[GC07] Mass Distribution in the Central Few Parsecs of Our Galaxy

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Near-IR observations of the central few parsecs of our galaxy from the HST/NICMOS have been analyzed to obtain a stellar surface number density profile. We only use the late-type stars as tracer population for the estimation of mass distribution in the central region because they are dynamically relaxed. With several statistical tests, we find the best-fitting parameters for number density models. Our analysis shows that the distribution of late-type stars at the Galactic center(GC) is $n \propto r^{1.5\sim1.7}$. We obtain velocity dispersion profiles of the tracer population by performing a chi-square test for velocities of the late-type stars presented in Genzel et al.(2000) and Figer et al.(2003). Then we calculate the mass distribution in the 4pc of the Galactic center from the Jeans equation, and discuss star formation environment in that region.

[GC08] On the Environmental Dependence of Galaxy Properties Established by the Initial Cosmological Conditions

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We present a theoretical model for the influence of the initial cosmological conditions on the environmental dependence of galaxy properties. First, we adopt the tidal torque theory according to which the angular momentum of a proto-galaxy is generated at first order by the misalignment between the inertia tensor of a proto-galaxy and the tidal shear tensor of the surrounding large scale structure. Then, we show analytically that the degree of the misalignment between the two tensor decreases with the density of the environment, which implies that galaxies forming in the low density regions should have higher angular momentum than those in the low density regions. This theoretical prediction is consistent with recent numerical finding that the void and field galaxies have higher spin parameters than the cluster galaxies. It also answer at least partly crucial observational questions such as why the void galaxies a spirals with high star formation rate, why the majority of cluster galaxies are ellipticals with low star formation rate, and so son. Finally, we conclude that our model explains quantitatively how the initial cosmological conditions establish the environment-galaxy property relation, providing a new theoretical insight to the mystery of galaxy formation.