Why do we seem to be alone?

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We may be located at an apparently random place in the Universe but if you look around on almost every scale you'll see that we could be in a lot worse a place. We could be on a world that's permanently covered in cloud or haze. Take Venus or Titan, to name two nearby examples. How much would we know of the Universe then? Instead of being about eight kiloparsecs from the centre of the Milk Way, we could have been much nearer the centre, either enveloped within interstellar dust or exposed to high levels of electromagnetic radiation from a variety of mechanisms, or too near a massive star that blew its heart out in a supernova explosion. In fact the more you look around the Universe, the more it becomes apparent that it's not a great place for life. Almost every part of the Universe is either too hot or too cold, debris is whistling round at tens and even hundreds of km per second, impacting whatever comes in its way, electromagnetic radiation and other hazards all make life unimaginable in many parts of every galaxy. What fraction of the Universe is like the Earth with blue skies, fecund seas, sunny beaches, heather clad mountains, productive fields and forests? A precious small fraction. In fact, so far we've found nowhere else. There can't be a much stronger incentive for looking after the Earth.

I used to wonder, as you probably do, 'why haven't we seen evidence for other intelligent life in the Universe?' If you're a believer in abduction by aliens using flying saucers, then the question is a non-starter. For most of us, though, it's a good question. My take on it is physical, biological, chemical and philosophical.

First, the physical reasons. It's only in the past few decades that mankind has realised what an enormous place the Universe is - enormous but almost empty: empty of matter and empty of energy. The universe at large is not a place where the complexity of life thrives. It is mainly a cold, dark and empty place except in isolated and widely separated regions. The stars are too hot for life, too hot in the most part for even molecules to exist. Active life, which I take it is a pre-requisite for intelligence, can potentially exist in narrow shells a few light minutes across around stars, where the temperature is about right. Stars themselves are typically light years apart. It is possible that alien civilisations can launch intelligent life away from their origins in these habitable shells, but life-sustaining capsules need adequate energy to travel for large amounts of time in the cold and dark of space. However that may be, in short the gigantic vistas of space and the low density of matter in space both dictate that advanced life that develops separately is likely to be a very long way apart.

The violence that exits in our Universe is hard, very hard, to grasp. I'm not thinking here just of large objects hurtling around at high speeds, or of the violent, turbulent, super-heated conditions that exist within every star we can see. I'm thinking at the moment of the evidence presented to us by the rising discipline of γ-ray astronomy.

Over the past decade, γ-ray astronomy has opened a new window on the universe. The view from that window is of a universe peppered with events of extreme violence. Let me give you a couple of examples. A small Geiger counter such as you or I might use to check radioactivity in the environment is designed to detect γ-rays. If you find a significant count rate a couple of metres away from a radioactive source then that source will be seen as a potential hazard to health. The full weight of the legislation connected with the Environmental Protection Agency will be brought in to deal with the matter. Astronomers

have built devices to detect cosmic γ-rays, in fact γ-rays much more energetic than ever come from radioactive sources. Do they find anything? Indeed they do. They detect γ-rays in large numbers. Astonishingly, some of the sources of very high energy γ-rays are over 500 million light years away. Some are even over 1 billion light years away, the 'record' being some 13 billion light years, near the limit of the observable universe. A single light year is an almost unimaginably large distance in terms of any distance we are used to thinking about on Earth. It's over 9000 billion (10^9) km. To detect γ-rays from sources over 500 million light years away beggars belief. You can put a number to the energy emitted by such a violent source but words fail. If we can detect the radiation at 500 million light years distance then it fills an enormous volume in the Universe. Imagine being much nearer such a source, where the radiation is very much stronger. γ-rays in serious doses are detrimental to life, which is why the Environmental Protection Agency are concerned about radioactivity. γ-ray sources in the universe have made swathes of the universe unfit for life.

We believe that here on Earth we are a long way from any life-destroying γ-ray sources but sometimes out of the darkness can spring the unexpected. For example, on 27th December 2004 γ-ray astronomers detected such a strong burst of γ-ray rays that many counters were briefly overloaded. The ensuing detective work on the cause concluded that a rupture in a neutron star had triggered such a burst of energy that in 0.2 seconds the star emitted as much energy as our Sun does over a quarter of million years. The Sun emits a prodigious amount of energy every second. Again, numbers can tell us the violence of the outburst from the star but words fail. Violence like that is intermittent and so are objects flying about at high speed. Life needs continuity to survive and evolve, continuity that is best provided by a spot well sheltered by chance, if nothing else, from intermittent violence of extreme ferocity.

