Cubic Kilometre Neutrino Telescope (KM3NeT)

Why in News?

Recently, the scientists have deployed 2 telescopes under the Mediterranean Sea to detect high-energy neutrinos.

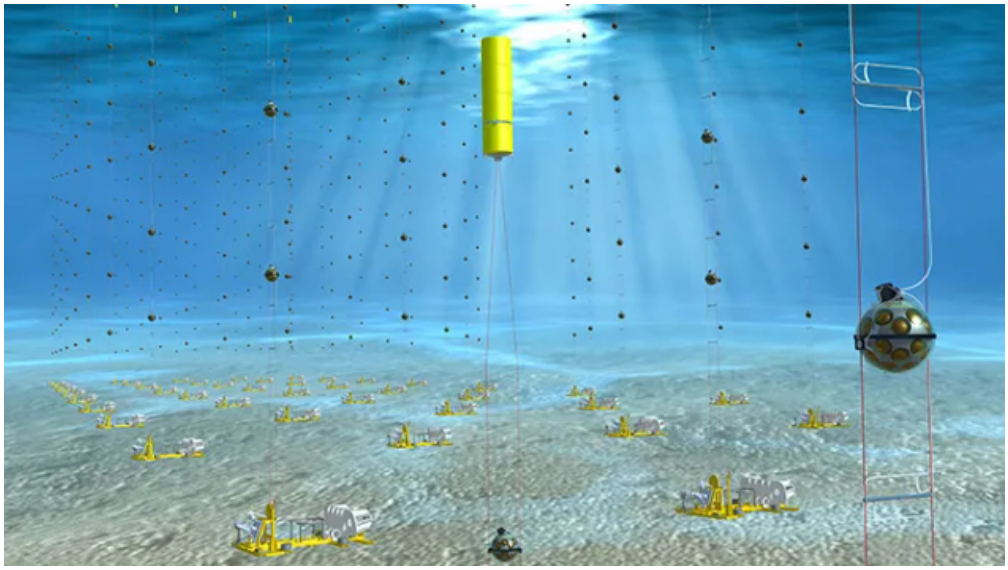
- It is an ***underwater Neutrino telescope***.
- **Aim** – To *study high-energy neutrinos* also known as ghost particles that could reveal secrets of the cosmos.

> ***Neutrinos*** *are weakly interacting subatomic particles that can travel astronomical distances undisturbed. They are the 2nd most abundant subatomic particles after photons.*

- **Need for underwater Neutrino telescope** – While both frozen ice and deep sea waters are used for detecting neutrinos, *underwater neutrino telescopes could be more efficient* than IceCube.
- That is because ***water scatters light less***, which gives a more accurate idea about where the detected neutrinos came from.

> *Neutrino detectors needs to be in dark because it look for flashes of* ***Cherenkov radiation****, a light that neutrinos produce when they interact with a water or ice molecule. These flashes trace the path of that neutrino, giving details of its source, the amount of energy it contains, and its origins.*

- **Features** – It consists of *2 telescopes* made up of glass baubles arranged on vertical cables.
- Each strand dangles in the water like a pearl necklace that's up to 700 meters long.
- Each bauble, a pressure-resistant sphere 44 centimeters wide, contains *31 photomultiplier tubes* that sense light generated when neutrinos crash into the seawater.



- **Deployment** – Detectors are *deployed in 1 month-long campaign every year* and at the end of 2024, the telescopes boasted 57 strands.
    - Eventually, 100's of such cables will sway in the currents, a few kilometers below the surface off the *coasts of Sicily and the South of France*.
- **Sicilian telescope** – Study high-energy *neutrinos from space*.
- **French telescope** – Study *neutrinos from the atmosphere* to understand how they oscillate, or change from 1 type of neutrino to another.
- **Disadvantage of underwater neutrino telescope** – Water absorbs light more and as a result, there will be less light to examine.

References

1. The Indian Express| Underwater Neutrino Telescope
2. Science News| Cubic Kilometer Neutrino Telescope

Related News – Neutinos and IceCube Neutrino Observatory

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