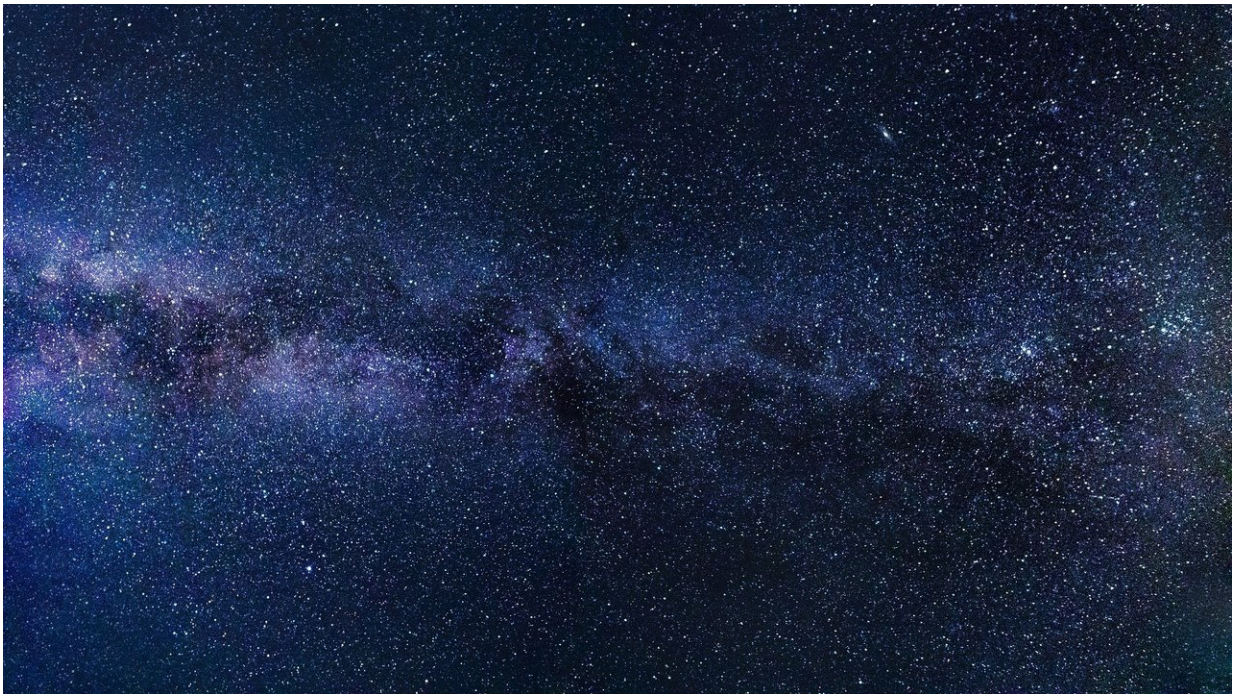


Researcher shows physics suggests life could exist in a 2-D universe

June 25 2019, by Bob Yirka



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James Scargill, a physicist at the University of California, has written [a paper](#) reporting that the laws of physics allow for the existence of a life-supporting two-dimensional universe. MIT's *Technology Review* [has reviewed](#) the paper and found that the work does show that such a 2+1 universe could exist.

Because we live in three-dimensions, it is difficult for us to envision a [universe](#) in which the third [dimension](#) does not exist—or one in which there is a fourth or fifth dimension. But philosophers and physicists have spent a lot of time and work trying to figure out if [life](#) could exist in anything but the three dimensions we know. In such discussions, time is also included, which has led to the description of what we experience as a 3+1-dimensional universe.

As TR notes, most physicists have concluded that our 3+1-dimensional universe is the only one that could support life. They point out that with more than three dimensions, Newton's laws of motion would be susceptible to problems with tiny perturbations, which would prevent the formation of orbits—like planets around a sun. So that is out. But what about a two-dimensional world? Most experts suggest it is difficult to imagine how gravity could work in such a universe, making it difficult or impossible for life-supporting systems to form. In his paper, Scargill suggests we might need to rethink this argument. He has shown that the [laws of physics](#) do allow for gravity in a 2-D world, and also the development of systems capable of supporting life.

In his paper, Scargill uses [physics](#) formulas to show that scalar gravitational fields could exist in two dimensions—and goes on to show that the necessary complexity needed for life could also exist in a 2-D universe—and he does it using neural networks as a basis for comparison. He starts by exploring whether there are any 2-D networks that have all the same characteristics as a neural network. He then shows that 2-D networks can be built in modular fashion to overcome the problem of crossing edges. Then he shows that such networks can demonstrate criticality. And by doing so, he demonstrates that there could exist a life-supporting 2-D+1 universe—at least according to physics.

More information: J. H. C. Scargill. Can Life Exist in 2 + 1

Dimensions? arXiv:1906.05336 [hep-th] arxiv.org/abs/1906.05336

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