

Elements created in the supernovae reaching earth:

The elements created in supernovae are ejected into the environment out to large distances. These elements mix with the hydrogen gas which then form the next generation of stars. Since our star is a third generation star, the full solar system has been enriched by the first two generation of stars.

Extra-terrestrial life:

Science is trying to detect the presence of life on other planets including exoplanets. Right now, we are searching for primitive forms of life, based on our own experience of life here on earth. Life on earth is a carbon life-form. They may well be life based on other types of material, or different from how we can imagine. But science progresses step-by-step, starting from what we know. Thus it is natural to start the search for extra-terrestrial life looking for life as we know it. We have no evidence till now that there are intelligent life out there, but this does not exclude that they exist.

Matter:

In reality, matter and energy have an equivalence according to Einstein's theory of relativity. Hence matter can be converted into energy and vice-versa. Anti-matter is a substance which is the opposite of matter. Matter combines with anti-matter - annihilates and produces energy. Similarly, energy can be converted into matter and anti-matter. We are still not able to answer the question as to why there is much more matter than anti-matter in the universe.

Is there a "giant" planet beyond Neptune?

When scientists studied the orbit of Uranus, they realised that there was something out there that was perturbing the planet, and this lead to the search and discovery of Neptune. Similarly, scientists have postulated that there is something out there which is perturbing the orbits of the planets, which they have called "Planet X". So far it is a theoretical concept, and has not been found observationally.

James Webb space telescope:

The next big telescope soon to be launched in space will be the James Webb space telescope (JWST). Its advantage is that it has a bigger mirror than the Hubble space telescope, and that it can see in near infra-red wavelengths. These wavelengths allow us to see through dusty and cloudy atmospheres. We expect that it will reveal a lot about how planets are born, help us study the atmospheres of other planets, as well as study the early universe to understand how the first stars, blackholes and galaxies were born.

The rate of acceleration the Universe:

We can measure the rate of acceleration of the Universe through the observations of distant supernovae. It can be expressed in some units. At the moment, it is quite strong, that we have attributed nearly ~70% of the density of the Universe to its originator - dark energy.

Large Hadron Collider:

The LHC cannot create a black hole.

When an object approaches a black hole, it is first torn up by the immense forces of gravity. The object adds itself to the mass of the blackhole. We cannot see it once it crosses the event horizon of the black hole.

Flat Universe:

In the models of the Universe of Einstein, the geometry of the Universe depends on the amount of matter, or its density. Measurements of the density of the Universe have revealed that it is more or less flat. But this means it is not curled up on itself. This means that that Universe corresponds to our basic intuition of a 3dimensional space + an extra dimension of time.

Magellan:

Magellan was the first European to note the Magellanic clouds. We did not know the distances to them until Levitt discovered her relationship. In fact Levitt, assumed that the the Cepheids in the Magellanic clouds were all at the same distance, and thus she derived her luminosity-period relationship. A few years later, observers were able to observe cepheids close by and get parallax for them. In this way, the luminosity-period relationship was calibrated. It was only then that people had a true understanding of the distance of the Magellanic clouds. With the discovery of Hubble that galaxies were very far away, they also were able to piece together that the Magellanic clouds were galaxies that were accreted by the Milky Way.

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