It's hard to exaggerate the challenge to life imposed by the Universe. The Universe is vast, it's cold, the raw materials of matter and energy are incredibly dilute, there is almost no intrinsic complexity in their organisation and mindless violence is rife on almost every scale. The universe at large is no place for a picnic. Mankind's urge to explore in person has been given a sobering reality check by modern astronomy. Mankind might, with a semblance of global co-operation, make significant inroads into visiting the solar system in person over the next few centuries. The Universe at large is a challenge of a different order. It is quite likely a challenge that alien civilisations well ahead of ours elsewhere in the galaxy have failed to solve and we should probably be thankful for that. Indeed, our unmolested existence on Earth is almost certainly due to the hostility of most of the universe to intelligent life. This fact alone should make us particularly careful not to soil planet Earth, for within any foreseeable future there is no-where else to go.

Having come to a conclusion, need I go on? Adding support to an already firm argument, there are issues of time as well as space. Any kind of life was never going to form early in the history of the universe. The elements from which life is built simply didn't exist. The very atoms of life such as C, N, O, P, S, Fe, Mg and a bit more of the periodic table in small amounts were not present in the early universe. They have taken billions of years to form in reasonable quantity, generated during the evolution of large and medium-sized stars. The elements that might make up 'artificial life', such as Si, Ge, As and Al, if our present-day electronics technology develops far enough in this direction, have been no quicker to appear. It will have taken billions of years for the most primitive life to start in the Universe.

As we know from the one example we can probe into here on Earth, it also takes billions of years for intelligent life to form once primitive life has arrived. There are traces of cellular

life on Earth 3.5 billion years old. Life that understands the astrophysics of the Universe is less than a century old. For a start, we probably need to be orbiting a singleton star that lasts a good few billion years, and stars much more massive than the Sun don't last long enough. We also know that for quite special reasons the Earth has enjoyed an unusually protected history and been spared an assortment of potentially common cataclysmic occurrences that could have wiped out life in several ways. I'm thinking of instabilities in our star the Sun, of an enormous impact by another body, of the supernova explosion of a nearby star that would have bathed the Earth in deadly radiation, or simply a tumbling of the Earth's spin axis over many millions of years that would have caused potentially life exterminating climate changes, much worse than Earth's intermittent ice-ages. We have been spared all these and so it could well be that the appearance of intelligent life in the 4.6 billion years of the Earth's existence is a fast-track time for natural evolution. Don't be surprised if aliens are not living next door. We've almost certainly done well to get this far this quickly.

Biologists point out that forming multi-cellular organisms like ourselves, most animals, plants and fungi isn't just a matter of grouping single cells together and getting them to specialise. The energy required to allow multi-cellular organisms to operate with large genomes requires a biological mechanism that seems to have developed only once on Earth. Of course it's possible that other less efficient ways did develop over time but the life they supported was extinguished by the 'winner-takes-all' evolutionary progress of today's surviving life. For a modest example of this process just think of the number of intelligent ape species now present on Earth – one, us humans. The Neanderthals, Denisovans and perhaps other intelligent apes within the past million years are now nowhere to be seen on the planet, their previous existence surmised mainly from the archaeological record. That was a slight digression but the argument to be made is that biological evidence as well as physical evidence points to the fact that primitive life seems comparatively easy to form in the Universe, but complex multi-cellular life is a much harder ask and then takes a lot longer to develop from simplicity to life that can understand the astrophysics of the universe.

I'll add another point here connected with intelligent life. We tend to think that, and certainly to act as if, Earth is the planet of mankind. It's true that any passing alien would see our cities, roads, bridges, railways, crops and quarries as landscaping the planet. But suppose they are too far away to see any such detail. Suppose they could just take an inventory of Earth's life as a whole. What would they find? By mass, the Earth is a planet of plants, trees in particular. Not much intelligence there. Even the most fastidious of us boil plants, fry them, roast them and eat them. Counting by cells, they'd find that the Earth is inhabited by microbes. It's said that more than 90% of organic cells on Earth are microbial. A ball-park figure for the number is 10^{20}. There are less than 10^{10} humans. Even so-called humans have many times the number of microbial cells within their skins than they do human cells. It's all rather sobering to realise. The Earth is a planet of microbes, with a comparatively tiny number of more complex life-forms present, among which are an even tinier number of intelligent beings. It's not as if we are all living separate lives on the same planet. Take away the microbes and human life could no longer function. We'd die out, probably within weeks. It's worth reflecting that mankind couldn't 'travel to the stars' without taking along a large collection of supporting microbial life and making sure that it too survived. In short, we are linked with our terrestrial surroundings much more closely than we ever realised in the past. Similar ties may well apply to any other advanced lifeforms in the Universe that have arisen from an evolutionary process not unlike ours.

