

SCIENCE CENTRE NEWS LETTER

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SCIENCE CENTRE

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WHAT'S NEW IN SCIENCE?

Light-powered chip makes AI 100 times more efficient

Researchers from SPIE (International Society for Optics and Photonics), Florida, United States had developed a silicon chip that uses light with electricity to perform convolution operations for AI (Artificial Intelligence), dramatically reducing energy use and increasing speed of AI.

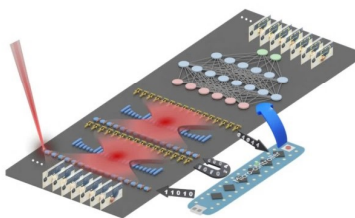
AI systems are increasingly central to technology, powering everything from facial recognition to language translation. But as AI models grow more complex, they consume vast amounts of electricity-posing challenges for energy efficiency and sustainability. A new chip developed by Researchers could help address this issue by using light, rather than just electricity.

The chip is designed to carry out convolution operations, a core function in machine learning (When a computer system automatically learns from data and improves its performance over time without being explicitly programmed for every task) that enables AI systems to detect patterns in images, video and text. These operations typically require significant computing power. By integrating optical components directly onto a silicon chip, the Researchers have created a system that performs convolutions using laser light

and microscopic lenses-dramatically reducing energy consumption and speeding up processing.

In tests, the prototype chip classified handwritten digits with about 98 percent accuracy, comparable to traditional electronic chips. The system uses two sets of miniature Fresnel lenses (flat, ultrathin versions of the lenses found in lighthouses) fabricated using standard semiconductor manufacturing techniques. These lenses are narrower than a human hair and are etched directly onto the chip.

To perform a convolution, machine learning data is first converted into laser light on the chip. The light passes through the Fresnel lenses, which carry out the mathematical transformation. The result is then converted back into a digital signal to complete the AI task.



Main Source:

<https://www.sciencedaily.com/releases/2025/09/250908175458.htm>

SCIENTIST OF THE MONTH

Dr. Subrahmanayam Chandrasekhar

Dr. Subrahmanayam Chandrasekhar was born on October 19, 1910 at Chennai in Tamil Nadu. He graduated in Physics from the Presidency College, Chennai in the year 1930. He did Ph.D from Cambridge University in 1933. He received the degree of D.Sc. in 1942.

Dr. Chandrasekhar won the Noble Prize for Physics in 1983, for his theory of black holes or dying stars. A Theoretical Astrophysicist. He did innovating work in the evolution of stars and the discovery of neutron stars and black holes. A theory known as 'Chandrasekhar Limit' was concluded by Dr. Chandrasekhar, which said that if a stellar mass is 1.4 times the solar mass at the time it starts the process of shrinkage, then the shrunk body at the end of its evolution would have Zero radius.

Dr. Chandrasekhar worked on a wide variety of problems in physics during his lifetime,

contributing to the contemporary understanding of stellar structure, white dwarfs, stellar dynamics, stochastic process, radiative transfer, the quantum theory of the hydrogen anion, hydrodynamic and hydromagnetic stability, turbulence, equilibrium and the stability of ellipsoidal figures of equilibrium, general relativity, mathematical theory of black holes and theory of colliding gravitational waves.

He won various medals and awards. He got the I.N.S.A. Vainu Bappu Memorial Medal in 1985. He passed away on August 21, 1995.



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

https://en.wikipedia.org/wiki/Subrahmanyan_Chandrasekhar



Timings

Tuesday to Sunday
& Public Holidays
9.30 am to 4.30 pm

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SCIENCE FACTS OCTOBER 2025

1 October 1904	: Austrian- born Physicist Otto Robert Frisch (First Measured the magnetic moment of the proton) was born.
2 October 1852	: Scottish Chemist William Ramsay (Winner of the 1904 Nobel Prize in Chemistry who discovered the noble gases) was born.
3 October 1904	: American Chemist Charles J. Pedersen (Co-winner of the 1987 Nobel Prize in Chemistry for describing methods of synthesizing crown ethers) was born.
4 October	: World Space Week (by U.N.)
4 October 1916	: Russian Physicist Vitaly Ginzburg (Co-winner of the 2003 Nobel Prize in Physics for their pioneering contributions to the theory of superconductors and superfluids) was born.
4 October 1957	: Soviet Union launched first artificial Earth Satellite named "Sputnik-1"
5 October 1882	: American rocket scientist Robert Goddard was born.
7 October 1885	: Danish Physicist Niels Bohr (Who made foundational contributions to understanding atomic structure and quantum theory) was born.
7 October 1939	: English Chemist Harold Kroto (Co-winner of the 1996 Nobel Prize in Chemistry for their discovery of fullerenes) was born.
8 October 1917	: English Biochemist Rodney Robert Porter (Co-winner of the 1972 Nobel Prize in Physiology/Medicine for determining the chemical structure of an antibody) was born.
9 October 1852	: German Chemist Hermann Emil Fischer (Winner of the 1902 Nobel Prize in Chemistry in recognition of the extra ordinary services he has rendered by his work on sugar and purine syntheses) was born.
10 October 1930	: French Chemist Yves Chauvin (Co- winner of the 2005 Nobel Prize in Chemistry for the development of the metathesis method in organic synthesis) was born.
11 October 1884	: German Chemist Friedrich Bergius (Co-winner of the 1931 Nobel Prize in Chemistry in recognition of their contributions to the invention and development of chemical high-pressure methods) was born.
13 October 1773	: The Whirlpool Galaxy is discovered by Charles Messier.
14 October 1914	: American Physicist Raymond Davis Jr. (Co-winner of the 2002 Nobel Prize in Physics who detect neutrinos emitted from the Sun) was born.
18 October 1967	: The Soviet probe Venera 4 reaches Venus and become the first spacecraft to measure the atmosphere of another Planet.
20 October 1891	: English Physicist James Chadwick (Winner of the 1935 Nobel Prize in Physics for his discovery of the neutron) was born.
22 October 1903	: American Geneticist George Wells Beadle (Co-winner of the 1958 Nobel Prize in Physiology/Medicine for their discovery of the role of genes in regulating biochemical events within cells) was born.
22 October 2008	: India launches its first unmanned lunar mission Chandrayaan-1.
24 October 1932	: French Physicist Pierre-Gilles de Gennes (Winner of the 1991 Nobel Prize in Physics for discovering that methods developed for studying order phenomena in simple systems can be generalized to more complex forms of matter, in particular to liquid crystals and polymers) was born.
28 October 1914	: British Biochemist Richard Laurence Millington Synge (Co-winner of the 1952 Nobel Prize in Chemistry for the invention of Partition Chromatography) was born.
30 October 1939	: American scientist Leland H. Hartwell (Co-winner of the 2001 Nobel Prize in Physiology/Medicine for their discoveries of protein molecules that control the division[duplication]) was born.
31 October 1835	: German Chemist Adolf von Baeyer (Winner of the 1905 Nobel Prize in Chemistry in recognition of his services in the advancement of organic chemistry and the chemical industry, through his work on Organic Dyes and Hydroaromatic compounds) was born.

