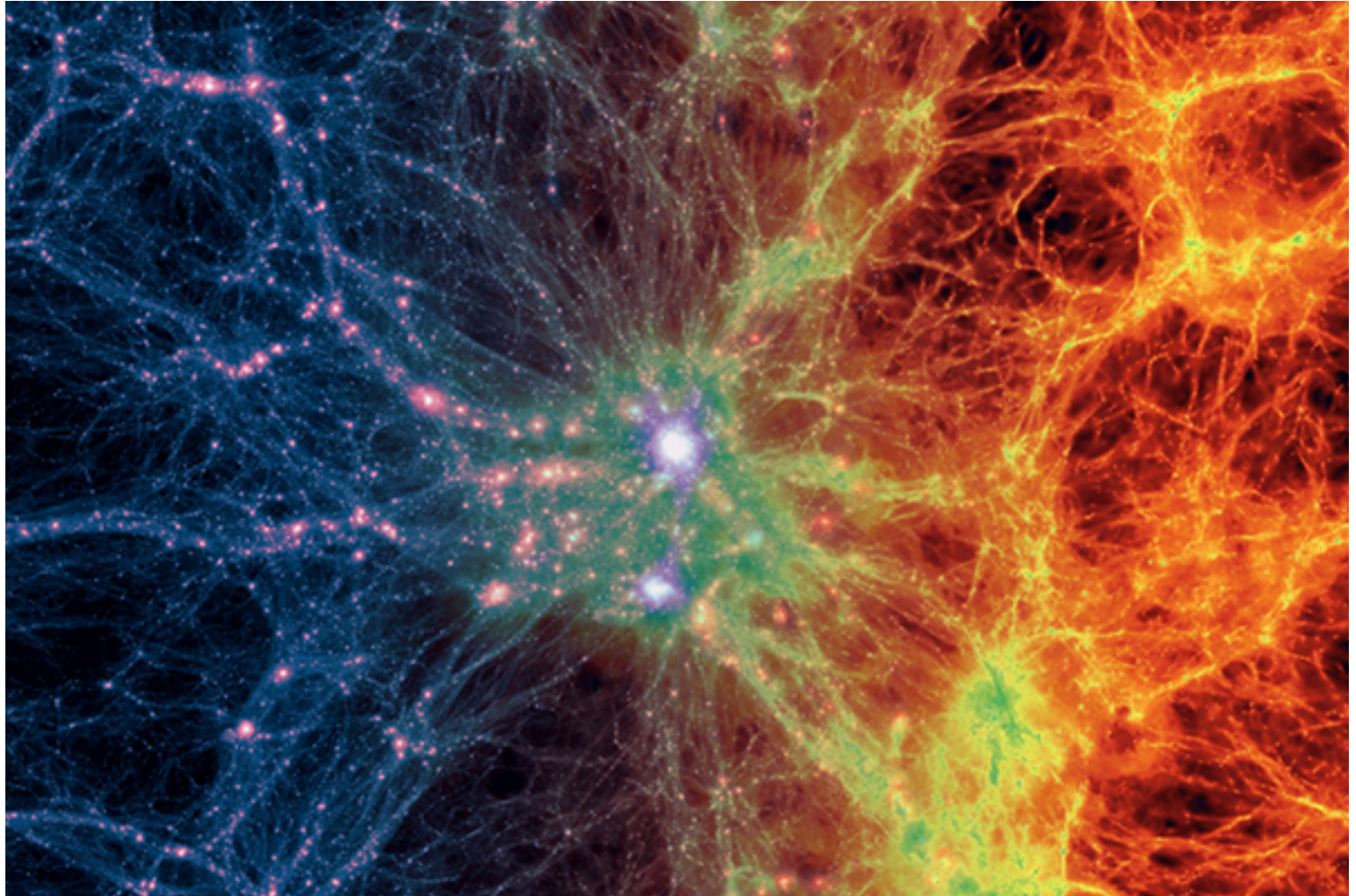
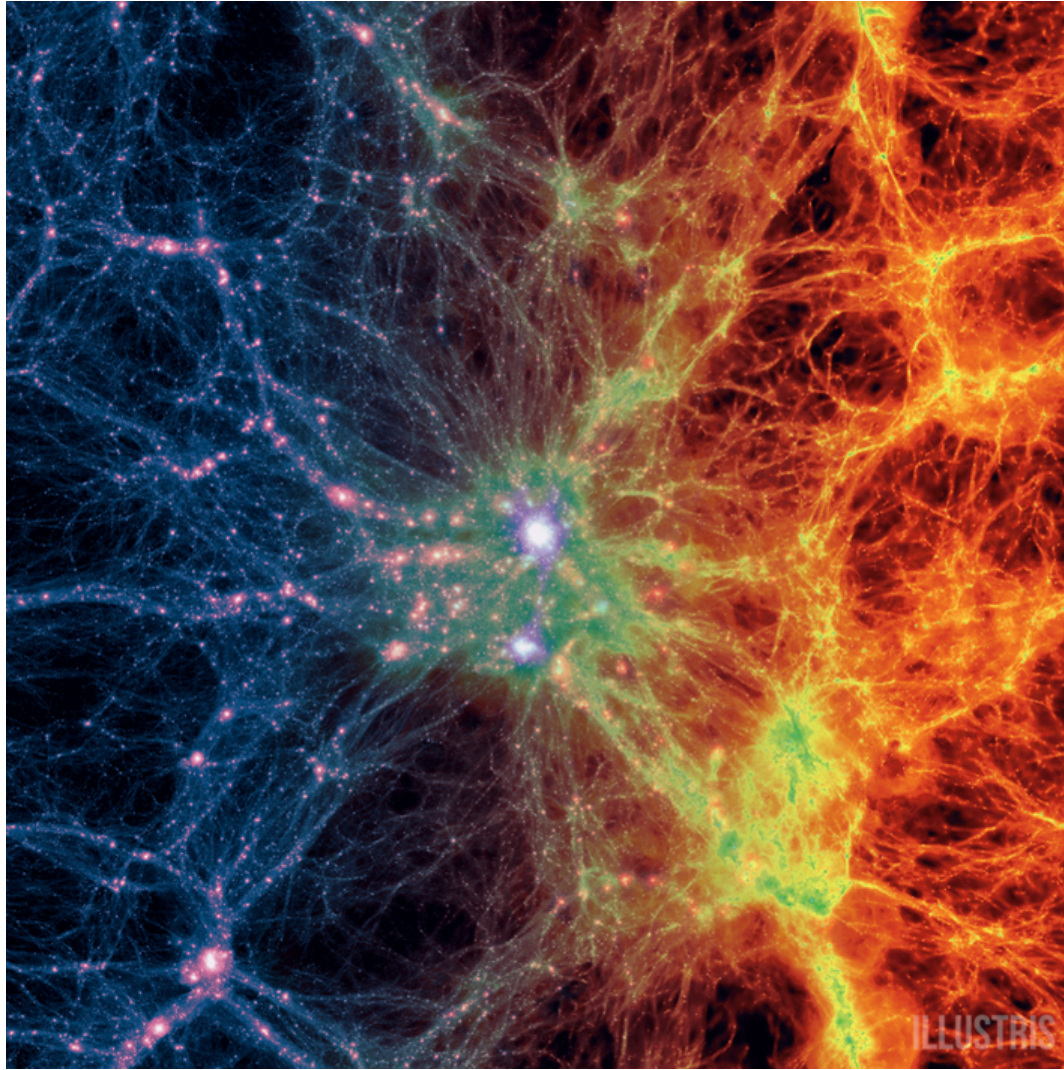