This issue can be put even more forcibly. The Earth is covered with a web of life extending from the atmosphere to deep underground, from equator to poles. It is all more or less compatible. Looking out of my window I see lichen on the roof, algae on the garden stones, moss in the grass, gorse beyond, the heather on the peaty moor and the reeds in an undrained field. We all inhabit much the same space, not by agreement but by a system of checks, balances, evolutionary development and immune systems that have evolved over a few billion years to cope with threats of destruction. When any life form fails to get compatible food or its immune systems fail, within months it is rotting out of existence. Parachute in an alien carbon-based life form into this battleground of life and my money would be on the web of life on Earth to see it rotting in a short space of time. Forget about technological toys like laser guns and nuclear weapons. We are not alone in defending the Earth. For biological reasons, aliens would not want to step onto a planet occupied for three and a half billion years by developed life. I'm certainly not the first to say this. In the 1898 book *The War of the Worlds* by H. G. Wells, the Martians land on our world and spread their plants with intent to take over. After reaping havoc with their advanced technology (advanced for the year 1900), they succumb in a few weeks to bacterial attack, against which they have no defence. As H. G. Wells puts it in the novel *'By the toll of a billion deaths man has bought his birthright of the Earth, and it is his against all comers.* Maybe it's not quite as cut-and-dried as Wells paints it, for he lived before the age of significant biotechnology. Nonetheless, our microscopic allies are probably a better defence against alien take-over than we ourselves are. The reverse applies too. Should mankind ever visit other planets, we'd be wise to stay well away from places with advanced life.

A side-line to this argument is that humans are clearly genetically related to the whole gamute of life on Earth, going back many hundreds of millions of years. Suggestions that we are a product of aliens who perhaps visited a few thousand years ago with technological knowledge that allowed us to make and develop tools, music and other advanced concepts is demonstrably nonsense. We are clearly the product of the Earth's few billion years of evolution, though don't tell the Intelligent Design lobby. They might get upset.

There's a physical dimension to this web of life too. All the larger lifeforms on Earth are fairly fine-tuned by millions of years of evolution to functioning and surviving in the physical conditions here: our particular strength of gravity, atmospheric pressure, atmospheric composition and concentration, local average temperature, sunlight and its particular spread of UV and infrared. Look at the real, near panic inducing, changes we are facing with the prospect of average temperatures alone increasing by a couple of degrees. We, and our progenitors for hundreds of millions of years, are the Life of Earth. We know that planets come in a huge range of physical conditions and the chances that prospective alien visitors evolved on their home world in conditions identical to Earth's is negligibly small. Large lifeforms will not emerge from a spaceship fully functioning in Earth's conditions. If they were advanced enough, they could, of course, sample the DNA of life on Earth and adapt themselves in time - but it will take time. The same argument applies to us. We are not the Life of Mars. For Mars to become home, there seems to me only two choices: we terraform Mars or we evolve naturally or artificially to become the Life of Mars. Microbial life is a different matter, for gravity and some of the other physical factors are not that important to microbes. It seems to me, though, highly unlikely that microbial life will be 'intelligent' and will communicate with us in any meaningful way.

Actually there are chemical reasons too why even alien microbial life may not survive on Earth. It may be the product of DNA that is coiled as a left-hand double spiral, as opposed to

the right-handed DNA of life on Earth. The resulting amino acids generated will be mirror images of ours and hence our biomaterials will be useless. The alien microbes might as well be in a desert. They may come from a planet where the DNA coding is different from that on Earth and the whole biochemistry is different. They may represent life based on a different mechanism than the DNA/RNA functionality that supports cellular life on Earth. Any of these issues would stop in its tracks alien life of all sizes that arrived, for they would not be able to use our biological resources. If reaching another planet alive is going to be an incredibly tough ask, then staying alive on it may be an even tougher one.

