Dynamical modeling and baryonic content of *NGC* 5055 and *DDO* 154

Milena Jovanovic

Astronomical Observatory of Belgrade

June 30, 2016

Ingredients

Ingredients

- stellar component - infrared 3.6μm photometry *Spitzer Survey of Stellar Structure in Galaxies (S4G)*

Ingredients

- stellar component - infrared 3.6μm photometry *Spitzer Survey of Stellar Structure in Galaxies (S4G)*
- gas component -21 *cm*-line of neutral hydrogen - *The HI Nearby Galaxy Survey (THINGS)* integrated HI maps

Ingredients

- stellar component - infrared 3.6μm photometry *Spitzer Survey of Stellar Structure in Galaxies (S4G)*
- gas component -21 *cm*-line of neutral hydrogen - *The HI Nearby Galaxy Survey (THINGS)* integrated HI maps
- rotational curve (RC) - *THINGS* data cubes

Dynamical models

Dynamical models

- stellar surface brightness decomposition - GALFIT code

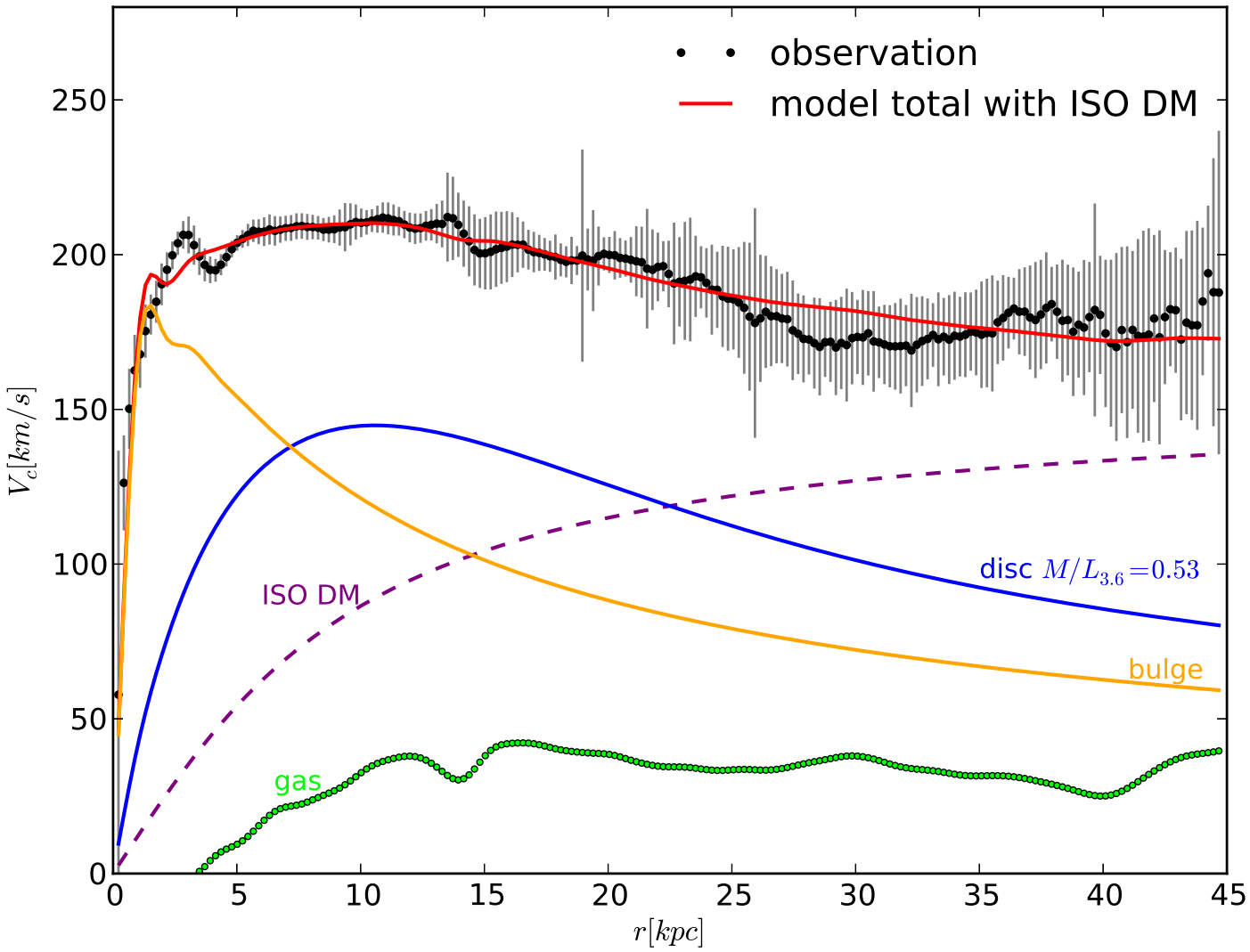
Dynamical models

- stellar surface brightness decomposition - GALFIT code
- derivation of RC and gas mass - GIPSY package

