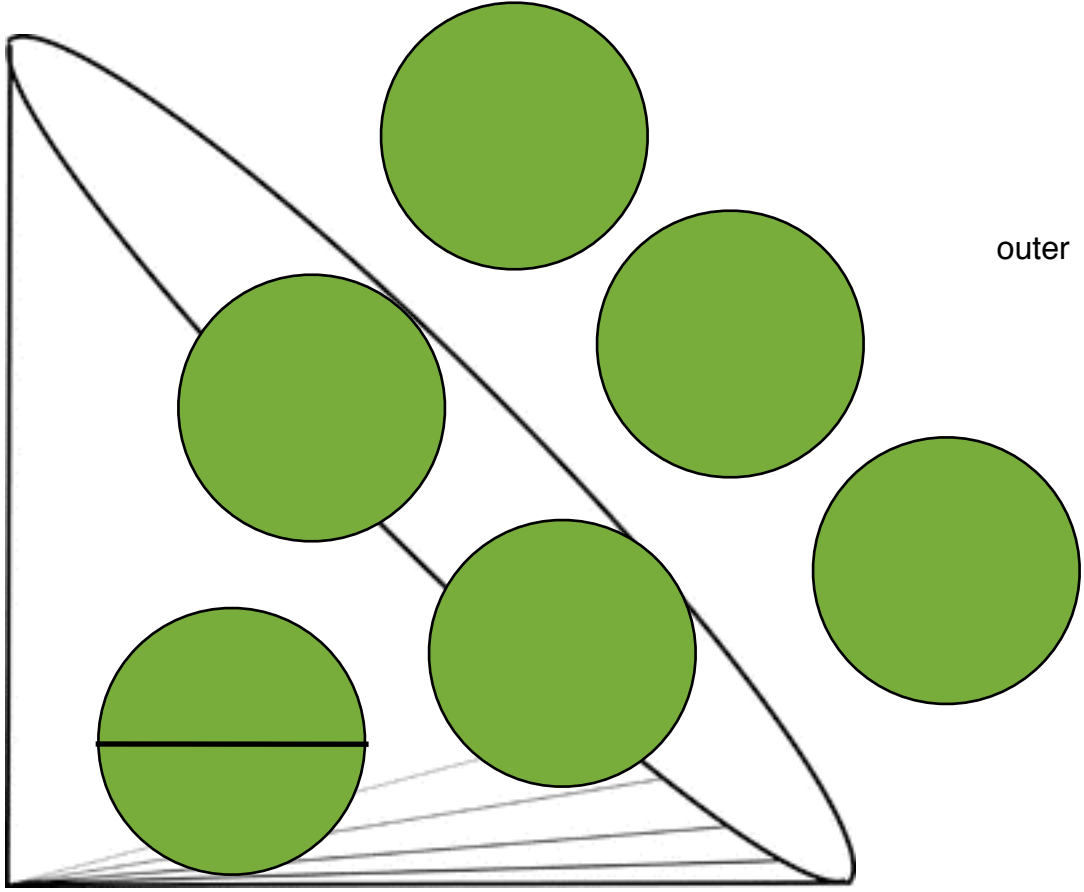

Let's say you have a universe where less entropy (to the left) does not equal the past, but the inner. And more entropy (to the right) does not equal the future but the outer. And the more the universe expands out, the more prominent the cosmic horizon becomes because the limitations of the speed of light prevent us from seeing everything in the given universe. It would appear that the right side would always have higher entropy because it contains more microstates, even though the left side can always delve deeper into itself, because the left side is limited in what it can incorporate and not raise entropy.

If at the beginning you have a macrostate consisting of three microstates, to the right and within the cone, entropy will increase and you will encounter more and more microstates to add to the one macrostate. Your entropy will increase as entropy=possible arrangements of microstates/macrostate. To the left, let's assume you shift your analysis from the microstate of three, to a microstate of one. You have less entropy because you have less microstates (one) per macrostate (one). You have more order, however. Assume you want to break down the one microstate even further. Assume the single microstate—and every microstate within the universe— has two oppositional poles and can be broken down into two. But because to the left is less entropy (and thus fewer microstates per macrostate) you cannot consider two microstates per macrostate because it would temporarily increase entropy. So the movement of macrostates to the left of the first single microstate is constantly consisting of one microstate, choosing one of the two though the given microstate breaks down into two. Now, after a long time of expanding into the outer, assume that the macrostate to the right is so well mixed and encounters so few new microstates that two giant

microstates are all that are left. These two microstates combine as the universe pushes further and further out, resulting in one microstate. The right side has now become the functional equivalent of the left side. They both have one microstate per macrostate. This equivalence might be the occasion of a phase transition, whereby the left and the right of the diagram become indistinguishable and the different layers of reality can be considered multiverses.

Given Sean Carroll's hypothesis[1] that the Higgs field can phase transition to a higher value and a lower energy level to avoid a high entropy environment where order is no longer possible, can we assume that a way to avoid a universe whose disorder constantly runs amok to higher and higher energy values is to consider that a universe that contains an outer macrostate with one microstate and an inner macrostate with one microstate produces low-entropy multiverses? Do these multiverses develop where the right of the diagram left off or at the left of the diagram when the universe undergoes a phase transition?

Is the transition to and inclusion of a multiverse (the individual multiverses are each a new microstate in a now larger macrostate system) any different functionally from how the given outer universe expanded further and further to incorporate other microstates? Does the diagram truly run from left to right or can we also assume that the given universe was simultaneously moving to the left (inner) and right (outer)?

Do the definitions above hold that each microstate contains within itself a macrostate that can be considered its own smaller universe, so that every point in existence is undergoing the same dynamic, not just the universe, so that the diagram looks like this?:

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[1] Carroll, Sean. The Higgs Boson vs Boltzmann Brains. Preposterous Universe. August 22, 2013. http://www.preposterousuniverse.com/blog/2013/08/22/the-higgs-boson-vs-boltzmann-brains/