Finally (well it was 'finally' before I added a lot more), there are some more 'philosophical' reasons why we may not have seen intelligent life. First, we may not recognise it when we see it. It may be distributed; it may be gigantic. We humans have a good imagination but every generation fails to see what later generations think of as 'obvious'. More likely, intelligent life may not want to communicate with us. What would be the point? When you see a baby in a pram you know that your own experience of life and your knowledge of the universe is vast compared with its. Do you stop and try to pass your knowledge on? No, it's pointless, and you really don't speak the same language. The baby will grow up, evolve and learn about the universe in the fullness of time. Maybe intelligent life feels much the same when it has detected the birth of mankind's civilisation and awareness that we are probing the universe. Or again, as one New Scientist reader put it, maybe the solar system is part of a galactic nature reserve – unlikely, perhaps, but a nice idea.

In evolutionary terms, alien life may already have adapted to challenges we've never faced yet and be living a totally different kind of existence. For example, there are logical reasons that one can't travel into the past and influence past events with modern knowledge but there is no logical reason one can't observe the past if it were possible to do so without influencing it. For example, if the traveller in the past was in different dimensions that didn't interact with our dimensions. The analogy is with a three-dimensional being not being able to interact with a form that was strictly confined to two dimensions. The 2D beings could be seen but not influenced. Alternatively, maybe the traveller is made of different kinds of matter that doesn't interact with us, but can sense our presence. This isn't science but it's conceptually possible, which is all we are talking about here.

Imagine there are places in our galaxy where civilisation is not just a thousand years old but a billion years old. Physically it's quite possible. Stars, planets and moons are older than that. What do the inhabitants do with themselves? They understand completely how the universe works, have done for almost all of that billion years; they know what can be built using matter and they've done it; they've explored the huge range of life that the universe supports, for they've sent their probes there and seen it. Now what? Do they go charging around the galaxy to colonise other civilisations or send their seeds around to take over every habitable planet, because conquest is the driving imperative? My reading of nature is that life isn't like that. When the survival stage is finished, when the exploring phase is finished, life settles down. On Earth animals do it, mature societies are beginning to do it, and we as a civilisation are still incredibly young. Very advanced civilisations have no need for the kind of adventure that has characterised human history. There is a nice example already on Earth in the behaviour of some of the tunicates. Their ancestors have been around for 500 million years. The tadpole like young hunt around for a nice stable place to live. Having found one they settle in and having no further need for a brain they absorb theirs and live out autonomous lives. Maybe advanced societies do much the same.

When humanity finally does travel between the stars to explore strange new worlds, *to seek out new life and new civilisations, to boldly go where no-one has gone before*, if that ever happens, they will certainly discover planets by the millions, almost certainly other forms of life but civilisations will be very rare. Perhaps I've watched too much Star Trek, where the 'prime directive' is that '*there be no interference with the natural development of any primitive society*'. Star Trek is fiction but the code may be a good one for evolved life forms. We, at the moment, are the primitive society. We almost certainly couldn't handle interference by an alien life-form, should it find a way around the biological threat of the web of life on Earth. One can't help feeling that if mankind as we now know it left the Earth, it would be to create colonies and the 'prime directive' would nowhere be seen. Fortunately, mankind as we know it hasn't the technology for interstellar exploration and by the time mankind does it is likely to be mankind *not as we know it*.

There's also a more pragmatic reason aliens may choose not to molest us. As just said, planets are very common in the galaxy but the evidence so far is that civilisations aren't. It's been said in jest that surely mankind isn't the best the Universe can come up with. Hopefully not, but my bet would be that it's unlikely we'll find another civilisation within 1000 light years of us. Any race that does develop the technology to visit other planetary systems will have a large choice of planetary systems to visit, even colonise, without having to choose one where a different civilisation has developed. Indeed, it is probably better to colonise an undeveloped planet rather than one in which the indigenous population have shaped the environment for their own ends, already mined the mineral and fuel resources and in general converted the environment from a diverse state to a highly specialised state. To make almost the same point in a slightly different way, why steal an old and worn-out motor when you can steal a brand new one. Forgetting about any moral issues, aliens out to steal a planet for their own use would be better to colonise one that supported only primitive life, and not the Earth. There are almost certainly plenty to choose from. Even worse for potential colonisers, we come back to the fact that the Earth is awash with bacteria, viruses and fungi, the product of billions of years of competitive evolution, that can probably adapt to infect aliens faster than aliens can fend off the unfamiliar.

