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Title:

The Abell Cluster Dipole Flow to 200 Mpc

Abstract:

We have obtained new Tully-Fisher (TF) peculiar velocity measurements for 52 Abell galaxy clusters distributed throughout the sky between 50 and 200 Mpc. The measurements are based on I band photometry and optical rotation curves for a sample of 522 spiral galaxies, from which an accurate TF template relation has been constructed. Individual cluster TF relations are referred to the template to compute cluster peculiar motions. The reflex motion of the Local Group of galaxies is measured with respect to the reference frame defined by our cluster sample and the distant portion of the Giovanelli et al. cluster set. We find the Local Group motion in this frame to be  $565 \pm 113$  km/s in the direction  $(l,b) = (267,26) \pm 10$  when peculiar velocities are weighted according to their errors. After optimizing the dipole calculation to sample equal volumes equally, the vector is  $509 \pm 195$  km/s towards  $(255,33) \pm 22$ . Both solutions agree, to within 1-sigma or better, with the Local Group motion as inferred from the cosmic microwave background (CMB) dipole. Thus, the cluster sample as a whole moves slowly in the CMB reference frame, its bulk flow being at most 200 km/s.