

Richard Mushotzky, 11/12/02 2:13 PM -0500,

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Pam, I just made airline reservations \$390.00 and hotel reservations. Leaving Sunday Jan 26 and returning Sat Feb 1.

Abstract for Pasadena
Richard Mushotzky

The Intercluster Medium in Clusters

With its large collecting area and adequate angular resolution XMM will enable large samples of well determined masses and baryon fractions for groups and clusters of galaxies. This will allow an estimate of the mass density of collapsed objects at the present epoch. Rich clusters can be detected and spatially resolved at $z < 2$ if they exist. There are numerous observing proposals to determine the cluster evolution with redshift which will have strong cosmological implications. The Fe abundance of rich clusters out to $z = 1$ can be determined and thus strongly constrain the star formation history of the universe. Astro-E high spectral resolution will allow detailed determination of the elemental composition of galaxies groups and clusters and determine the origin of these elements. Astro-E data will also allow measurement of the velocity field in clusters for comparison with detailed numerical simulations. If this is the epoch of cluster formation, as indicated by classical SCDM then the clusters should be highly turbulent. Analysis of ASCA data from groups and clusters of galaxies indicates that most of the metals in clusters and groups lies in the IGM and that the specific metal creation rate is 3-5 times that inferred from studying the stars alone. The abundance ratios for Si and Fe are robust over a factor of 30 in mass and indicate that type I SN dominate at large mass scales but that type Ia become more important in the cluster centers and for lower mass systems. The total amount of injected energy is large and may have a important role in the formation and evolution of groups, the most common place in the universe. I will present preliminary results from Chandra and XMM on elliptical galaxy, cluster and group metal abundances and the constraints that these new data will place on models of the formation and evolution of metals in the universe and large scale structure.