MASS STRUCTURE OF Sa SPIRALS: NGC 2179 & NGC 2775

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Recent analysis of extended rotation curves of late-type spirals have confirmed that these objects have detectable amounts of dark matter (DM) already in the optical region, with dark-to-luminous mass ratio scaling inversely with luminosity. Since currently available rotation curves of early-type spirals are often fragmentary and not extended enough, the question remains open as to whether dark halos are unequivocally present in Sa galaxies. To address this point we have observed a sample of 7 Sa's measuring major axis velocities and velocity dispersion for both stars and ionized gas. Here we present results for two objects, NGC 2179 and NGC 2775. We have constructed detailed dynamical models which, for each galaxy, explain the observed kinematics for both stellar and gaseous component and which are consistent with observed photometry. The best fit model for NGC 2179 involves an oblate isotropic rotator bulge, a thin exponential disk with the same mass-to-light ratio, and a pseudo-isothermal DM halo.The mass-to-light ratio in the inner galaxy was found to be $M/L_{\rm R} = 4.5\ (M/L_{\rm R})_{\odot}$ reaching $M/L_{\rm R} = 7.5\ (M/L_{\rm R})_{\odot}$ at the optical radius ($R_{\rm opt}$). For NGC 2775 the best fit model involves an oblate isotropic rotator bulge and a thin exponential disk, with $M/L_{\rm r} = 3.5\ (M/L_{\rm r})_{\odot}$, and $M/L_{\rm r} = 4.7\ (M/L_{\rm r})_{\odot}$ respectively. No DM halo was needed to explain the data extending to $0.7\ R_{\rm opt}$. In the inner regions the gas rotates as fast as stars but with negligible velocity dispersion. This rules out the case where the gas kinematics is dominated by random motion, and leads us to speculate we are seeing gas rotating on a non-equatorial plane, resulting from a past external acquisition, possibly from the companion galaxy NGC 2777.

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