

Mailvaganam Memorial Oration – 2006

2006 lecture was delivered by

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Building Blocks of the Universe – Have we discovered them?

Date: November 30th, 2006

Venue: Physics Lecture Theatre (PLT), University of Colombo.

Summary:

Scientists have attempted to understand the Universe from its creation, a history of 13-14 billion years. During the 20th century, three layers of matter, atoms to nucleons to quarks, have been uncovered probing the structure of matter in to the scales of 10^{-19} m through particle colliders. However, the studies of large-scale structures (Galaxies $\sim 10^{21}$ m, Clusters $\sim 10^{23}$ m) of the universe have discovered that only a small fraction ($\sim 4\%$) of the universe consists of known matter, atoms - the building blocks of the stars and planets. 22% of the universe is "dark matter", which neither emit nor absorb light and is different from atoms. The remaining 74% of the Universe is defined to be composed of "dark energy" that acts sort of as anti-gravity. This energy is believed to be responsible for the acceleration of the universal expansion of the present Universe.

At present, there are several unanswered questions. What kind of strange matter/energy is in the form of dark matter/energy in the Universe? What would be the future of the Universe? Does the mysterious dark energy dominate the Universe?

The present understanding of the matter in the universe and the status of ongoing particle physics experiments in search of new particles will be discussed in this talk.