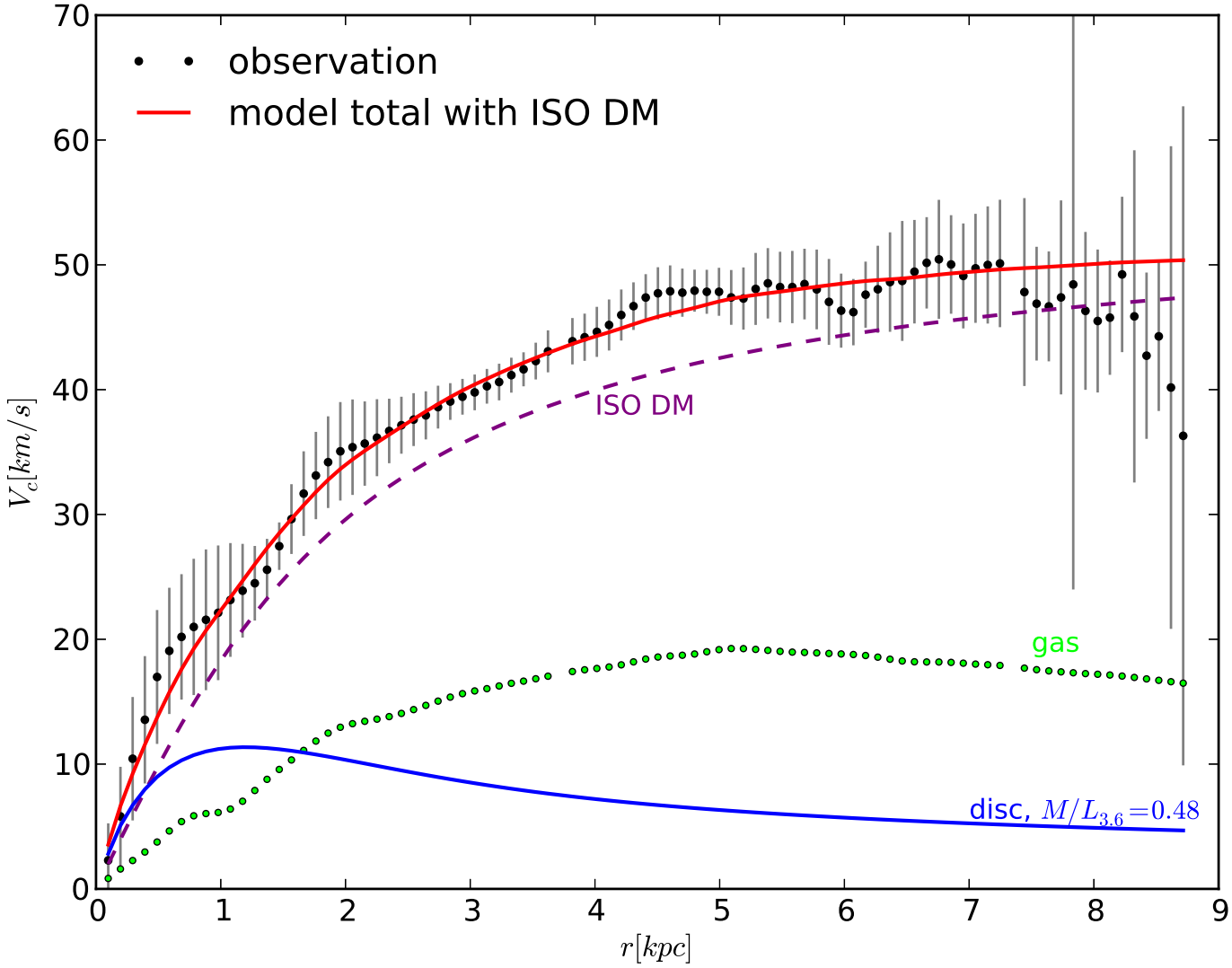
Dynamical models

- stellar surface brightness decomposition - GALFIT code
- derivation of RC and gas mass - GIPSY package
- finally, Newtonian DM models: isothermal (ISO) and Navarro, Frenk & White (NWF)

