

1

ARE WE ALONE?

0:09–0:43 One of the enduring mysteries of Big History is, “Why the heck are we alone?” As we have started to appreciate the size of the universe and how many stars there are, how many planets there are, it’s a certainty there must be many, many Earth-like planets circling suns just like ours. So there’s this thing called the Fermi paradox. The idea of the Fermi paradox is that if there are so many billions of stars, then you would expect you would get intelligent races, and those intelligent races, without much more technology than us, would start to be able to colonize other planets.

ENDURING MYSTERIES

0:43–1:10 And even if we only colonized other planets around other stars every couple thousand of years, within the course of a few million years, we would have filled up the sky. But that hasn’t happened. The sky

seems to be empty. We haven’t even succeeded in finding bacterial life on Mars. Why is life so rare?

Are we alone in the universe? It’s very exciting that astrobiology, which is the discipline that studies life outside Earth...So it’s a kind of strange discipline. It was science fiction 30 years ago, and now it’s becoming serious science because we’ve learned that there are billions of planets. We didn’t know that 15 years ago. And lots of them are probably like Earth. There could be billions of planets a bit like Earth just in our galaxy. That means that it’s quite likely that the universe is crawling with life, but there’s bacterial life, But complex life like us, well, there are so many planets that you really can’t rule out the possibility. So we have a lot of great speculation here, but if we prove that there’s life on another planet — and it could happen in the next 20 or 30 years — that would be a fundamental breakthrough.

The fields of physics and astronomy have been largely responsible for expanding our knowledge about what’s out there in the universe, how the universe came to be and how it’s evolving. And one of the great mysteries is whether or not we’re the only example of the kind of complex life that reflects upon the nature of the universe, and I think that would really help root so much about who we are in this universe and our role in it if and maybe when we actually learn the answer to that question about whether we’re alone. So I think somehow maybe Big History is in a way preparing us for that question to answer.

1:10–2:04

ASTROBIOLOGY

2:04–2:46

THE FIELDS OF PHYSICS AND ASTRONOMY