

First Steps Towards A Self-Consistent N-body Model Of The Local Group

Michael Fellhauer, Astronomisches Rechen-Institut Heidelberg, Germany

e-mail: mike@ari.uni-heidelberg.de

First steps are reported for a self-consistent model of the system Milky Way – M31 from high redshifts until now. This model is compared with the semi-analytical models of the local group (e.g. Peebles (1994+95) [2], [3]).

In a further step the LMC – SMC system will also be included and their evolution and dynamics are simulated following different scenarios (e.g. Kunkel [4]) to check for possible constraints on the tangential motion of M31 (if the Magellanic Clouds are an unbound system, passing the Milky Way).

Another aim is to extract proper setups for small groups like the local group at median redshifts out of "low resolution" models (covering the large scale structure of the universe) (e.g. from Governato et al. (1997) [6]) and follow the evolution of these groups until now with our high resolution code.

For our simulations we use the particle-mesh code Superbox [5] with high-resolution sub-grids including a special setup for comoving cosmological coordinates.

The final aim of this study will be the inclusion of many satellite galaxies (simulated with a parallel version of our code) in a consistent model of galaxy formation and evolution.

References

- [1] P. J. E. Peebles et al.: ApJ 345, p.108-121 (1989)
- [2] P. J. E. Peebles: ApJ 429, p.43-65 (1994)
- [3] P. J. E. Peebles: ApJ 449, p.52-60 (1995)
- [4] W. E. Kunkel et al.: 3.CTIO/ESO Workshop, p.200-208 (1994)
- [5] R. Bien ; M. Fellhauer: both in Proc. Ser. ITA 2, Heidelberg (1997)
- [6] F. Governato et al.: NewA 2, p.91-106 (1997)