

## ASET Colloquium

Speaker: Prof. S.Ramakrishnan, DCMP&MS, TIFR

Title: Pain and pleasure: Measurements at Microkelvin temperatures

Date: Friday, January 27, 2017

Time: 4pm

Venue: Main Lecture Theatre (AG-66), TIFR, Homi Bhabha Road, Colaba, Mumbai

### Abstract:

At ambient pressure, bulk rhombohedral bismuth is a semimetal that remains in the normal state down to at least 10 millikelvin. Superconductivity in bulk bismuth is thought to be unlikely because of the extremely low carrier density. We observed bulk superconductivity in pure bismuth single crystals below 0.53 millikelvin at ambient pressure, with an estimated critical magnetic field of 5.2 microteslas at 0 kelvin. Superconductivity in bismuth cannot be explained by the conventional Bardeen-Cooper-Schrieffer theory because its adiabatic approximation does not hold true for bismuth. Future theoretical work will be needed to understand superconductivity in the nonadiabatic limit in systems with low carrier densities and unusual band structures, such as bismuth.

In this talk, I will discuss the ultra low temperature measurements and discovery of superconductivity in Bismuth and its importance in detail.