

From “good” distances to intriguing results: A Baryonic Tully-Fisher Relation from galaxies with primary distances

J. Letai

M. Haynes

J. Gomez Barrientos

M. Jones

Jan 11, 2021

Notice: This file is an auto-generated download and, as such, might include minor display or rendering errors. For the version of record, please visit the [HTML version](#) or download the [PDF](#).

License: [Creative Commons Attribution 4.0 International License \(CC-BY 4.0\)](#)

We present our work on constructing a template Baryonic Tully-Fisher Relation (BTFR) from galaxies in the local universe that have primary distances. We utilize HI 21 cm line data from the complete Arecibo Legacy Fast ALFA (ALFALFA) survey and the digital HI archive from Springob et al. 2005; we also use photometry from the Sloan Digital Sky Survey (SDSS) and the NASA Sloan Atlas (NSA) MANGA v1_0_2 database; lastly, we have also made use of the Extragalactic Distance Database (EDD) for identifying galaxies with primary distances. After cross-matching the galaxies in these catalogues, we identify some 144 galaxies which meet our requirements for having all the necessary HI and photometry data, having primary distances, residing within 30 Mpc, and having low enough uncertainties to be considered reliable data points. An important trait of this data set is the prominence of low-mass, low-luminosity dwarves. Notably, we find the values for the slope, intercept and intrinsic scatter of the relation to be around 2.3, 4.8, and 0.4, respectively. Further, while unresolved velocity widths have historically produced shallower slopes, and while the BTFR has been shown to have a higher intrinsic scatter for low-mass galaxies, these precedents are not enough to explain the deviation of our data from the “standard” values of the BTFR. This work therefore raises several questions about why this discrepancy exists, how it can be resolved, and what we can learn from it.

The authors would like to acknowledge the support of NSF/AST-1714828 and the Brinson Foundation.