

[S14-1] Foreground Subtraction with an Internal Linear Combination Method from the Temperature Fluctuations Observed by the WMAP

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We have performed an internal linear combination (ILC) to subtract the Galactic foreground emission from the temperature fluctuations observed by the Wilkinson Microwave Anisotropy (WMAP). Previous ILC methods have been applied to several disjoint sky regions that are defined based on the foreground intensity. Instead, we have divided the whole sky into hundreds of groups with similar foreground spectral indexes over a range of WMAP frequencies, and applied the ILC method with a constraint of minimum variance for each group of pixels to obtain a CMB map with foreground contamination effectively reduced. With the resulting foreground-cleaned ILC map, we have investigated the known anomalies in CMB maps on very large scales, namely the low quadrupole ($l=2$) power and the strong alignment between the quadrupole and octopole ($l=3$), and found that those anomalies occur due to the residual Galactic foreground that strongly contaminates $l=2$ mode.

[S14-2] Cosmological Halos: Comparison between FoF and PSB Halos

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We have studied the characteristics of halos identified by the FoF and PSB methods. Until recently, a particle group found by the FoF has been regarded as a single virialized halo satisfying the Press & Schechter (PS) hypothesis and subhalos hosted by it are thought to be substructures or parts of the FoF group. However, after measuring the initial positions of subhalos and the Lagrangian radius of the major halo, we have found that a large fraction ($\sim 50\%$) of subhalos are not yet collapsed into the major halo. The rest of them which are predicted to be completely collapsed in the PS theory, still survive in the N-body simulations. It is natural that subhalos should be counted as halos rather than substructures according to the hierarchical clustering of structure evolution scenario. We have compared the physical properties between the FoF and PSB halos, such as the shape, spin parameter, number distribution, and so on.