



# Physical Research Laboratory, Ahmedabad

## Colloquium 17-09

- Speaker :** Dr. Kinsuk Acharyya  
Reader, Planetary Sciences Division, PRL, Ahmedabad.
- Title :** “The Universe as a Giant Laboratory: The Making of Complex Molecules from Simple Atoms”
- Time :** Wednesday, 22 March 2017, 16.00 hrs.
- Venue :** K. R. Ramanathan Auditorium, PRL

### Abstract

Observations reveal that our Universe is surprisingly molecular. Molecules are found almost everywhere starting from the high-redshift galaxies to the nearby solar system. More than 200 different gas phase molecules and around 20 molecular species on the dust grain surface has been detected in the various astrophysical environments. Many of these molecules are organic, and therefore important astro-biologically. These molecules range in complexity from diatomic  $H_2$  to a 15-atom linear nitrile,  $HC_{13}N$ , and many of these molecules are quite unusual by terrestrial standards. In the gas phase,  $H_2$  is the most abundant molecule by far, with CO in the second position, four order of magnitude lower. On the other hand, water dominates on the dust grain surface. More complex molecules are even less abundant – at least 4 to 10 orders of magnitude lower than  $H_2$ . These molecules are very important because they could be the precursors of more complex biomolecules including simple amino acids, such as glycine. The possible molecular precursors of larger organic molecules, such as  $CH_4$ ,  $H_2O$ ,  $NH_3$ ,  $HCOOH$ ,  $CH_3COOH$  are all detected in the various astrophysical environments. Thus understanding how these molecules are formed in the variety of astrophysical conditions are of prime importance. This talk will discuss about how these molecules are formed and ongoing research work.

### The Speaker

Dr. Kinsuk Acharyya completed his B.Sc. from Ramakrishna Mission Residential College, Narendrapur and M.Sc. From the Physics department, Calcutta University. He received his Ph.D. degree from University of Calcutta in 2008. He started his Ph. D. work on “Understanding Accretion process around Compact object such as Black Hole” and ended up submitting his thesis ‘On the formation of Complex Molecules During Star Formation’. His research interest is on Astrochemistry. He is recipient of J. Mayo Greenberg Fellowship and worked on laboratory astrochemistry in the Leiden University. Prior to joining in PRL, he was a research scientist in the University of Virginia.

Tea at 15:30 hrs.

ALL ARE WELCOME

