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A NEARBY EARTH?

Ken Tapping, 6th September, 2016

So far we have found well over a thousand planets orbiting other stars, including some that may be Earthlike. However, our excitement has been somewhat tempered by these planets being so far away they are effectively out of reach, at least for a while. Then there was the recent discovery that the nearest star after the Sun, Proxima Centauri, has a planet that could be Earthlike. That could change everything. We could actually send a space probe to have a closer look, using technologies we have.

Proxima Centauri is a dim, red dwarf star, producing about 0.17% of the Sun's energy output. Our Earth lies 150 million kilometres from the Sun, and every square metre of the side facing the Sun collects about 1400 watts of solar energy. This is what makes our world warm and habitable. If our Sun were as dim as Proxima Centauri, that figure would be about 2.4 watts per square metre. That is not much more than what Pluto receives. We would be frozen solid. However, if we were to move closer to the star we would collect more energy. If the Earth were to orbit Proxima Centauri at a distance of 6.2 million kilometres we would receive the amount of energy we now receive from the Sun. The big difference is that Proxima Centauri is a red star. It would look like sunset all the time. Because our eyes are optimized for yellow light, this would take some getting used to.

The newly-found planet has a mass of 1.3 Earths, which is tolerable. We could live on its surface and the feeling of being a bit heavier would wear off in time. It also lies about 7.5 million kilometres from its star. That is 1.3 million kilometres beyond the optimum distance of 6.2 million kilometres. This means it is receiving only about 70% of the energy needed to make it Earthlike. It could be frozen.

However, there is hope. If we look back into the Earth's remote past, we find that around 3.5 billion years ago, around a billion years after our planet formed, there were liquid water oceans and living creatures swimming or floating around in them. Our knowledge of how stars work, derived through the study of numerous examples, indicates that 3.5 billion years ago the Sun was about 70% of its current brightness. Why wasn't the Earth frozen solid? The answer is almost certainly the greenhouse effect. Back then our atmosphere was rich in carbon dioxide and methane. These are powerful greenhouse gases, and what applied to the young Earth may well apply to the planet we have found orbiting Proxima Centauri. If that planet is like the young Earth, it too could have an atmosphere rich in greenhouse gases. That could raise the temperature to where liquid oceans might exist and life get started.

One really exciting thing is that Proxima Centauri is close by cosmic terms, a mere 4.3 light years away. That is, at a distance where its light takes 4.3 years to get here. It is feasible to consider sending a spacecraft there for a closer look.

The fastest moving manmade spacecraft out in space at the moment is moving at between 200,000 and 300,000 kilometres an hour. That would get us to Proxima Centauri in about 16,000 years. However, engineers have ideas for spacecraft that could reach maybe 10% of the speed of light, a speed of 30,000 kilometres a second. At that speed a spacecraft could get to Proxima Centauri is less than 50 years, depending on how hard it accelerates and decelerates.

I once read a story where the crew of a spacecraft did the 50 or so years' trip to Proxima Centauri only to find people already there. In the interim, someone had discovered a means of faster than light travel. The travellers were upset at spending a big chunk of their lives unnecessarily. However, this won't upset a robot spacecraft.

Mars and Saturn lie very low in the southwest after dark. Mars is on the left and Saturn on the right. The Moon will reach First Quarter on the 9th.

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