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Ask A Genius 157 – Elements of a New Set Theory (Part 2)
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[Beginning of recorded material]

Rick Rosner: However, when you try to apply set theory to IC or to a regular quantum universe, it becomes less clear that you could use the normal assumptions and rules of set theory, which, I assume, includes the idea that members of a set are distinct. Not that every member of the set is different, but that every member of the set has a definable existence – like the set of all counting numbers. Every number is precisely defined.

No number turns into some other number. No number is some other number part of the time, but under quantum mechanics, elements of a set can be fuzzy and can change from one thing to another and could may sometimes belong to a set or not belong to a set. If you're defining members of a set of something, according on quantum rules, the set of all things in this box. Well, under quantum theory, not everything that starts in a box, even if the box is tightly sealed, remains in the box.

Because the things in the box exist as quantum probability clouds or points within probability clouds. Those clouds don't stop at the edge of the box. They can sometimes be pointwise particles, can pick a point in the probability cloud outside of the box. If you're choosing members of a set if they're part of the box or not, your elements of the set are not well-behaved, according to the traditional rules of set theory.

Well, under IC, or under quantum mechanics, sometimes you cannot assign definite states to physical systems with the most famous indefinite system being Schrödinger's Cat. If your set is the set of all things with a live cat, well, Schrödinger's Cat only partly belongs to your set, which makes it—why have set theory if you have elements that may or may not belong your set depending on stuff.

IC further complicates it because the delineation of the existence of things under IC, the degree to which things exist under IC, depends on the amount of matter in the universe. When you have a big universe, like the one we live in, with $10\text{^}80^{th}$ particles, especially those with a long history of interacting with the other particle, those are well-established because they have long histories. But if you have a teeny little universe with roughly $10\text{^}3^{rd}$ particles, it will have a much shorter history, much less interaction among the particles.

It will have more particles that are more nebulous and closer to being virtual particles. That haven't left enough of a record for you to definitely say they even exist. They only potentially exist. A universe, a teeny little IC universe is so ill-defined in so many ways that it is not a definite element of a set that you can apply standard set theory to. You have to come up with some new set theory like fuzzy set theory.

[End of recorded material]

Authors[1,2]

[1] Four format points for the session article:

1. Bold text following "Scott Douglas Jacobsen:" or "SDJ:" is Scott Douglas Jacobsen & non-bold text following "Rick Rosner:" or "RR:" is Rick Rosner.
2. Session article conducted, transcribed, edited, formatted, and published by Scott.
3. Footnotes & in-text citations in the interview & references after the interview.
4. This session article has been edited for clarity and readability.

For further information on the formatting guidelines incorporated into this document, please see the following documents:

1. American Psychological Association. (2010). Citation Guide: APA. Retrieved from http://www.lib.sfu.ca/system/files/28281/APA6CitationGuideSFUv3.pdf.
2. Humble, A. (n.d.). Guide to Transcribing. Retrieved from http://www.msvu.ca/site/media/msvu/Transcription%20Guide.pdf.

[2] These sessions and the correspondence are different expressions of the same ideas. In correspondence, we discussed this:

> ***Scott Douglas Jacobsen: Your associative landscape seems to solve it, if we take the 3-dimensional bumpy landscape with each moment as the focus to solve it. Every moment can be more or less closely leaned to based on the current one.***
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> ***So if the individual moment associates more with one superset in the set of all sets of logical possibilities for actualization of the universe, then the superset sub-1, universe sub-1, of the current universe moment (one Planck moment, fraction of fraction of a second: 1 tP) will transition into superset sub-2, universe sub-2, over superset sub-3, universe sub-3, because in the set of all sets of logical possibilities for actualization of the universe superset sub-2 associates more with superset sub-1 than the superset sub-3, where superset sub-2 & superset sub-3 could be future or past possibilities. This eliminates the distinction between past and future.***
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> ***Each moment actualizing into another with apparent, but not real, distinction in time. Only distinction in moment-to-moment. Furthermore, superset sub-4 could not equate to a transition from superset sub-1 because superset sub-4 does not remain in the set of all sets of logical possibilities for actualization of the universe. This creates three big classes of sets. These sets as IC Set Theory, so probabalistic and dynamic.***
>
> ***Standard set theory is certain, infinite, and static. Fuzzy set theory is probabilistic, infinite, and static. ICST is probabilistic, finite, and dynamic. It justifies a new set theory. Big class 1: the set of all sets of logical possibilities for actualization of the universe; big class 2: the set of all sets of logical impossibilities for non-actualization of the universe; big class 3: the set of all sets of the universe. Class 3 contains class 1 and 2. Class 3 is the superset of sets 1 and 2.***
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> ***Class 1 is the answer to the question, "What can happen?" Class 2 is the answer to the question, "What can't happen?" Class 3 is the answer to the question, "What can and can't happen?" The 3-dimensional non-Cartesian grid provides an image for it. 3-dimensional inflations with flowing into and out of, toward and away, from one another: the stuff, the information represented as spatial shapes, content, and relationships.***
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> ***We can differentiate sub-events in superset sub-1, sub-2, or sub-3. With sectioning of a select volume from them, we find more probabilistic, finite, and dynamic elements at the bottom most level with the lowest magnitude defined by the information processing capacity limits set by the information in the universe. For us, the Planck scale to the universe seems like the minima and maxima.***
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> ***ICST maps onto the universe. With the example, it does so, literally. Each instantiation of the smallest units of the universe and the universe as a whole ask Class 1, Class 2, and Class 3 questions,***

simultaneously. We described aspect of the universe as "Agents of the Universe" from particles to people to planets to filaments. We provide the how from physics. We provide the how from set theory.

We derive the ethic from the physics and the set theory. These foundations set the stage for asking, "Why?" Why these particles? Why these interrelationships? Why these information processing constraints? Why these organisms? Why this form of creation? Why these time and space scales? So that's that.

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