Our Peculiar Motion Away from the Local Void

The peculiar velocity of the Local Group of galaxies manifested in the Cosmic Micro wave Background dipole is found to decompose into three dominant components. The three components are clearly separated because they arise on distinct spatial scales and are fortuitously almost orthogonal in their influences. The nearest, with substantial gradients on a scale of only a few Mpc, arises from the evacuation of the Local Void. We lie in a filament that bounds the void and we participate in the bulk motion of the filament away from the void. The component of our motion on an intermediate scale is attributed to the Virgo Cluster and its surroundings, 17 Mpc away. The third component is an attraction on scales larger than 3000~\kms\ and centered near the direction of the Centaurus Cluster. The amplitudes of the three components are roughly 200, 200, and 460 \kms, respectively, adding collectively to 619 ~\kms. Taking the local influences into account, particularly that of the Local Void, causes the residual attributed to large scales to align with observed concent rations of distant galaxies and reduces somewhat the amplitude of motion attributed to their pull. Turning to small scales, in addition to the motion of our Coma- Sculptor Filament away from the Local Void, the nearest adjacent filament, the Leo Spur, is seen to be moving in a direction that will lead to convergence with our filament. Finally, a good distance to an isolated galaxy within the Local Void reveals that this dwarf system has a substantial motion of at least 285~\kms\ away from the void center. Given the velocities expected from gravitational instability theory in the standard cosmological paradigm, the distance to the center of the Local Void must be of order 40 Mpc from our position, implying the Local Void is immense.

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