Cold Dark Matter

By IASToppers | 2024-01-16 15:45:00



Scientists recently found a new approach to explore **cold dark matter (CDM)**, a hypothetical dark matter that constitutes **25% of the current Universe**.



[Ref- Forbes]

About Cold Dark Matter:

- Cold dark matter (CDM) is a **theoretical form of dark matter** that, along with dark energy, constitutes a significant portion of the total mass and energy content of the universe.
- Dark matter is an **elusive and invisible form of matter** that does not emit, absorb, or reflect light, making it challenging to detect directly.
- Its presence is inferred from its **gravitational effects on visible matter**, such as galaxies and galaxy clusters.
- The **term "cold"** in cold dark matter refers to the form of dark matter that is assumed to move **relatively slowly** compared to the **speed of light**.
- CDM is used to explain the **large-scale structure of the universe**, including the formation and distribution of galaxies and galaxy clusters.
- The prevailing cosmological model (**Lambda-CDM model**), incorporates both cold dark matter and dark energy.
- CDM provides the gravitational scaffolding that facilitates the formation of cosmic structures.
- Dark energy can be responsible for the observed accelerated expansion of the universe.
- Various candidates for dark matter particles have been proposed, including **Weakly Interacting Massive Particles (WIMPs)** and **axions**, but direct detection is challenging.

Key Findings of the study:

- A paper by **Raman Research Institute (RRI)**, under the Department of Science and Technology (DST) confirmed the relevance of WIMP.
- The universe is composed of approximately **70% dark energy and 25% dark matter**, both of which remain poorly understood.
- The **cosmological model** describes the universe's large-scale structures, dynamics, and fundamental questions about its origin, evolution, and fate.
- The **particle physics model** delves into the basic building blocks of the universe.
- The standard cosmological model has been successful, but **confusion arises** due to discrepancies between the two models.
- The researchers considered a model in which **unstable WIMPs** decay and one of the decay products acts as **cold dark matter**.
- Such particle arises naturally in extensions of standard model of particle physics and **predicts the correct energy density** of the CDM for a range of interaction strength (WIMP miracle).