Very Large Telescope

April 25, 2020

Context: Using the European Space Organisation's (ESO) Very Large Telescope (VLT), astronomers have noticed the unprecedented dimming of Betelgeuse, a red supergiant star in the constellation Orion

- It is the world's most advanced optical instrument, consisting of four Unit Telescopes with main mirrors of 8.2m diameter and four movable 1.8m diameter Auxiliary Telescopes.
- The telescopes can work together, to form a giant 'interferometer', the ESO Very Large Telescope Interferometer, allowing astronomers to see details up to 25 times finer than with the individual telescopes. The light beams are combined in the VLTI using a complex system of mirrors in underground tunnels
- The VLT consists of four individual telescopes. They are generally used separately but can be used together to achieve very high angular resolution.
- The four separate optical telescopes are known as Antu, Kueyen, Melipal, and Yepun
- Seated in the Atacama Desert of Chile
- The light beams are combined in the VLTI using a complex system of mirrors in underground tunnels where the light paths must be kept equal to distances less than 1/1000 mm over a hundred metres. VLTI can reconstruct images with an angular resolution of milliarcseconds, equivalent to distinguishing the two headlights of a car at the distance of the Moon.
- Individual telescope help see objects that are four billion (four thousand million) times fainter than what can be seen with the unaided eye.
- VLT has made significant contributions to astronomy, snapping the first image of an exoplanet, capturing the

first direct measurements of the atmosphere of a super-Earth, and taking the universe’s cosmic temperature.
- The VLT was also instrumental in revealing a system of seven Earth-sized planets just 40 light-years from Earth.

Betelgeuse

- a red supergiant star in the constellation Orion
- During January and February 2020, it reached a record low – around 40 percent of its usual brightness.
- Researchers have estimated that this will likely happen to Betelgeuse within the next 100,000 years, which is relatively soon in astronomical terms
- This explosion will create a burst capable of briefly outshining an entire galaxy