prize in Chemistry for the discovery and development of the green fluorescent protein "GFP") was born.
3 February 1966	: The unmanned Soviet Luna 9 spacecraft makes the first controlled rocket-assisted landing on the moon.
4 February 1896	: German Physicist Friedrich Hund (Known for his work on atoms and molecules) was born.
7 February 1940	: Japanese Physicist Toshihiko Maskawa (Co-winner of the 2008 Nobel Prize in Physics for the discovery of the origin of the broken symmetry which <u>predicts</u> the existence of the least three families of quarks in nature) was born.
9 February 1910	: French Biochemist Jacques Monod (Co-winner of the 1965 Nobel Prize in Physiology or Medicine for their discoveries concerning genetic control of enzyme and virus synthesis) was born.
9 February 1945	: Japanese -----Yoshinori Ohsumi (Winner of the 2016 Nobel Prize in Physiology/ Medicine for his discoveries of mechanisms for autophagy) was born.
12 February 1777	: French Chemist Bernard Courtois (Credited with first isolating iodine, making early photography possible) was born.
12 February 1804	: German Physicist Heinrich Lenz (Formulated Lenz's law in electrodynamics) was born.
13 February 1910	: American Physicist and eugenicist William Shockley (Co-winner of the 1956 Nobel Prize in Physics for their researches on semiconductors and their discovery of the transistor effect) was born.
14 February 1869	: Scottish Physicist Charles Wilson (Co-winner of the 1927 Nobel Prize in Physics for his invention of the cloud chamber) was born.
14 February 1917	: American mathematician Herbert A. Hauptman (Co-winner of the 1985 Nobel Prize in Chemistry for their outstanding achievements in the development of direct methods for the determination of crystal structures) was born.
15 February 1861	: French Physicist Charles Edouard Guillaume (Winner of the 1920 Nobel Prize in Physics in recognition of the service he has rendered to precision measurements in physics by his discovery of anomalies in nickel steel alloys) was born.
15 February 1873	: German Chemist Hans von Euler Chelpin (Co-winner of the 1929 Nobel Prize in Chemistry for their investigations on the fermentation of sugar and fermentative enzymes) was born.
17 February 1888	: German Physicist Otto Stern (Winner of the 1943 Nobel Prize in Physics for his contribution to the development of the molecular ray method and his discovery of the magnetic moment of the proton) was born.
19 February 1859	: Swedish Chemist Svante Arrhenius (Winner of the 1903 Nobel Prize in Chemistry in recognition of the extraordinary services he has rendered to the advancement of chemistry by his electrolytic theory of dissociation) was born.
20 February 1945	: American Physicist George F. Smoot (Co-winner of the 2006 Nobel Prize in Physics for their discovery of the blackbody form and anisotropy of the cosmic microwave background radiation) was born.
21 February 1895	: Danish Biochemist Carl Peter Henrik Dam (Co-winner of the 1943 Nobel Prize in Physiology/ Medicine for his discovery of Vitamin K) was born.
21 February 1953	: Francis Crick and James D. Watson discover the structure of the DNA molecule.
22 February 1857	: German Physicist Heinrich Hertz (First conclusively proved the existence of the electromagnetic waves) was born.
23 February 1966	: Swiss Physicist Didier Queloz (Co-winner of the 2019 Nobel Prize in Physics for the discovery of an exoplanet orbiting a solar-type star) was born.
26 February 1903	: Italian Chemist Giulio Natta (Co- winner of the 1963 Nobel Prize in Chemistry for work on high density polymers) was born.
26 February 1946	: Egyptian Chemist Ahmed H. Zewail (Known as the father of femtochemistry) was born.
27 February 1942	: American Chemist Robert H. Grubbs (Co- winner of the 2005 Nobel Prize in Chemistry for his work on olefin metathesis) was born.
28 February 1935	: Nylon is invented by Wallace Carothers.

Answer: 1. c 2. b 3. d 4. c 5. c



# SCIENTIFIC QUESTION

## What is Big Bang? (part-4)

### Radiation Era and Epoch

The end of the electroweak epoch characterized by the separation of the electroweak force into the weak and electromagnetic forces, marked the beginning of the Quark epoch.

