⟹ **Observable Universe** → Observable Universe (~~प्रत्यक्ष ब्रह्माण्ड~~) is a ball-shaped spherical Region of the Universe comprising all matter that can be observed from Earth or its space-based telescopes & exploratory probes at the present time, because the EMR (Electro Magnetic Radiation) from these objects has had time to reach the Solar System and Earth since the beginning of the Cosmological expansion.

→ There may be 2-Trillion galaxies in the observable Universe (based on data from New Horizons, 2021).

→ Assuming the Universe is ISOTROPIC, the distance to the edge of the observable Universe is roughly the same in every direction (i.e. the Observable Universe is a spherical region centred on the observer). Thus, Every location in the Universe has it's own observable universe, which may or may not be overlap with the one centered on Earth.

→ (different from proper distance) → this can change overtime due to the Expansion of the Universe.

→ The Comoving distance (the distance between two ~~as more~~ nearby objects in the Universe which remains constant with epoch if the two objects are moving with the Hubble Flow) from earth to the edge of the observable Universe is about 14·26 gigaparsecs (46·5 billion Light years) in any direction. The observable Universe is thus a sphere with a diameter of about 28·5 gigaparsecs.

NOTE:

① Light Years → A Light year is a measure of distance and not of time. Light travels at speed of 300,000 Kms/Second. Considering this, the distances the light will travel in one year is taken to be ONE LIGHT YEAR. This equals to 9.461×10^{12} Km.

eg:→ The mean distance between the Sun & the Earth is 149,598,000 Km. In terms of light years, it is 8.311 minutes.

② Parsec → The Parsec is a unit of LENGTH used to measure the large distances to Astronomical objects outside the Solar system, approximately equal to 3.26 Light years i.e 30.9 trillion Kilometres.

eg:→ The nearest Star, PROXIMA CENTAURI, is about 1.3 parsecs (4.2 Light years) from the Sun.

The word PARSEC (Parallax of one Second) was coined by the British Astronomer Herbert Hall Turner in 1913, to make calculations of astronomical distances from only Raw observational data easy for astronomers. Partly for this reason, it is the unit preferred in astronomy and astrophysics, though the Light year remains prominent in popular science texts & Common usage.

→ Although Parsecs are used for the Shorter distances within the MilkyWay, but Multiples of Parsecs

are required for the larger scales in the Universe, including Kiloparsecs (Kpc) for more distant objects within and around the Milky way, Megaparsecs (Mpc) for mid-distance galaxies and Gigaparsecs (Gpc) for many Quasars and the most distant Galaxies.

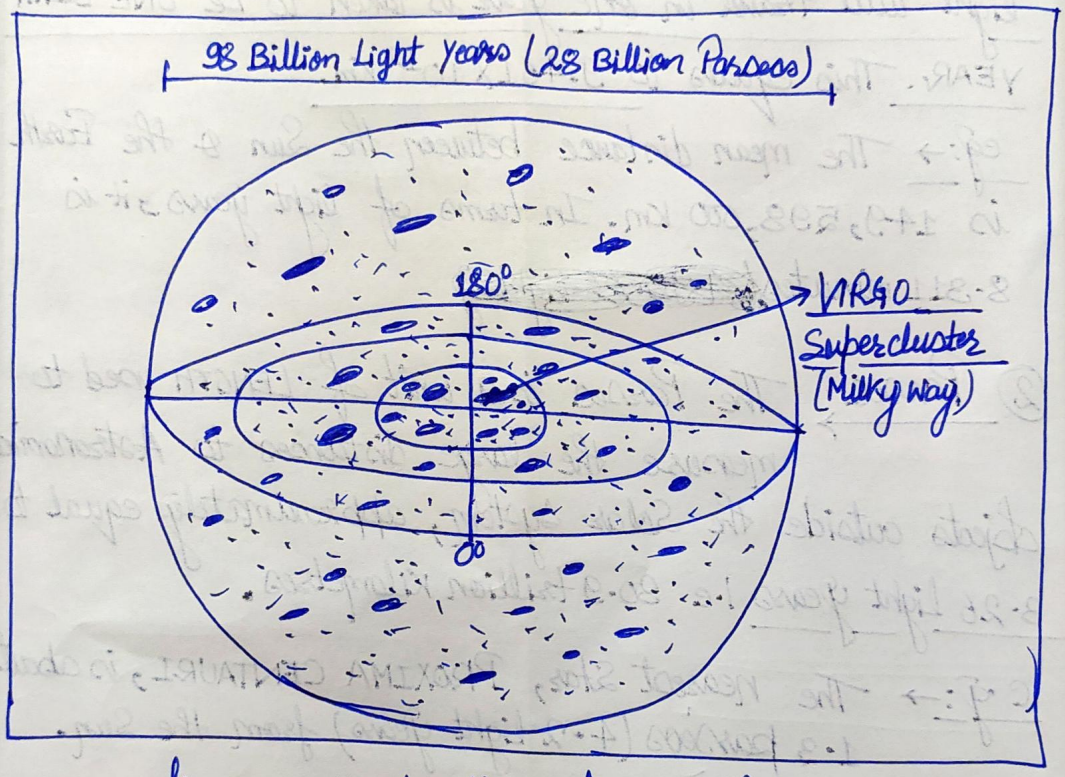

Figure: Visualization of the Whole observable Universe which includes large numbers of Superclusters. The VIRGO Supercluster (Home of Milky way) is placed at the centre, but is too small to be seen.

* Supercluster → A super cluster is a large group of smaller galaxy clusters & Galaxy groups, they are among the largest known structures of the Universe. eg → Virgo, Sarasvati, Ursa major (also supercluster), Leo etc.