

‘NEWTON’S UNIVERSE’ (IDRM):
Infinite: No beginning/end - Random events/All possibilities
Deterministic: Cause & effect / No free will / Predetermined
Reductionistic: No more than the sum of our parts
Mechanistic: Repetitive / Predictable / Parts of Machines

Einstein:
Special Theory: - Time is relative (time dilation) (at close to SOL) - Space is relative (space dilation) - Space-time continuum
General Theory: - ‘Beautiful answer’ ($E = mc^2$) - Time slows closer to Centre of Gravity - Space-time had a starting point – The universe is finite

Quantum Mechanics (QM):
 (Sub-atomic Particles - weird behaviour) } - Known location - unknown speed } No speed or location until observed
 - Known speed - unknown location }
 - Effects w/out causes / causes w/out effects / *Unpredictability*
 - *Quantum tunneling* / Instantaneous ‘skipping’ / Back in time
 - Two places at once / spontaneous existence / comm. faster than SOL
 - Nothing happens unless observed / Shroedinger’s cat / *Q. Uncertainty*
 - Before Big Bang - quantum singularity / Had to be observed

Chaos Theory:
 - Butterfly effect / Tiny variations have immense consequences
 - Reproducing original conditions is impossible / Non-deterministic
 - Chaos leads to order / Evident throughout nature / Fractals etc.

Complexity Theory:
 (*Emergence, Self-organisation, Collective Intelligence and Feedback*)
 - Complex interactions in nature / everything is related
 - More than just the sum of our parts (not reductionist)
 - Spontaneous re-organisation / girl with half brain / DNA
 - Order is evident in nature for us to ‘discover’:
 - Periodic table
 - Logarithmic spirals
 - Fractals etc.
- WHERE DOES IT COME FROM? AND WHY?

‘21ST CENTURY SCIENCE’:
After the Big Bang:
There was: Light, Heat & Darkness (after the light)
And: An Empty, Expanding & **Ordered Universe:**
 - 2nd law of thermodynamics - Entropy - things fall apart
 - Low entropy (stability) is unusual/unlikely
And: Rules - The Laws of Physics:
 - QM – Particles (quarks) materialise
 - Particles gather into atoms – simple elements form
 - Atoms clump (*Gravity & Electromagnetism*)
 - Large clumps generate heat – *Nuclear Fusion*
 - Clumps become stars – held in galaxies by gravity
ALL BECAUSE THE ORIGINAL CONDITIONS WERE ‘JUST SO’:
 - Gravity & electromagnetic forces are ‘just right’ for star, galaxy formation
 - Strong & weak nuclear forces are ‘just right’ for formation of protons etc.
 - Ratio of proton to neutron mass is ‘just right’ for atoms, chemistry & life
 - The unique properties of water molecules & hydrogen atoms (*ice floats*)
 - Ratio of nuclear force & electromagnetism is ‘just right’ for carbon formation
 - The planet Earth is in ‘just the right place’ in the solar system for life to evolve
 - *And many more (about 65) parameters for the existence of life on earth*
THE ODDS AGAINST ALL THIS ARE PHENOMENAL

“TWO SIDES TO THE DEBATE”

<p>The Accidental Universe: - The Universe is still <i>relatively</i> Reductionistic - Our behaviour is a result of nerves & molecules – chemistry & physics - We are no more than machines for propagating DNA (?) - Survival is all there is in a <i>mechanistic, reductionistic universe</i> - Post Humanism – <i>Man Is Just a Weed</i> - The earth would be <i>better off</i> without us - No purpose to life or meaning to existence - No God - <i>A Pointless Universe</i> (?)</p>	<p>The Anthropic Principle: - Big Bang was a <i>Quantum Event</i> - QM – Nothing happens unless observed – <i>Who?</i> - The Universe: (<i>finite space/time</i>) - Not <i>wholly</i> Deterministic - <i>QM</i> - Not <i>purely</i> Mechanistic - <i>Chaos</i> - Not <i>purely</i> Reductionistic - <i>QM</i> - Well-ordered / Designed for order - <i>Complexity (emergence, self-organisation, collectivity etc.)</i> - Here because we (?) observed it - Designed to produce us (?)</p>
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SQ: *There was a ‘beginning’; We have free will sometimes; We will never understand everything; We are not machines - there is creative mystery; We are far more than the sum of our parts; The universe is supremely well-ordered; We seem to matter (to someone); Our lives have meaning*