Infinite wisdom

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The Life of the Cosmos By Lee Smolin, Weidenfeld & Nicolson, 358pp, $39.95

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The Fabric of Reality By David Deutsch, Allen Lane, 390pp, $45

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LET'S not beat about the bush these are two of the most dazzling books of this century. If their basic claims are correct, our understanding of life, mind and the cosmos itself will never be the same.

Why is the universe shaped the way it is? Precisely what shape is it, anyway?

Most of us have never understood quite how large the answers might prove to be.
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Lee Smolin, a leading gravitational physicist, and David Deutsch, one of the world's top ***quantum computation*** theorists, claim in their distinct ways that to resolve these questions satisfactorily we must venture into the infinite.

They are not talking about deity, however. Smolin's story involves infinities of time, cosmos succeeding cosmos, universes birthing baby universes that bang and expand and fade into attenuated death or perhaps crush into fiery nothing -but not before giving birth to billions of new baby space-times of their own, from black-hole wombs.

The core idea is the discovery, crucial to quantum theory, that the vacuum emptiness -is unstable, liable to emit energetic particles. At high enough energies, this flaw in emptiness can buckle inward to form a black hole, which may then inflate wildly into a fresh space-time, creating an entire segregated cosmos.

Depending on the interaction laws coded into that cosmos, it might recollapse in a tiny fraction of a second, or bubble with micro-black holes that collapse in turn, or even blow out into a starry space-time universe akin to our own.

Imagine, then, a fabulous series of bubbles popping in the void. Most vanish without progeny. Some persist long enough for their colossal outpouring of energy to form elemental vibrating strings and membranes, and for those to coalesce into quarks and electrons, and then into hydrogen and helium atoms.

If the values describing the new universe (perhaps inherited from its parent) are suitable, its contents will form stars that cook new, heavier elements in their compressed gases. Some of these stars, rich in carbon and other key elements, will explode in thermonuclear glory, their cores sucked down to fecund black holes, their hot debris seeding the skies with the raw materials of life and new stars.

In a few universes, Smolin speculates, an extraordinary set of basic vales will coincide, yielding two interesting features: a maximal number of stars suitable for making black holes (and hence new universes with slightly variant parameters), and many other stars and their planets suitable for evolving life, and even intelligence.

A key and contentious step in this Darwinian argument is that the parameters determining the shape of the new cosmos must resemble those of its parent, rather than being picked at random.

Granting this, after a while most universes in the mega-cosmos will cluster around certain apparently arbitrary values -the kind that, luckily, produce observers like us. And the beauty of Smolin's cosmogony is that it's testable. It moves out of the domain of faith and into that of science.

Deutsch's shocking idea is even more resistant to the mind's clutch: he sees every event literally doubled and reduplicated, with small crucial variations, in trillions upon trillions of diverging parallel realities, spread through infinite lateral time. If you're having a bad hair day, cheer up -there's another version of you, in a universe at right angles to this one, who's doing just fine. And a zillion more, it's true, taking up every conceivable alternative position in between. Some of them are dead. Some are on Mars. A few are sharing Graceland with Elvis, who is married to Princess Di, or perhaps to John Lennon.

Neither of these remarkable postulates is freshly minted by Deutsch or Smolin.

Baby universes go back more than a century, Smolin tells us, to Charles Peirce, semiologist and pragmatist, while the many worlds hypothesis was proposed in 1957 by Hugh Everett III, who -in this universe -died in 1982. Until now, though, nobody had pursued these striking notions with such ruthless intellectual attack, following them all the way down.

Deutsch, curiously, insists that his outrageous version of reality ought not surprise us, or at least physicists, since it is simply the best theory available to science (quantum mechanics) taken perfectly literally without metaphysical evasions.

In a brilliantly effective display, he argues that something as ordinary as the splash of illumination shone by an electric torch on a wall can't be explained without acknowledging that a sort of "shadow light" from many other adjacent universes is leaking into our own, interfering with the beam we see and blurring its bright sharp disc into concentric rings.

In those universes, naturally, a few photons from our local universe also leak across. "It follows," Deutsch notes, "that reality is a much bigger thing than it seems, and most of it is invisible." Even so, the multitude of overlapping histories is needed to explain some of the most basic features of our ordinary world.

Deutsch argues ingeniously that DNA sequences performing a given coding function in different adjacent worlds must be closely similar, while so-called "junk DNA" that litters chromosomes will vary at random. This truly weird interpretation of basic science lies, for Deutsch, at the heart of an emerging fourfold theory of everything we know (which is only a small part of everything, admittedly). It will condense our understanding of evolution, theories of knowledge and the quantum, and computation.One of the founders of ***quantum computing***, Deutsch is no New Ager. His extravagant ideas are worth taking very seriously indeed.

Damien Broderick's new book on the impact of future science is The Spike: Accelerating into the Unimaginable Future.

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