

# The Rotation of the halo of NGC 6822 from the radial velocities of carbon stars

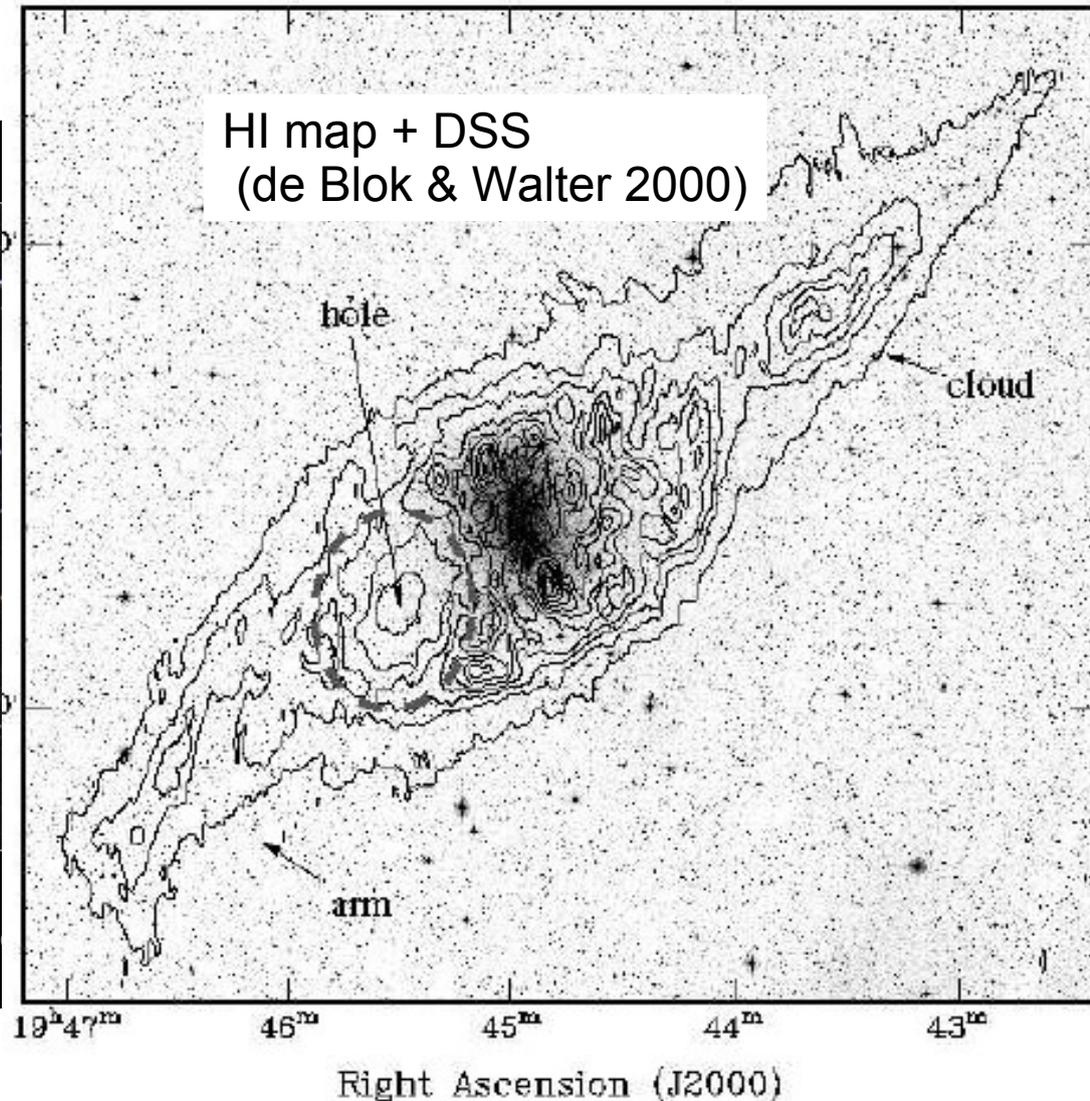
