

TATA INSTITUTE OF FUNDAMENTAL RESEARCH
DEPARTMENT OF ASTRONOMY & ASTROPHYSICS

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Title : Cluster structure modeling, Sunyaev-Zel'dovich scaling relations and secondary CMB anisotropies at small angular scales

Day, Date & Time : Tuesday, 31 March , 2009 at 16.00 hrs

Venue : Lecture Theatre (AG-66)

Abstract

The talk is divided into two parts. The first half of the talk will deal with the description of a simple, phenomenological, X-Ray observations plus hydro-simulation based model for galaxy clusters. We construct Sunyaev-Zel'dovich (SZ) scaling relations for these clusters, connecting the cluster SZ properties to the temperature, gas mass and the total mass of the clusters. These are compared to latest SZ observations and are found to be in excellent agreement. We also predict new SZ scaling relations at cluster virial radii and comment on the implications for upcoming SZ surveys. In the second half of the talk, we calculate the SZ anisotropy of the CMB at arc-min scales due to a population of clusters. The Cosmic Background Imager (CBI) measured excess anisotropy power over the primary CMB anisotropies at high l -values. The simplest explanation is due to the SZ effect from clusters. However, with currently popular analytic or simulation cluster models, one needs a value of ' σ_8 ', much higher than the value estimated from WMAP. This is known as the 'CBI-excess' anomaly. We provide a simple solution to this anomaly and show that our best fit ' σ_8 ' is fully concordant with WMAP value of ' σ_8 '.