### 5. Quark Epoch:

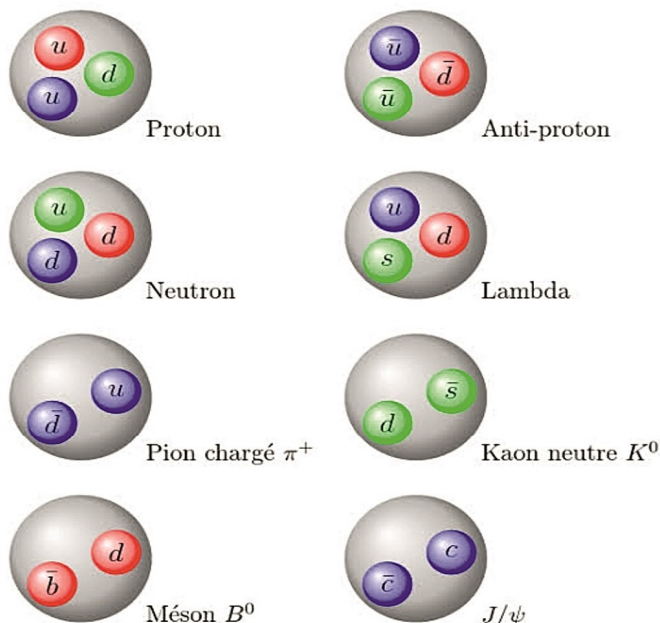
#### Time Period

From  $10^{-12}$  to  $10^{-6}$  seconds

Quarks, electrons and neutrinos form in large numbers as the universe cools off to below 10 quadrillion degrees and the four fundamental forces assume their present forms. Quarks and anti quarks annihilate each other upon contact but in a process known as 'Baryogenesis' a surplus of quarks (about one for every billion pairs) survives, which will ultimately combine to form matter.

During the quark epoch, the universe was filled with a dense, hot quark gluon plasma, containing quark, leptons and their antiparticles. Collisions between particles were too energetic to allow quarks to combine into mesons (baryons). The quark epoch ended when the universe was about  $10^{-6}$  seconds old, when the average energy of particle interactions had fallen below the binding energy of hadrons. The

following period, when quarks become confined within hadrons is known as the Hadron epoch.



### The Proton

Three Quarks  
Up: Down: Up

36 point charges

3 Noether cores

J Mark Morris

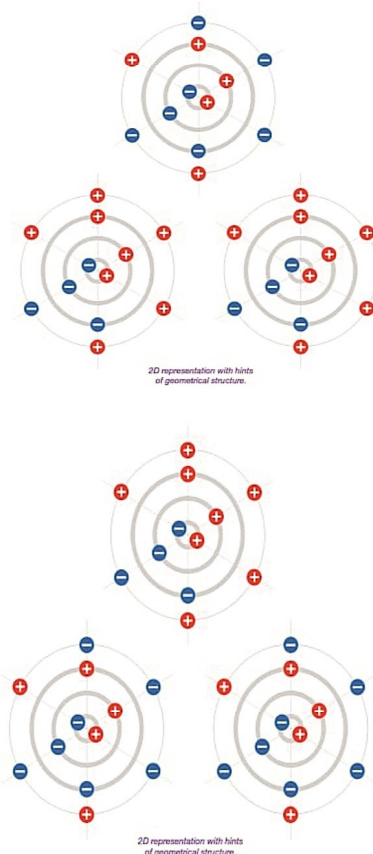
### The Neutron

Three Quarks  
Down: Up: Down

36 point charges

3 Noether cores

J Mark Morris



### 6. Hadron Epoch:

#### Time Period:

From  $10^{-6}$  seconds to 1 second

In this epoch the temperature of the universe cools to about a trillion degrees, cools enough to allow quarks to combine to form Hadrons (like protons and neutrons). Electrons colliding with protons in the extreme conditions of the Hadron Epoch fuse to form neutrons and give off massless neutrinos which continue to travel freely through space even today, at or near to the speed of light. Some neutrons and neutrinos recombine into new proton-electron pairs. The only rules governing all this apparently random combining and recombining are that the overall charge and energy (including mass energy) be conserved.