U.N. – United Nations

WHO – World Health Organization

UNESCO – United Nations Educational Scientific & Cultural Organization

Ans: 1.b 2.a 3.a 4.b 5.a

SCIENTIFIC QUESTION

What is Doppler Effect?

The frequency of a wave is equal to the number of waves that pass a particular point in one second.

The doppler effect is named after physicist 'Christian Doppler' who described the phenomenon in 1842.

The Doppler effect is the apparent change in the frequency (or wave length) of a wave that occurs when there is relative motion between the source of the wave and an observer.

The Doppler effect also known as Doppler Shift.

We observe, Doppler Effect in 3 ways:-

1. SoundWave
2. LightWave
3. Everyday Technology

In real life Doppler effect examples:

In Sound Wave:-

Emergency vehicle sirens (Ambulance /Police) and Train horns changes the pitch as it approaches higher pitch and after it passes lower pitch.

In Light Wave:-

Astronomers use the Doppler effect to measure the speed of stars and galaxies.

Light from a star or galaxy moving away from Earth shifts toward Red end of the Spectrum. It is called a Red Shift.

Light from a star or galaxy moving towards Earth shifts toward Blue end of the Spectrum. It is known as Blue Shift.

Technological Application:-

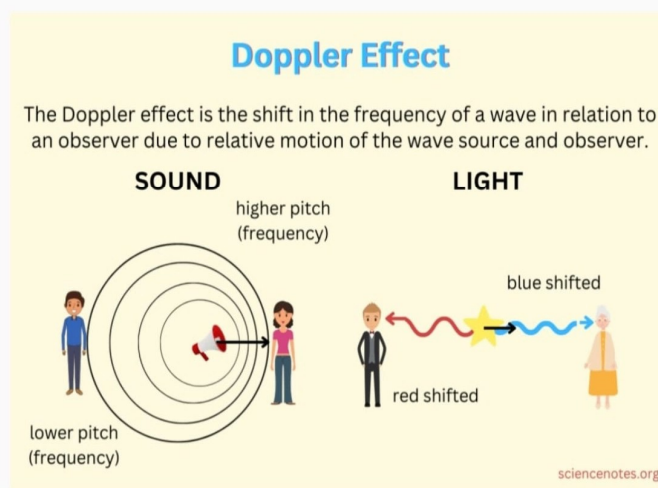
Measure blood flow velocity in arteries & veins to detect blood clots, heart valve issues & monitor fetal health.

Military uses for identify a submarine's location and speed with the help of SONARS.

In Aerospace navigation, calculate the speed of flying objects like drones, plane jets etc.

Main Source: Britannica, NASA, Wikipedia

Image: Science Notes (SN)



KNOW THE ENTERING INTO SPACE GALLERY EXHIBIT

National Space Law (Selected)

Countries will not place any objects carrying nuclear weapons or weapons of mass destruction in orbit around the Earth. Countries will not install such weapons on Celestial bodies or station or in outer space in any other manner.

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



SCIENCE PROJECT

Surat Municipal Corporation had organized “Science Fair-2025” at Art Gallery, Science Centre Surat on 22nd and 23rd August, 2025 for students of Std. 8 to 12. Sant Tukaram Maharaj School No.138 had participated in Science Fair with their project on “Rain Shield Project” under the sub theme of “Building Sustainable Future of Digital India for Global Leadership”

The aim of the project was to find solution of daily life problems through digital methods. In this project, a house was build out of card board and rain sensor was attached to its roof using tape. The rain sensor was connected to a circuit and with a DC motor.

Working method: The motor starts when water drops fall on the rain sensor and clothes drying outside the house accumulate in the porch area.

Use: When it rains while clothes are drying outside the house, technology can help prevent clothes from getting wet in the rain.



SCIENCE QUIZ

1. Volt is unit for which physical quantity?
a. Electric Current b. Electric Potential c. Power
2. Which instrument is used to measure the difference in Electric potential?
a. Voltmeter b. Emitter c. Galvanometer
3. Who first invented the Simple battery?
a. Volta b. Coulombe c. Ampere
4. What plate is used as the positive pole in a Voltaic cell?
a. Lead b. Copper c. Zinc
5. What solution is filled in a Voltaic Cell?
a. Dilute Sulfuric acid b. Sodium chloride c. Copper sulphate