

# Improving Distance Estimates in the Local Universe: Applications to ALFALFA ()

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To understand the larger scale structure of the local Universe ( $z < 0.06$ ), we require adequate distance assignments and an understanding of their uncertainties. Local departures from smooth Hubble flow introduce large errors in distances derived from CMB velocities alone. For analysis of data from the blind extragalactic HI survey ALFALFA, the ALFALFA distance estimation routine takes advantage of pre-determined redshift-independent distances from the literature - including primary distances measurements such as TRGB or secondary Tully-Fisher measurements, a flow model developed by Masters (2005) and assignments of membership in known groups and clusters. Here we report an update of the previous methodology used for ALFALFA. To reduce the impact of orbital scatter and peculiar motions, a halo-based group-finder algorithm is used to assign a group CMB velocity and corresponding distance to galaxies identified as group/cluster members. We make use of six different group catalogs created using SDSS or 2MRS. For the nearest volume  $z < 0.02$ , the multi-attractor flow model is still used to account for local peculiar velocities. The new code, written in Python, is useable on other low-redshift galaxy catalogs, with mutable inputs for which group catalogs are used. We present an analysis of the impact of group catalog choice. This research has been supported by NSF grant NSF/AST-1714828 to M.P.Haynes and by the Brinson Foundation for the Arecibo Pisces-Perseus Supercluster Survey (APPSS).

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