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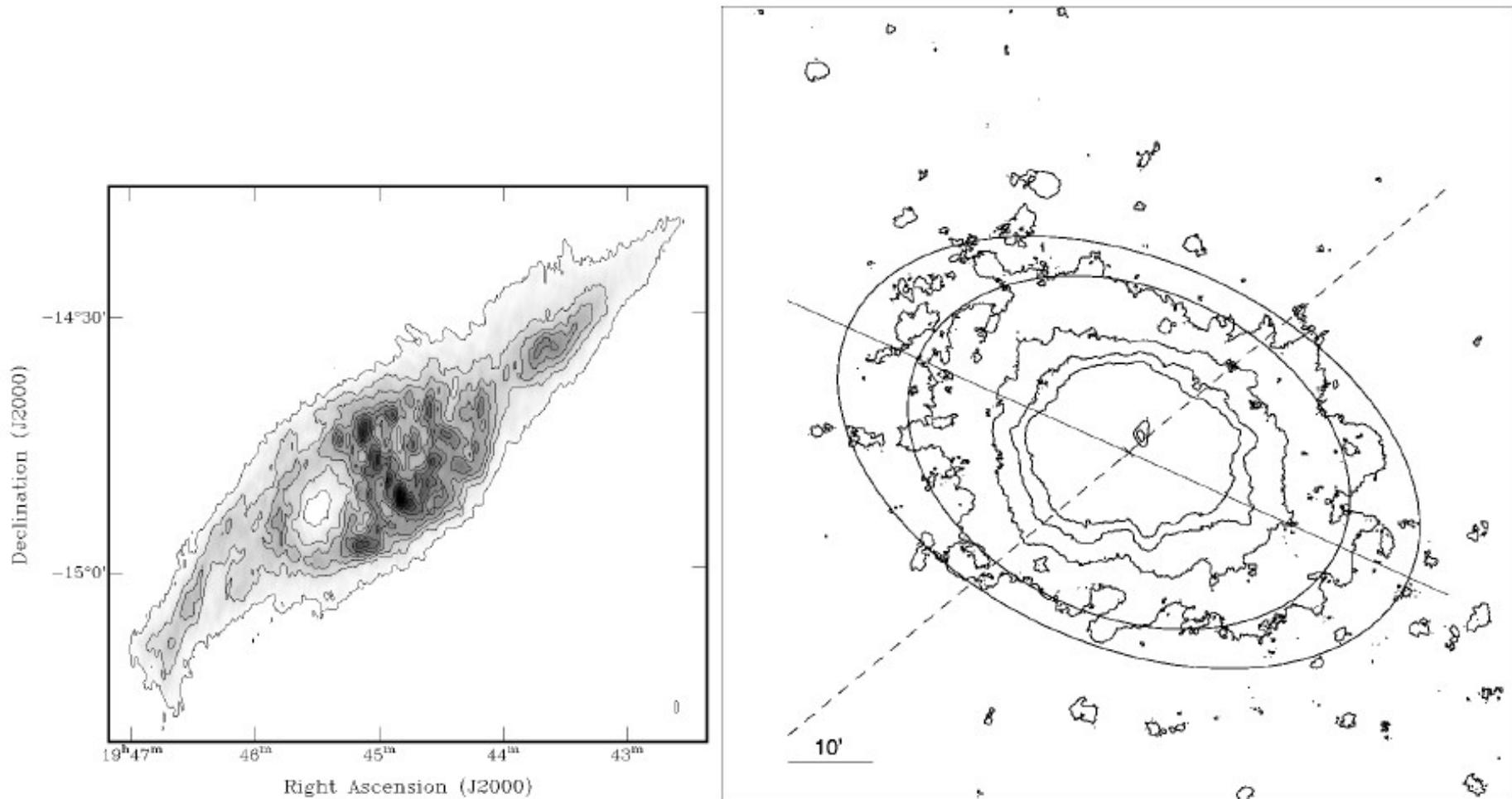
arXiv:1605.05582

