

IS THERE LIFE AT ALPHA CENTAURI

Could life exist on planets in the star system closest to ours, Alpha Centauri? Dangerous X-ray radiation makes it unlikely for the single exoplanet found so far. But new data suggest better odds for any new planets yet to be discovered.

Alpha Centauri is the closest star system to our Sun. Chandra data from May 2, 2017 are shown in the inset, in context of a visible-light image of the Alpha Centauri system taken from the ground. With the discovery of thousands of exoplanets orbiting other stars, the search for life elsewhere has entered an exciting new phase. So far, most of these worlds have been found many light-years away (largely due to the fact that the Kepler Space Telescope, which has discovered the majority of them so far, has focussed on a specific patch of sky which contains very distant stars). But what about closer stars? Including, of course, Alpha Centauri, the closest star system to our Sun, only just over four light-years away. According to **Tom Ayres** of the University of Colorado Boulder: Because it is relatively close, the Alpha Centauri system is seen by many as the best candidate to explore for signs of life. The question is, will we find planets in an environment conducive to life as we know it?

Scientists had thought that there was too much X-ray radiation from the stars in the system for life on any planets to be likely. But now, as announced by NASA on June 6, 2018, there is new evidence from NASA's Chandra X-ray Observatory, that, perhaps, conditions could be more life-friendly than previously assumed.

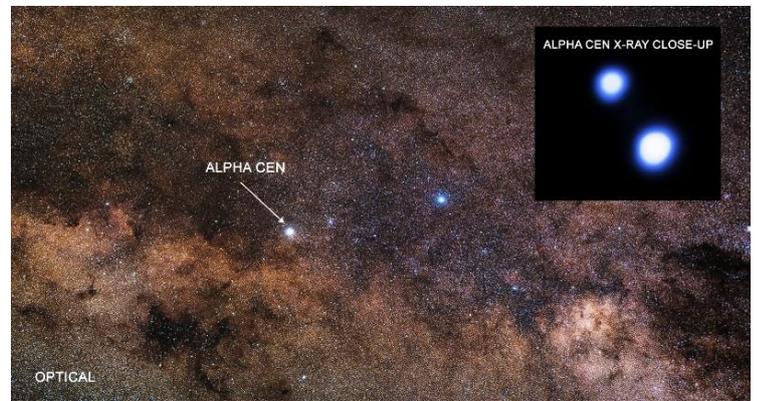
While the other two stars, Alpha Centauri A and B, are both similar to our Sun, Proxima Centauri is a red dwarf, which emits much more deadly X-ray radiation. That is bad news for its one known Earth-sized planet, Proxima b. However, observations from Chandra since 2005 show that conditions around the other two stars are about the same or even better than around our own Sun. In terms of the radiation, the prospects for life are actually better for habitable zone planets around Alpha Centauri A than our own Sun, with lower doses of X-rays than similar planets in our solar system, and only slightly worse around Alpha Centauri B, by a factor of five. As Ayres noted:

This is very good news for Alpha Cen AB in terms of the ability of possible life on any of their planets to survive radiation bouts from the stars. Chandra shows us that life should have a fighting chance on planets around either of these stars.

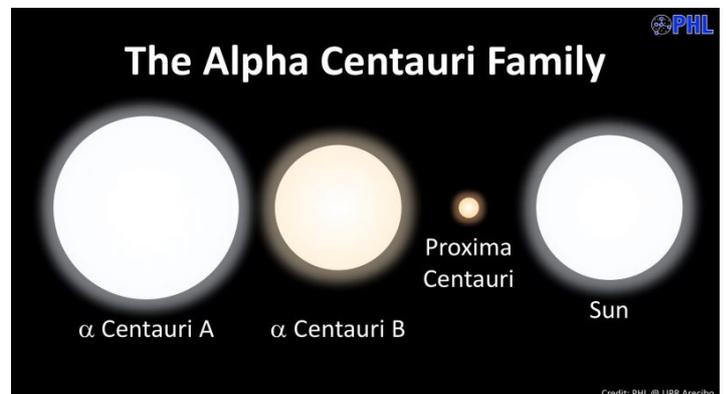
It is not known yet if there are any rocky planets orbiting Alpha Centauri A or B, but if so, then there is an increased chance of habitable conditions, although other factors come into play as well, such as temperature,

liquid water or lack of it, composition of any atmosphere, etc. One problem with searching for planets there is that both stars are bright and currently closer together because of their orbits, making detection more difficult.

For Proxima b however, the situation is different. It receives an average dose of X-rays about 500 times greater than Earth, and up to 50,000 times stronger during a large solar flare. Not exactly ideal conditions for life.



Artist's concept of the exoplanet Proxima b orbiting the red dwarf star Proxima Centauri, the closest star to the solar system.



Comparison of the three stars in the Alpha Centauri system and the Sun.