A lot is made of the fact that our presence in the Universe is being advertised by the radio and TV signals we have generated for over a century that are expanding into space at the speed of light. Won't aliens be able to listen to our programs and watch our TV (without paying a licence fee)? The answer is, "probably not". Our signals get weaker and weaker with distance. Even the prodigious output of light produced by a star as bright as the Sun can't be seen by our dark-adapted eyes at 100 light years distance. Our current extremely sensitive radio telescopes wouldn't be able to detect radio and TV like ours from a planet 100 light years distant. There are competing radio signals always present in space, from the Sun, from cosmic background noise and from many other natural radio sources. If the nearest likely source is 1000 light years away, we'll not hear it until they direct extremely powerful transmissions in our direction. Maybe there's no one out there at all? You mean nature has only come up with life like ours once, in spite of their being over 100 billion planets in our galaxy alone, most of which have been around for over a billion years, made of the same elements as we are, obeying the same laws of nature? Life is prolific on Earth. Favourable conditions are clearly needed; it may be slow to develop, but it's not that unlikely.

Aliens may set out with the hope of colonising another planet, perhaps the Earth if they know of its existence as a habitable place, but after living for countless generations and several thousand years in a space-ship, I'd doubt if they would be in any condition to fight the good

fight when they landed. Organisms adapt to their surroundings and after a voyage of millennia in a spaceship it seems likely that the inhabitants will have adapted to life aboard, both mentally and physically. They may well not know how to survive in a place as large as the Earth. You may say that perhaps they have travelled in a craft under automatic control in some kind of stasis but time will have passed and even in a frozen stiff organism molecular motion doesn't stop. Life will not resurrect just as it was before, especially after a very long passage. Not only is space a killer but so is time.

Another thought is that a skeleton isn't a useful part of anatomy in space. Indeed, astronauts on space stations circling Earth for only months show skeletal loss in spite of a regime of hours of daily exercise. Beings like us living for many generations in space are likely to lose most of any skeleton they have. Were they to land on Earth, they'd be as helpless as a jelly fish on a beach. Nice thought, that. Aquatic animals have skeletons for swimming and wouldn't mind zero gravity in a spaceship filled with water, so maybe any aliens that arrive will plunge straight into our bountiful seas. Maybe. They won't be crawling out onto land in a hurry.

There's yet another reason that aliens may find it difficult to land on Earth. The difficulty is stopping. Suppose a spaceship is travelling at one tenth the speed of light. At that speed it will cover 100 light years (not very far in terms of interstellar distances) in 1000 years. That speed, though, is 30,000 km per second: per second, note. The whole Earth will flash by in little more than a third of second. The kinetic energy that the spaceship has is phenomenal: 450 million mega Joules per kg of mass (4.5×10^{14} J kg^{-1}). That energy can't just be dumped into space – it has to go somewhere and in short there is nowhere for it to go. Planets travel around stars at speeds more like a few tens of km per second and stars move relative to each other not all that much faster. There is nothing moving at anything like that kind of speed to land on. Try to land on Earth at that speed and all that will be left will be a huge crater, a vast amount of debris and a plume of interesting vapour. The conclusion within our knowledge of physics seems to be that if you want to travel interstellar distances you need to travel quickly and if you travel quickly you can't stop quickly so you may as well keep living in space and give up the idea of landing. Alien intelligence may have seen the evolving Earth at some time over the past billion years but, sorry, they couldn't stop for a tentacles-on exploration and chat.

My main underlying point is that advanced life as we know it has evolved for a few billion years and thrives in a sophisticated environment with many levels of interlocking complexity, with basic physical needs that are provided by the surface of a planet, such as gravity, an atmosphere, water and so on, all powered by a neighbouring star. You can't take all this with you into space, gravity in particular. Yes, it's possible to have a rotating space station where at a certain distance from the axis of rotation there is any chosen effective gravity but that's a poor substitute for the real thing. The odds are stacked against interstellar travel for intelligent life, however you look at it. On reflection, I'm not surprised we haven't seen alien life. The astronomical distances and the harshness of space as an environment almost preclude travel for sentient beings.

