

THE FUNDAMENTAL PLANE AT $Z = 0.4$

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Measurements of the mass-to-light ratios of galaxies are crucial to a proper understanding of galaxy dynamics, dark matter distributions, and the general matter content of the universe. We report on results of a program to measure the change of the M/L ratio with redshift. Since the evolution of the M/L can be parameterized as

$$\ln M/L(z) - \ln M/L(0) = -0.83z(1 + q_0 + 1/z_{\text{form}}), \quad (1)$$

measurements of the evolution of the M/L ratio give valuable information about the epoch of galaxy formation.

Studies of nearby galaxies have shown that their central M/L ratios, as computed from the structural parameters of the galaxies, are very regular. Here, we present first results on the determination of the structural parameters r_e , μ_e , and σ , for galaxies in the rich and concentrated cluster CL0024 + 1654 at $z = 0.39$.

Hubble Space Telescope imaging data were combined with 1991 spectroscopic observations made at the *Multiple Mirror Telescope*. In a 19.5 hour integration through a multi-aperture mask sufficient signal to noise ratios were obtained to measure velocity dispersions reliably. With the combination of HST imaging and high S/N spectroscopy it is possible to determine the required parameters accurately out to $z = 0.4$. These measurements will be used to determine the change in M/L with redshift. A preliminary analysis shows that the slope and offset of the Fundamental Plane are very similar to the FP at low z , indicating little evolution since $z = 0.4$.