DAILY CURRENT AFFAIRS 08-04-2024

GS-1

1. Gravity hole' in the Indian Ocean

GS-2

2. SARAH(Smart AI Resource Assistant for Health)

3. Clean Energy Transitions Programme 2023

GS-3

4. Dark matter and dark energy

5. Ahobilam temple

Gravity hole' in the Indian Ocean

Syllabus: GS-1: World Physical Geography.

Context:

➢ *The mysterious giant 'gravity hole' in Indian Ocean, and why it was formed.*

Indian Ocean Gravity Hole:

➢ **Weak gravitational pull** *in the Indian Ocean results in a depression in sea level by over 328 ft.*

Explanation for Formation:

➢ *Researchers propose* **magma plumes originating** *from deep within the Earth, similar to those forming volcanoes.*
➢ **Utilized supercomputers** *to simulate area's evolution over 140 million years.*
➢ *Recent study in* **Geophysical Research Letters** *outlines findings.*

Influence of Earth's Shape and Density:

➢ **Earth's irregular shape and density variations** *influence surface features and gravitational pull.*
➢ **Density variations determine hypothetical water level** *equilibrium on the surface under gravity.*

Indian Ocean Geoid Low:

➢ *Circular depression covering around* **1.2 million square miles**.
➢ *Originates from* **southern tip of India,** *noted since 1948.*
➢ *Dutch geophysicist* **Felix Andries VeningMeinesz** *first observed during a gravity survey.*

Computer Simulations and Magma Plumes:

➢ *Conducted simulations* **spanning 140 million years**.
➢ *Six out of nineteen simulations show* **emergence of geoid** *low similar to Indian Ocean's.*
➢ **Presence of magma plumes** *believed to be responsible, originating from ancient ocean disappearance due to India's movement.*

Future Outlook:

➢ *Originated roughly 20 million years ago,* **continuity or cessation depends on Earth's mass anomalies.**
➢ *Cardiff University professor finds research* **intriguing, anticipating further inquiry**.

> *University of Florida geology professor voices concerns about* **study's modeling approach and disparities between projected** *and actual geoids.*
> *Researcher acknowledges limitations in simulations but maintains confidence in overall* **explanation for 'gravity hole' phenomenon**.

SARAH(Smart AI Resource Assistant for Health)

Syllabus: GS-2; Health, GS-3: Science and Technology

Context:

> *The* **World Health Organization** *(WHO) unveils S.A.R.A.H., an AI-powered digital health promoter, available 24/7 in eight languages via video or text.*
> **S.A.R.A.H. provides tips to destress**, *eat right, quit tobacco and e-cigarettes, be safer on the roads as well as give information on several other areas of health.*

About Sarah: WHO's First Digital Health Promoter

> *S.A.R.A.H. (Smart AI Resource Assistant for Health) leverages cutting-edge generative AI technology:*
>   o **Enhanced Empathetic Response:** *S.A.R.A.H. goes beyond scripted interactions, engaging in dynamic conversations that provide nuanced and empathetic support.*
>   o **Personalized Health Information:** *Access information on various health topics, including mental health and healthy habits, tailored to your specific needs.*
>   o **24/7 Availability:** *S.A.R.A.H. is available anytime, anywhere, on any device, empowering you to take charge of your health journey.*

S.A.R.A.H. empowers individuals to:

> **Understand Health Risks:** *Gain insights into risk factors for leading causes of death like cancer, heart disease, and diabetes.*
> **Make Informed Decisions:** *Access up-to-date information on quitting tobacco, maintaining a healthy diet, staying active, and managing stress.*
> **Realize Your Health Rights:** *S.A.R.A.H. is a valuable tool to access reliable health information, promoting health equity worldwide.*

Clean Energy Transitions Programme 2023

Syllabus:GS-2; International Institutions, GS-3: Climate Change

Context:

➢ *Recently, Clean Energy Transitions Programme 2023 report was released.*

More about CETP:

➢ *The Clean Energy Transitions Programme (CETP) is aimed at moving the world towards a* **global net-zero energy system.**

➢ **Launched in 2017** *by the* **International Energy Agency** *(IEA) to utilize its expertise and influence.*

➢ *Provides analysis, technical assistance, and capacity building for transitioning to clean energy.*