The Protons (two up quarks, one down) and neutrons (one up quark, two down) were formed. Initially hadron-antihadron pairs were constantly formed and destroyed, as the universe cooled further.

#### Main Source and Image:

[https://www.physicsoftheuniverse.com/topics\\_bigbang\\_timeline.html](https://www.physicsoftheuniverse.com/topics_bigbang_timeline.html), <https://en.wikipedia.org>

# SCIENCE FAIR-2025

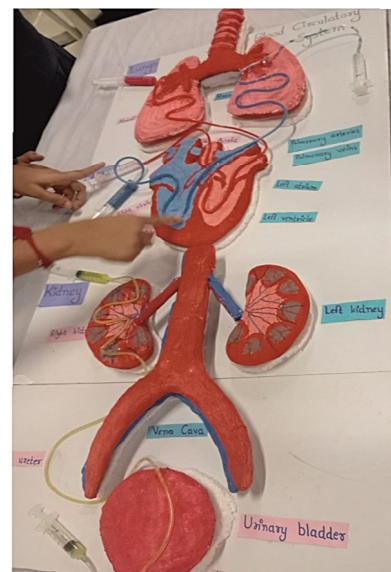
Surat Municipal Corporation had organized “Science Fair-2025” at Art Gallery, Science Centre Surat on 22<sup>nd</sup> and 23<sup>rd</sup> August, 2025 for students of Std. 8 to 12. L. P. Savani School, Palanpur had participated in Science Fair with their project on " Blood Circulatory System" under the Subtheme of "Enhancing skill development of youth in the field of science and Innovation"

The aim of the project was to study how the vital body Organs- the heart, lungs and kidneys-manage blood and to understand how much they are support to each other's function.

The heart is a muscular organ who pump blood to all body parts. There are four chambers in the heart: Right atrium, Right Ventricle, left atrium and Left ventricle.

From the body de-oxygenated blood enters in the heart through vena cava. It will come in the first chamber of the heart called right atrium and then second chamber called right Ventricle. After passing through this two chambers, it is transferred to the lungs through pulmonary arteries. In the lungs there is a muscular part called Alveoli, exchanges the air (oxygen and Carbon dioxide). Oxygenated blood is transferred into the heart. There it will enters in the heart through pulmonary veins. It passes through left atrium and left ventricle and then it is pumped to the body through Aorta.

All living things excrete to remove waste and extra fluids from the body. From the pair of kidneys, pair of ureters, urinary bladder and urethra excrete the waste. For excretion of blood it is passed through kidney, which filter the blood and return the blood to the body. After filtration the remaining waste is called urine. It is transferred to urinary bladdes through the pair of urethra. Urinary bladder hold urine until it is full. When it is full, the urine is excreted by urethra from our body. This is how our Blood circulatory system works in our body every day.



## KNOW THE ENTERING INTO SPACE GALLERY EXHIBIT

### International Space Laws(Selected)

The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on the Moon shall be forbidden.

This Exhibit is situated at “Entering Space Gallery” between Fun Science Gallery and Power of Play Gallery at First Floor of Science Centre.



## QUIZ

1. What is the chemical symbol for gold?  
a) Ag                      b) Go                      c) Au                      d) Gd
2. Which planet is known as the “Red Planet”?  
a) Jupiter                      b) Mars                      c) Venus                      d) Saturn
3. What is the largest organ in the human body?  
a) Liver                      b) Heart                      c) Brain                      d) Skin
4. Which type of mirror is used in a car's rear-view mirror?  
a) Concave mirror      b) Plane mirror      c) Convex mirror      d) Cylindrical mirror
5. What gas do plants absorb from the air for photosynthesis?  
a) Oxygen                      b) Nitrogen                      c) Carbon Dioxide      d) Hydrogen