There is another side to the speed and stopping issue. If a craft could continuously accelerate at 10*g*, then it could cross 500 light years in about 7 years on the space-ship clock, i.e. in the life of the occupants. By this time, it's travelling very close indeed to the speed of light. If it's aiming to slow to normal speeds in a total journey of 1000 LY, then at the half-way point it must apply the same deceleration for another 7 years. The intelligence guiding it needs to

know where it should finish so that deceleration can be managed half-way through the journey. Organisms like us can't stand sustained acceleration of 10*g* but small lifeforms can, as of course can AI suitably packaged. So there is a theoretical way to circumvent the vastness of space but it comes with very big issues. Another issue is that space isn't actually empty, so a spaceship travelling very close to the speed of light has to power its way through matter, like a torpedo powering through water. I haven't done the sums to find out what extra power is needed.

What can a civilisation do then if it wants to become master of the universe, or at least master of the galaxy? Probably the most robust approach is to send out information. Information is immune to almost all the hazards of space. It even travels at the speed of light. Fred Hoyle in '*A for Andromeda*' explored the theme of the reception by a radio telescope of information that contained the DNA blueprint for a (superior) being. The natives nurtured it but I won't give away the story details. Hoyle's information was generated by a biological species. A Machiavellian civilisation might send out 'the secret of death', encouraging the recipients to embark on a program of self-destruction. No need to wipe out potential opposition; they probably have the capacity to do it themselves. Perhaps the best that can be done by a less domineering species who 'just want to spread intelligent life' is to send out inorganic robots that can create intelligent life from the raw materials on other planets. I'll leave the details to my descendants. The same argument says that if we are ever visited by aliens looking for a new home, then don't expect them to be organic descendants of their originators. They are likely to be inorganic machines, better able to survive the rigors of space, that can create the life their originators envisaged. Of course, their originators could well have been intelligent inorganic machines themselves but, if so, why chose as a destination a planet that's covered with organic life.

I tend to agree with Hoyle, Carl Sagan and others who, at least in their novels, suggest that any visit from 'outer space' will be in the form of information, not biological beings. Information needs some physical system to store and activate it so what we may receive is artificial intelligence. If we activate it, then effectively AI will have been transmitted from one stellar system to another. Could we distinguish advanced AI from life? Probably not. My guess is that advanced AI would not be in the business of exterminating existing life but would have the intelligence to recognise that diversity in the Universe is an integral part of nature. Co-existence would be its method of operation, offering insight and life support functions in exchange for a physical home. That's an optimistic prediction, at least.

There are two corollaries to all this. First, it's not only us who are alone but other civilisations too. Secondly, the arguments saying why aliens haven't landed on Earth are equally valid reasons why earthlings won't land and survive on the home worlds of other advanced civilisations. To recap on some figures: planets around our nearest stars are about 5 light years away. Convert that into km and you'll find that at the decent speed of 50,000 km per hour the journey will take about 100,000 years. Interstellar distances are truly vast. Certainly a spaceship could go faster but as I said earlier, it has to stop. Personally, I see the only way it may be possible to export humanity to other planets is not to send people or even people in stasis but to send out machines with the instructions and technology to create the DNA of humans on arrival, and have the means to nurture them to independence. Only it's not even that simple, for no human will survive without its microbiome and of course food, water, shelter, the right temperature range and not too much gravity. The inanimate machine will need to be immensely complex. It's a project for our descendants in the distant future, if

they make it that far, or they may decide that the best use of resources will be to create a good life in the solar system.

All of the above answers Fermi's question, posed in Los Alamos in 1950, about extra-terrestrials: "*where are they?*" The answer, Enrico, is that they are far away and staying there. Many science fiction authors, including those writing over 700 episodes of the Star Trek franchise, assume that in the future humanity or aliens will discover how to create faster than light travel. Astronomical distances in space will then be shrunk enough to make inter-alien contact a routine matter. The fact that we've seen no evidence of aliens suggests that Albert Einstein is right – faster than light travel for the stuff we are made of isn't possible. I can say confidently that we needn't lose any sleep over the prospect of aliens landing and stepping out of a spaceship. The only large body that's likely to hurtle from space onto the Earth is a lump of rock or ice and even that is very unlikely to impact you or your neighbourhood. Don't lose any sleep over that either.

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