1 INTRODUCTION

This work has two principal goals: to constrain the near-infrared mass-to-light ratios and stellar masses of a sample of local disk galaxies, and to constrain the fraction of the total mass of those galaxies that is dark matter.

We present mass models of 14 spiral and 14 lenticular (S0) galaxies. By comparing the predicted kinematics of the models to observed stellar kinematics, we constrain their stellar and dark matter content.

Each mass model is comprised of an axiymmetric stellar component based on observed K_s-band photometry (Bureau et al. 2006) and an NFW halo (Navarro et al. 1997). The stellar component is assigned a constant mass-to-light ratio, (M/L)_Ks. The halo is assumed to follow a correlation between halo mass M_200 and concentration c_200 (Macciò et al. 2008).

The Jeans equations for the corresponding potential are solved under the assumption of constant anisotropy in the meridional plane, b_2 (Cappellari 2008). This yields a prediction of the second velocity moment, which we compare to observed stellar kinematics (Chung & Bureau 2004) to constrain the three parameters of the model, (M/L)_Ks, M_200, and b_2. An example model for one of the 28 galaxies is shown in Fig. 1.

2 RESULTS

In all cases, these simple models are able to reproduce the wide range of observed stellar kinematics, which extend to 2-3 effective radii or, equivalently, 0.5-1 R_eff.

In Fig. 2 we show contours of x^2 for the sample. This demonstrates the constraints we are able to place on (M/L)_Ks and M_200 for each galaxy (x^2 is not a strong function of b_2 in these rotationally supported galaxies).

The median (M/L)_Ks for the sample is 0.11 with an rms scatter of 0.36. Our preliminary comparisons show this is consistent with the predictions of two stellar population models (Bell & de Jong 2001, Maraston 2005).

The median M_200 for the sample is (7.5+0.9)x 10^{12} M_☉ with an rms scatter of 0.7 dex. This is equivalent to halo concentrations between 7 and 9. The mass models contain a median dark matter fraction of 16% within one effective radius and 50% within R_eff.

Models without a dark halo are able to reproduce the observed kinematics satisfactorily in most cases. The improvement when a halo is added is statistically significant, however, and the stellar mass-to-light ratios of mass models with dark haloes match the independent expectations of stellar population models better.

REFERENCES