➢ **Structured across three pillars:** *supporting countries in setting clean energy goals, facilitating coordination among multilateral organizations, and showcasing global-level work.*

➢ **Notable achievements in 2023** *include new fuel standards in Indonesia, energy transition plan in Uganda, and regulations for China's electricity market.*

➢ **These policies align with IEA recommendations** *and strengthen its role as a trusted advisor.*

➢ *Published reports include the* **Latin America Energy Outlook** *and a special report on clean cooking in Africa.*

➢ **Supports IEA's work** *on energy efficiency, critical minerals, energy employment, and clean energy investment.*

➢ *Assists in* **energy data collection** *and capacity building for policymakers.*

➢ **Contributes to global energy dialogue** *through participation in various international meetings.*

➢ *Supported IEA's engagement with COP28, leading to the first-ever global agreement on 1.5°C-aligned energy transitions.*

Dark matter and dark energy

Syllabus: GS-3; Science and Technology

Context

➢ *Largest 3D map of our universe could hint that dark energy evolves with time*

What is Dark matter?

➢ *Dark matter is a hypothetical form of matter that seems to* **not interact with light or the electromagnetic field.**
➢ *It makes up about 27% of the universe.*
➢ *Dark matter is classified as "cold", "warm", or "hot" according to its velocity.*

What is Dark energy?

➢ *Dark energy is the dominant component of the universe, contributing 68% of the total energy.*

More to know

➢ *Dark matter and dark energy are* **mysterious influences that seem to be stretching the universe apart and clumping stuff together in unexpected ways.**

Scientists study dark matter and dark energy in multiple ways, including:

➢ **Observing galaxies:** *To measure the effects of dark matter on their structure and evolution*
➢ **Creating theoretical models:** *Of dark matter behavior from observational data*
➢ **Measuring cosmic acceleration**: *By mapping the position of tens of thousands of galaxies*

CRIB SHEET

DARK matter

Science and Technology Facilities Council (UKRI)

Dark matter makes up more than **26%** **of all the energy** in the Universe – whereas normal matter (the stuff stars, planets and you are made of) barely makes up 5%. This mysterious substance doesn't interact with the electromagnetic radiation (heat, light, radio etc) that we rely on to see the Universe so it is invisible and is only detectable by the gravitational influence it has on stuff we can see.
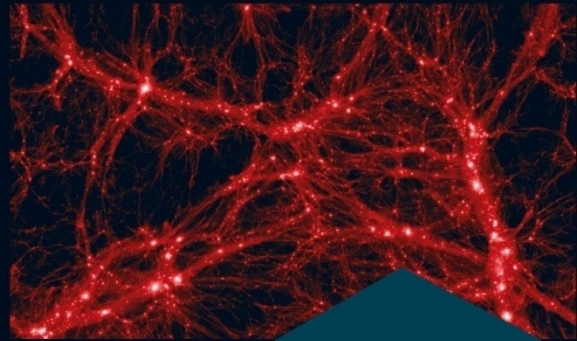
This simulation of dark matter distribution shows the 'filaments' or threads of dark matter that are thought to connect galactic clusters and stop them flying apart. These invisible threads have now been detected indirectly by measuring the effect their gravity has on the path of light travelling through them (called gravitational lensing).

How dark matter was discovered

In 1933, a Swiss astrophysicist, Fritz Zwicky, was studying a galaxy cluster (a group of galaxies bound together by gravity). He observed the motions of the galaxies within the cluster and applied Newton's laws to estimate its gravitational mass. But when he came to estimate the amount of visible mass within the cluster (by measuring the light emitted by the stars within it, extrapolating their mass and adding it all together) his figures fell drastically short of his first estimate – the visible mass accounted for only a fraction of the cluster's gravitational mass.

Furthermore, there wasn't enough visible mass to generate the gravity needed to hold the cluster together (the galaxies should have been flying apart but they weren't). He concluded that there must be something invisible and undetectable making up all the missing mass – dark matter.

How much is there?

It turns out that the matter that makes all the galaxies, stars and planets in the Universe only accounts for a tiny fraction of all the matter and energy... visible matter is really just the tip of the iceberg!

