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The Universe

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object which you can picture as a membrane, as long as you remember that it's three-dimensional and we just draw it as two-dimensional because that's easier to visualize. According to this picture, we live on one of these membranes, and this membrane is not alone, there's another partner membrane, separated from it by a very tiny gap. There are three dimensions of space within a membrane, and a fourth dimension separating the two membranes. It so happens that in this theory there are another six dimensions of space, also curled up in a tiny little ball, but let's forget about those for the moment.

So you have this set-up with these two parallel worlds, just literally geometrically parallel worlds, separated by a small gap. We did not dream up this picture. This picture emerges from the most sophisticated mathematical models we have of the fundamental particles and forces. When we try to describe reality—quarks, electrons, photons, and all these things—we are led to this picture of the two parallel worlds separated by a gap, and our starting point was to assume that this picture is correct.

These membranes are sometimes called end-of-the-world branes. Basically because they're more like mirrors; they're reflectors. There's nothing outside them. They're literally the end of the world. If you traveled across the gap between the two membranes, you would hit one of them and bounce back from it. There's nothing beyond it. So all you have are these two parallel branes with the gap. But these two membranes can move. So imagine we start from today's universe. We're sitting here, today, and we're living on one of these membranes. There's this other membrane, very near to us. We can't see it because light only travels along our membrane, but the distance away from us is much tinier than the size of an atomic nucleus. It's hardly any distance from us at all. We also know that, in the universe today,