

Mathematics of Natural Law - Two Continually Became One

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Victorian science saw the world as bits of matter moved by forces like gravity and electromagnetism. Natural law was described with simple formulas using real numbers—for example, $F = ma$. These numbers measured size, mass, or position.

But this view had limits. For instance, Newton could not explain why glass partially reflects light. Quantum physics solved this mystery by introducing the **wavefunction**—an invisible but essential property of matter. Describing it required **complex numbers**, which combine two

aspects into one.

So, matter now has:

1. A physical particle (local, external, tangible)
2. A wavefunction (spread out, internal, intangible)
3. Natural law guiding how the wavefunction behaves

Later, **quaternions** were introduced—an even richer math system that unites two complementary aspects. This suggests that deeper layers of natural law organize all particle behavior into unity.

Probability: Old vs. Quantum

In Victorian science, probability meant ignorance—like not knowing how a coin toss will land. In quantum physics, **probability is law itself**. For example, stars are prevented from collapsing by the quantum rule that no two electrons can occupy the same state. This is not ignorance—it is reality.

Wavefunctions always fit inside a **unit circle**, where probabilities range from 0% (forbidden) to 100% (certain). But what about the rest of the math plane outside this circle? Could it explain mysteries like **dark energy**, which makes up most of the universe?

Emergent Properties

When wavefunctions overlap, particles can merge into stable structures with new properties. This is called **emergence**—where the whole has qualities the parts don't.

Examples:

- A proton + electron = hydrogen atom (new identity)

- Two hydrogens + oxygen = water, with unique life-giving properties

Step by step, natural law builds complexity:

- Particle law → atoms → molecules → planets → oceans → volcanoes

The Origin of Life

About 4.5 billion years ago, Earth cooled enough for oceans to form. In volcanic “White Smoker” vents, natural chemical flows powered reactions that produced the building blocks of life. From this environment came **LUCA**, the Last Universal Common Ancestor.

LUCA already had the core of modern biology: amino acids, ATP, RNA, DNA, and cell membranes. Natural law made this development not random, but probable—guided by higher mathematical patterns.

Sophisticated Life

For 2 billion years, bacteria shaped the planet, eventually producing oxygen through photosynthesis. In sheltered structures called **stromatolites**, bacteria interacted more closely, giving rise to a new leap: **LECA**, the Last Eukaryotic Common Ancestor.

LECA was formed when one bacterium lived inside another, becoming the ancestor of mitochondria. This merging created the **eukaryote mind**—a new level of organization, leading to fungi, plants, and animals. Later, another merger produced plant chloroplasts.

Higher Minds and Natural Law

Each leap in life reflects a higher level of natural law:

- Bacteria mind (basic life)
- Eukaryote mind (cells with nuclei)
- Multicellular mind (plants and animals)
- Primate mind
- Human mind

These levels correspond to higher forms of mathematics (complex numbers, quaternions, octonions, and beyond), each harmonizing more aspects of reality.

Conclusion

The history of life mirrors the hierarchy of natural law. What began with quantum physics and wavefunctions extends all the way to human consciousness.

In short: **The quantum revolution reshaped not only physics, but the story of biology and life itself.**

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