On the Spiral Structure of NGC2915 and Dark Matter

M. Bureau (Columbia University), F. S. Masset (CE-Saclay)

NGC2915 is a blue compact dwarf galaxy embedded in an extended, low surface brightness HI disk with a bar and two-armed spiral structure. Common mechanisms are unable to explain those patterns and disk dark matter or a rotating triaxial dark halo were proposed as alternatives. Hydrodynamical simulations were run for each case and compared to observations using customized column density and kinematic constraints. The spiral structure can be accounted for both by an unseen bar or triaxial halo, the former fitting the observations slightly better. However, the large bar mass or halo pattern frequency required make it unlikely that the spiral is driven by an external perturber. In particular, the spin parameter lambda is much higher than predicted by current CDM structure formation scenarios. Massive disk models show that when the gas surface density is scaled up by a factor about 10, the disk develops a spiral structure matching the observed one in perturbed density and velocity. This is consistent with more limited studies in other galaxies and suggests that the disk of NGC2915 contains much more mass than is visible, tightly linked to the neutral hydrogen. A classic (quasi-)spherical halo is nevertheless still required, as increasing the disk mass further to fit the circular velocity curve would make the disk violently unstable. Scaling up the HI brings the disk and halo masses to comparable values within the disk radius. The surface density remains under Kennicutt's star formation threshold for a gaseous disk and no stars are expected to form, as required by observations.

Abstract submitted for AAS [] meeting AAS201

Date submitted: 2002-10-16 15:02:28 Electronic form version 3.0 (21 June 2000)

American Astronomical Society Abstract Form

AAS Category 16 | Running # 732 | Session 0.00

Presentation type: 1

Presented by

Martin Bureau
Columbia Astrophysics Laboratory,
Columbia University,
550 West 120th Street,
1027 Pupin Hall, MC 5247,
New York, NY 10027

Phone: (212) 854-6899
Fax:
Email: bureau@astro.columbia.edu

Special instructions:

Membership number (presenting author or sponsor): 16414

- [ ] New address
- [ ] Session chair
- [ ] First AAS presentation
- [ ] New Ph.D.
- [ ] Newsworthy

AV Requirements:

Online version points to URL:
Online email inquiries directed to: