

Dark Genesis and Energy Conservation

Dark Genesis, Energy Conservation, and $E = mc^2$

The Problem in LambdaCDM

In the standard Lambda Cold Dark Matter (LambdaCDM) model:

- **Dark energy** has constant density, but as the universe expands, its **total amount increases**, violating energy conservation.
- **Dark matter** behaves like normal matter - it spreads out (dilutes), but is not created or destroyed.
- This leads to an unexplained, evolving ratio: ~68% dark energy and ~26% dark matter today.
- $E = mc^2$ is not used to explain the relationship between dark energy and matter in LambdaCDM.
- There's no conversion mechanism between dark energy and baryonic matter - they're treated as unrelated.

How Dark Genesis Solves This

Dark Genesis proposes:

- **Dark energy and dark matter** are two phases of a unified **primordial dark substrate**.
- The Big Bang triggered a **partial conversion** of this substrate into baryonic matter and energy.
- The ratio of dark energy and matter we observe (68% to 26%) is simply a **snapshot** of where we are in the cosmic **conversion timeline**.
- There's no energy creation - just transformation.

$E = mc^2$ at the Cosmic Scale

Dark Genesis and Energy Conservation

In Dark Genesis:

- The conversion from dark substrate -> baryonic matter + energy follows:

Dark Substrate Energy -> mc^2 + Radiation Energy

- The **Aaryamun Law** governs this transformation, respecting Einstein's mass-energy equivalence.
- The universe didn't create mass-energy from nothing - it **converted** what already existed in the dark substrate.

Summary

| Concept | LambdaCDM | Dark Genesis |

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| Energy Creation | Allowed (dark energy grows) | Not allowed |

| Energy Conservation | Not globally conserved | Globally conserved |

| $E = mc^2$ | Applies only locally | Applies at cosmological scale |

| Dark Energy/Matter Relation | Separate and mysterious | Unified and convertible |

Dark Genesis doesn't reject LambdaCDM's observations - it **reinterprets** them through the lens of transformation, not creation.