MATTER DISTRIBUTION IN NEARBY GALAXIES

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Abstract. In this work we determine the Baryonic Mass Function (BMF) for a representative sample of nearby galaxies for which very detailed observations are available. The galaxy sample is based on the THINGS survey of neutral atomic hydrogen. From these types of observations it is possible to derive the rotation curve, and thus the total dynamical mass up to relatively large radii. Furthermore, in combination with IR observations, we simultaneously fit dynamical mass with observed stellar mass, the neutral gas component, and dark matter (DM) models, following Jovanović 2017. Stellar mass is scaled with the mass-to-light ratio, which is a factor of great interest in this work, and it is either kept free or fixed in the models. The DM component is implemented in the ΛCDM framework, which is a dominant cosmological paradigm entailing cold dark matter CDM and a cosmological constant Λ. Two ΛCDM profiles are used – pseudo-isothermal sphere and Navarro-Frank-White model. Having determined dynamical, stellar, gas, and dark matter mass we construct mass functions for our sample. By adding all contributions from baryonic components in a given mass range we derive the BMF. Additionally, we compare our Galactic environment with a BMF constructed for a larger volume (Papastergis et al. 2012), and discuss the Milky Way's placement on the BMF as well. Surprisingly, we find that while the Milky Way is typical for its immediate environment, it is not at all typical when the larger volume is considered.

References

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Papastergis, E., Cattaneo, A., Huang, S., Giovanelli, R. & Haynes. M. P.: 2012, *Astrophys. J.*, **759**, 138.