galaxies also exhibit proper motions caused by their transverse peculiar velocities that prevent detection of secular parallax for any single galaxy, although a statistical detection may be made instead. Such a detection could constrain the local Hubble parameter. We present methods to measure secular parallax using correlated extragalactic proper motions and find a first limit on the secular parallax amplitude using proper motions of nearby galaxies from Gaia Data Release 2. Using the local peculiar velocity field derived from Cosmicflows-3, we simulate galaxy proper motions and predict that a significant detection of secular parallax will be possible by Gaia's end of mission. We further investigate the implications of our simulations for the study of transverse peculiar velocities, which we find to be consistent with large scale structure theory. The peculiar velocity field additionally results in low-multipole correlated proper motions that may be confounded with other cosmological proper motion measurements, such as limits on the gravitational wave background and the isotropy of the Hubble expansion. The authors acknowledge support from the NSF Graduate Research Fellowship Program, the NSF grant AST-1411605, and the NASA grant 14-ATP14-0086.

279.09 — Isocurvature sensitivity of upcoming galaxy surveys

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The existence of primordial isocurvature perturbations implies a model with multiple fields driving inflation. Currently, cosmic microwave background (CMB) data is our most powerful tool in searching for imprints of isocurvature perturbations. However, upcoming galaxy surveys such as the Large Synoptic Survey Telescope (LSST) may allow large scale structure to be an equally significant probe. This research investigates the sensitivity of the matter power spectrum as determined by LSST to primordial isocurvature perturbations. We use Fisher forecasting to predict constraints on the isocurvature fraction from LSST alone, as well as when combined with CMB data. Here, we look at cases of uncorrected and correlated perturbations.

279.10 — The Trials and Tribulations of Fuzzy Red Giant Tips

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Using Hubble Space Telescope imaging of M96, we discuss particular challenges encountered in extragalactic applications of the Tip of the Red Giant Branch (TRGB) method to measure distances, and present solutions to circumvent them. A subset of the existing HST tilings of M96 have proven particularly difficult when trying to locate the TRGB. In these datasets, we find that variations in sample selection and detector binning parameters can result in vastly different TRGB detections: here, a secondary edge-detector peak can gain apparent significance over the peak corresponding to the adopted "true" TRGB magnitude. We also find a clear dependence in M96 of the measured tip on galaxy-center distance, likely due to a gradient in AGB contamination. We discuss the ramifications of these issues and offer methods of mitigating them when finding TRGB distances.

279.11 — Data Reduction Integrated Python Protocol for the Arecibo Pisces-Perseus Supercluster Survey(DRIPP for APPSS)

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Developments in open-source high-level programming languages enable undergraduate students to make vital contributions to modern astronomical surveys. The Arecibo Pisces-Perseus Supercluster Survey (APPSS) currently uses data analysis software written in Interactive Data Language (IDL). We discuss the conversion of this software to the Python programming language, which uses freely available standard libraries, and the conversion of the data to a standard form of the Single-Dish FITS (SDFITS) standard. Data Reduction Integrated Python Protocol (DRIPP) provides user-guided data reduction with an interface similar to the former software written in IDL. Converting to DRIPP would provide researchers with more accessible data processing capabilities for APPSS (or any similar radio spectral survey).

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