NGC 5055 best model: ISO, $\chi^2 = 0.375871$

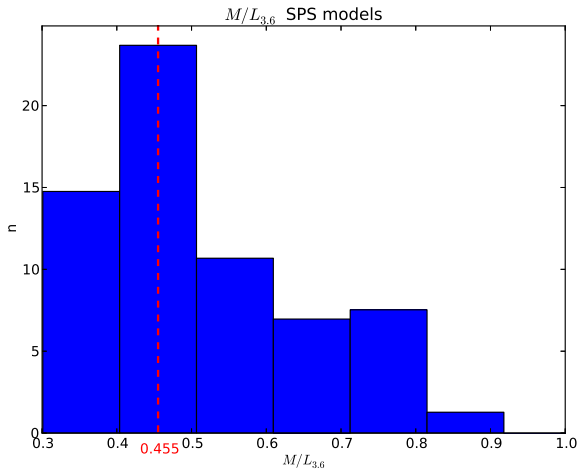


DDO 154 best model, $\chi^2 = 0.212370$

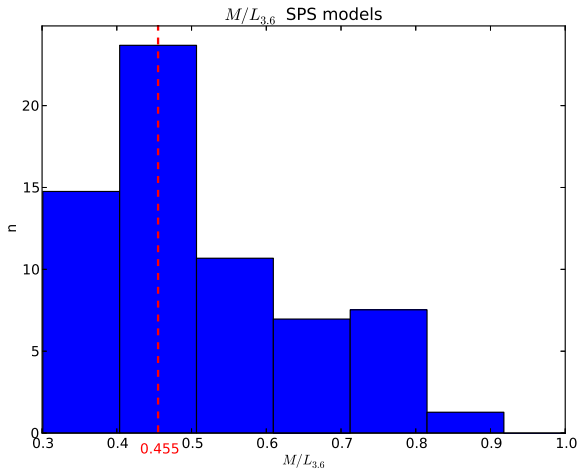


SPS models for *NGC* 5055

SPS models for *NGC* 5055

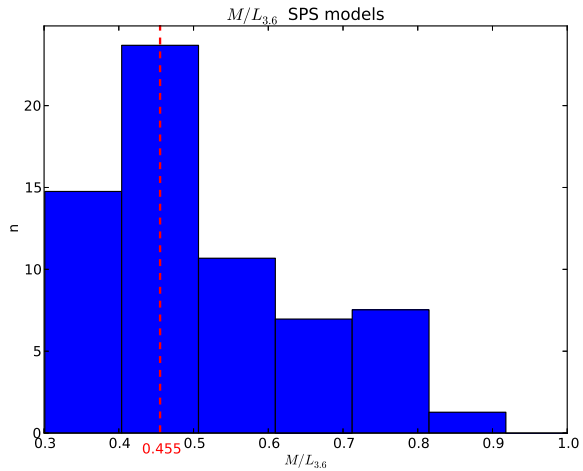


SPS models for *NGC* 5055

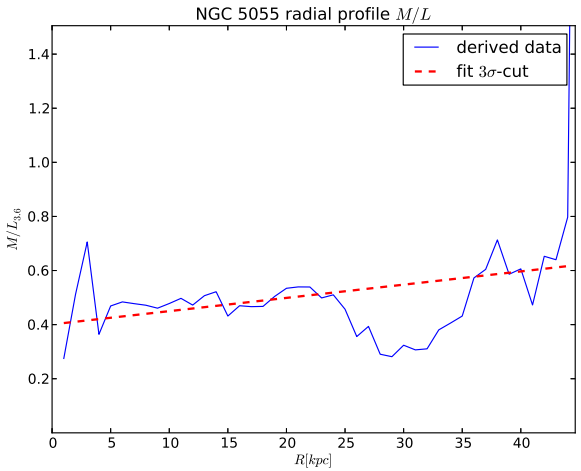


$\mathbf{M/L}_{dynamical\ \ modeling} = 0.53 \pm 0.13$ vs. $\mathbf{M/L}_{SPS} = 0.46$ - within uncertainty

SPS models for *NGC* 5055



$\mathbf{M/L}_{dynamical\ \ modeling} = 0.53 \pm 0.13$ vs. $\mathbf{M/L}_{SPS} = 0.46$ - within uncertainty



Conclusions

Conclusions

- ISO and NFW similar values for stellar disk M/L and similar fit quality and in good agreement with SPS constraints - congruence with λCDM?

Conclusions

- ISO and NFW similar values for stellar disk M/L and similar fit quality and in good agreement with SPS constraints - congruence with λCDM?
- radial profile of M/L almost flat, can it tell us something about stellar populations - certainty in IMF?

Conclusions

- ISO and NFW similar values for stellar disk M/L and similar fit quality and in good agreement with SPS constraints - congruence with λCDM?
- radial profile of M/L almost flat, can it tell us something about stellar populations - certainty in IMF?
- SPS tricky for DDO 154, still in progress