NGC 6822 - Barnard's Galaxy in Sagittarius



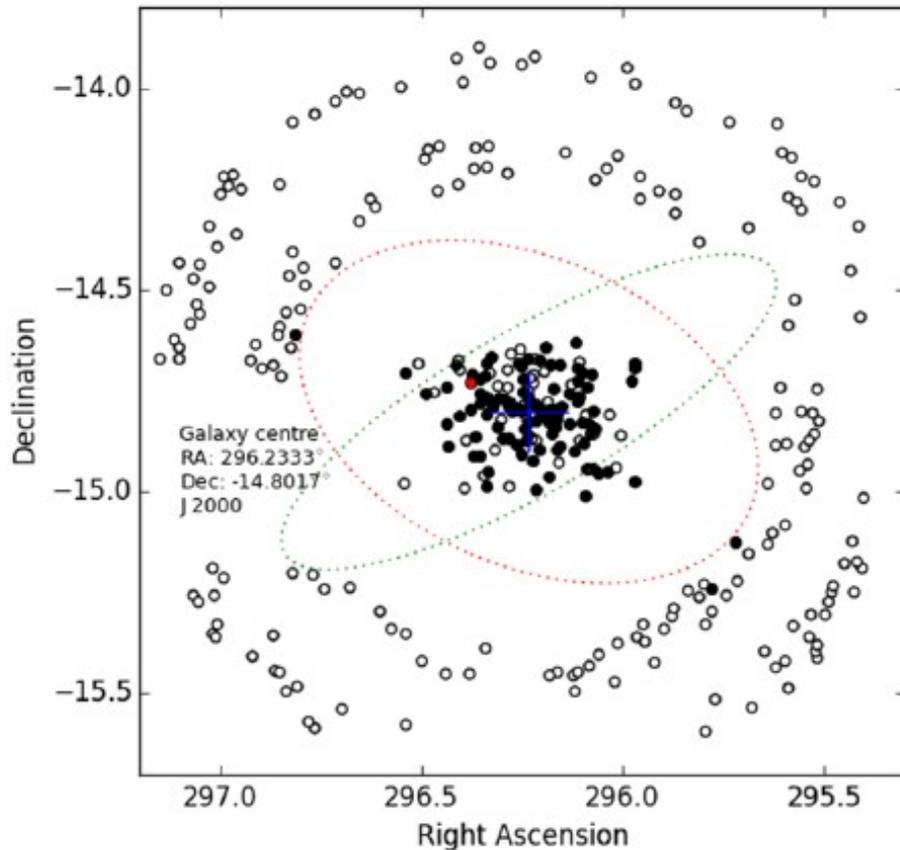
NGC 6822 (aka IC 4895) is an irregular dwarf galaxy that is a member of our Local Group of Galaxies. The galaxy contains a mere 10 million stars – a very small number compared to the Milky Way Galaxy's estimated 400 billion stars. E.E. Barnard discovered the galaxy in 1881, earning this galaxy the distinction of being named "Barnard's Galaxy".



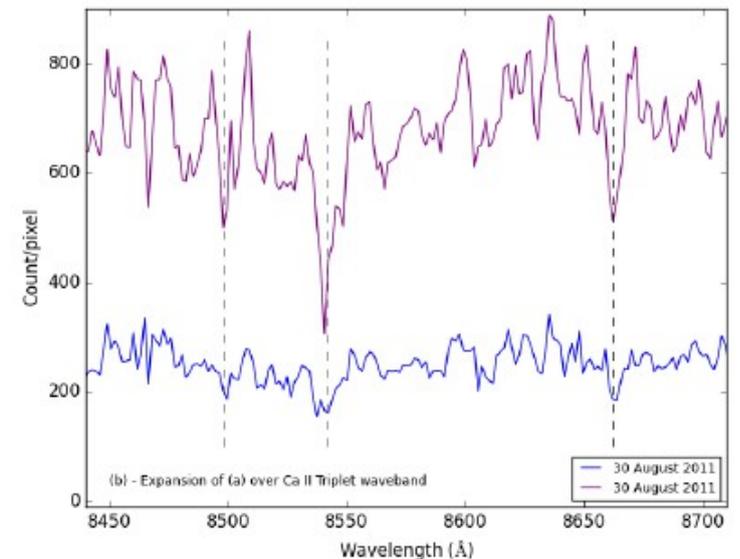
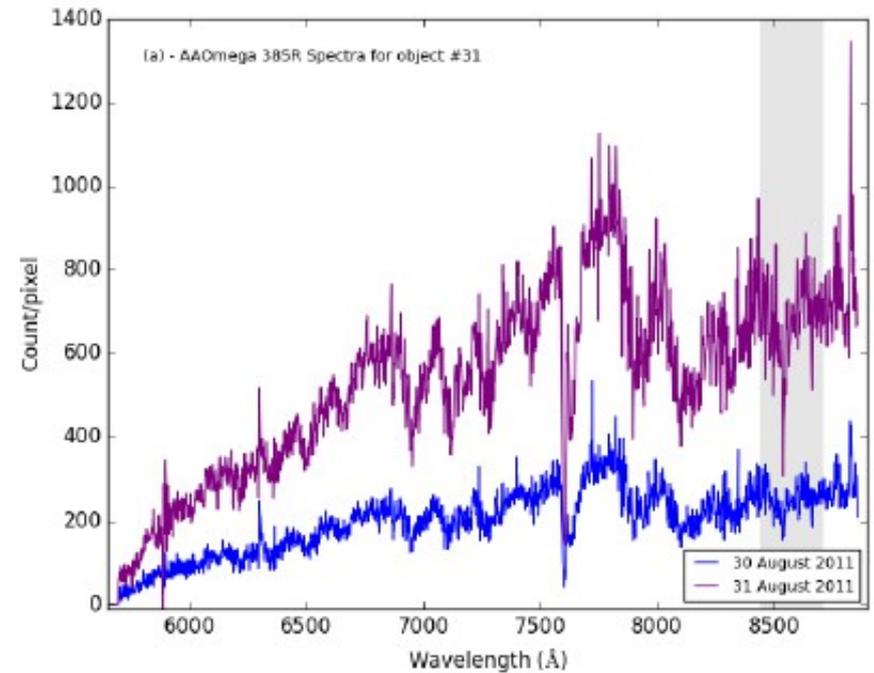
*Carbon star rotation in NGC 6822*