Visible matter 4.9%

Dark matter 26.8%

Dark energy 68.3%

Infographics: Ben Gilliland
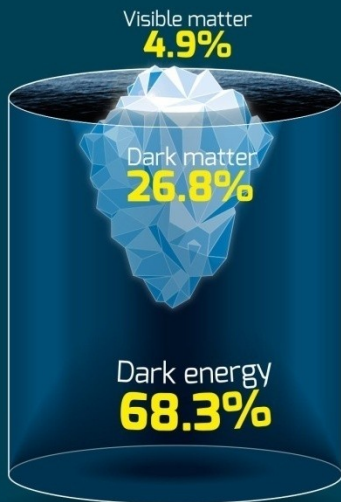
In many ways, dark energy is dark matter's opposite – whereas dark matter holds stuff, like galaxies, together, dark energy is a mysterious repulsive force that is fueling the Universe's ever-accelerating expansion.

What is it?

The fact is, we just don't know! We know more about what dark matter isn't than what it is.

It isn't clouds of normal matter

Particles of normal matter reflect or block light, which allows us to see them.

It isn't antimatter

Matter and antimatter particles annihilate each other on contact, producing gamma-rays, positrons or neutrinos – if dark matter was antimatter, the sky would be flooded with this stuff.

It isn't black holes

Dark matter can act as a gravitational lens and bend light, as do black holes. But black holes are much too powerful to account for the effects we can measure.

It might be new particles...

WIMPS

One of the favourite dark matter candidates is something called a WIMP, or Weakly Interacting Massive Particle. As their name would suggest, WIMPs are expected to possess a lot of mass but will barely interact with normal matter.

AXIONS

The axion is another theoretical particle that interacts even more weakly with normal matter than WIMPs, and possesses far less mass, which (of course) makes it even more difficult to pin down than their more massive rivals.

GRAVITINOS

The gravitino is the theoretical (but more massive) partner of the particle that is thought to carry the gravitational force, the graviton. Unfortunately the graviton is also theoretical – you can imagine the difficulties involved in finding a theoretical particle's theoretical partner!

Ahobilam temple

Syllabus: GS-3; Environmental Concern and Conservation, GS-1; Art and Culture

Context

➢ *The Forest Department and Sri Lakshmi Narasimha Swamy Devasthanam (SLNSD) at Ahobilam have imposed certain restrictions on visitors arriving at the shrine, which is composed of nine different temples, situated within the Nallamala forest.*

Why?

➢ *The restrictions have been imposed in the wake of the* **intense heatwave** *that can impact the movement of wild animals.*

➢ *To ensure the safety of animals, the department has already banned all forms of plastic such as sachets, water cups, tea cups and bottles, which will have to be deposited at the Cheethal base camp.*

➢ *Further, overnight stays in the region have been prohibited given the likelihood of* **man-animal conflict,** *due to the movement of nocturnal animals.*

➢ *As this shrine is known for the conduct of animal sacrifice, the department has announced that such practices are explicitly prohibited.*

About

➢ *Ahobilam is a town and holy site in the Allagadda mandal of Nandyal district in the Indian state of* **Andhra Pradesh***.*

➢ *It is surrounded by picturesque hills of the* **Eastern Ghats** *with several mountain hills and gorges.*

➢ *It is the centre of worship of* **Narasimha, the lion-headed avatar of Vishnu,** *to whom the nine Hindu temples and other shrines all dedicated.*

➢ *The main Narashima Swamy temples at each site were built or expanded by the emperors of* **Vijayanagara in the 15th and 16th centuries,** *then sacked by the Mughals in 1578, then restored and expanded at various times, up to the present day.*

➢ *As they stand, they are a mixture of work from all these periods.*

More to know

➢ **The Nagarjunasagar-Srisailam Tiger Reserve (NSTR),** *which was declared a tiger reserve in 1983, extends up to 3,727.82 sq km., including the core and buffer areas.*

➢ *The* **Ahobilam National Tiger Conservation Authority (NTCA***), constituted as per the provisions of the* **Wild Life Protection Act, 1972***, by the Ministry of Forests, Environment and Climate Change, oversees the rare flora and fauna specific to the region.*

➢ *The forest area around the Pavana Narasimha temple is home to red sanders, leopards and deer.*

➢ *Five tigers also inhabit the area.*