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Predictions for the Infall Patterns Near Large-Scale Cosmological Filaments

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We present a method for estimating the amount of matter in large-scale (approximately 50 Mpc) filaments using the surrounding velocity infall pattern, based on 242 filaments in the Millennium simulation. We identify filaments using a minimal spanning tree to link large groups and clusters, and find the axis of each filament using a weighted principle component analysis. We improve our previous determination of a typical infall velocity profile by rescaling the profile for each filament by the distance where the infall speed reaches a maximum. We use the resulting average profile to determine a two-parameter piecewise function that can be used to estimate the maximum infall speed and location for individual filaments. Finally, we present the correlation between the maximum infall speed and the mass of the filament. These results will be used as part of the Arecibo Pisces-Perseus Supercluster Survey (APPSS), a project to map the infall pattern around the Pisces-Perseus Supercluster filament. This work is supported by NSF grant AST-1637339.