**Figure 1.** Left hand panel, HI isodensity curves of NGC 6822 (de Blok & Walter 2000). The HI curves exhibit a disk-like structure which is twisted with a major axis  $PA$  from  $\sim 110^\circ$  to  $\sim 130^\circ$ . Right hand panel, RGB stellar isodensity profiles (Demers et al. 2006). The RGB profiles exhibit elliptical contours, where the major axis  $PA$  changes from  $\sim 65^\circ$  (outermost contour) to  $\sim 80^\circ$  (innermost contour). The solid line in the right hand panel lies at  $65^\circ$  and the dashed line lies  $130^\circ$ . The panels are shown to approximately the same scale and orientation.

# AAO Omega observations: 323 target objects

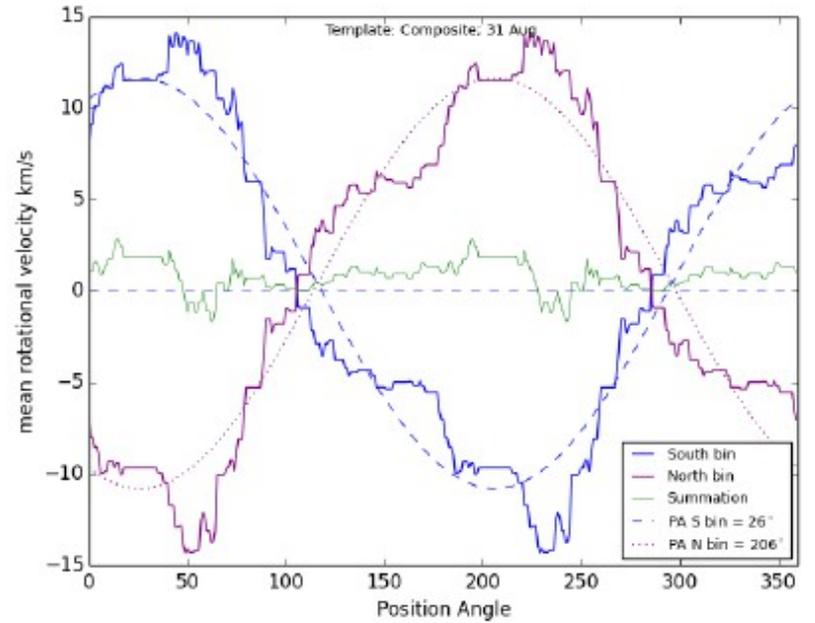
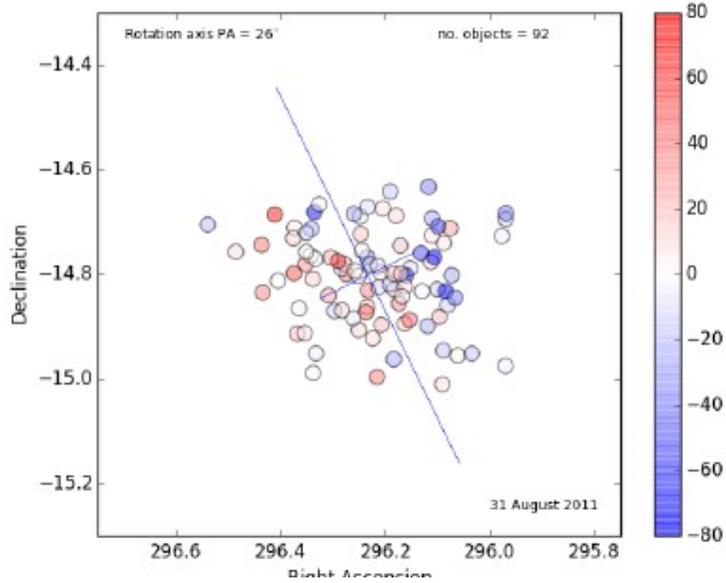
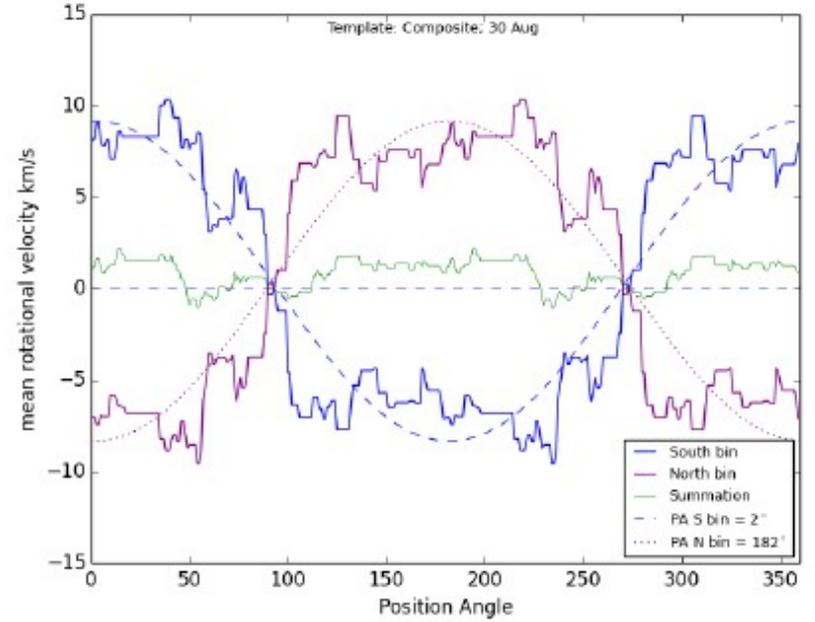
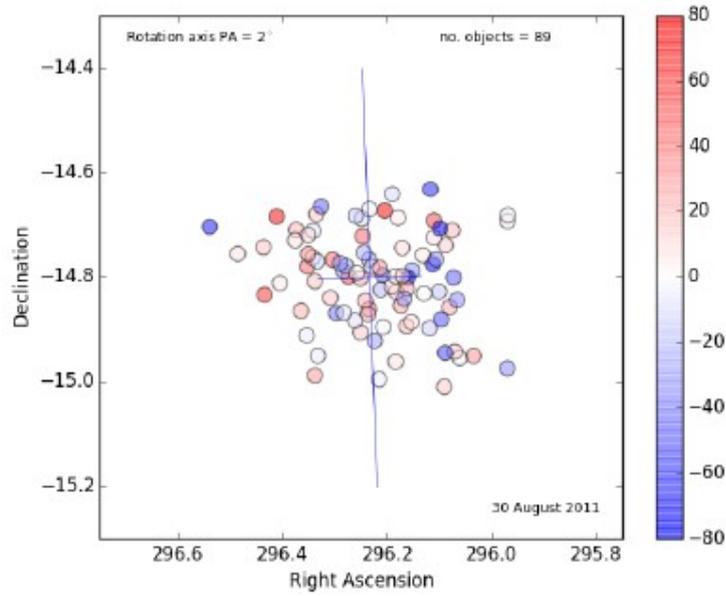


~90 C-type AGB in inner part  
 $\langle V \rangle = -51 \pm 3$  km/s  
Two data sets (2011 Aug 30 and 31)  
Low resolution: FWHM (CaII)=56 km/s!



“

” :(



## Conclusion: it is not a polar ring!

| Rotation rate      |                         | Rotation axis |             | Offset             |
|--------------------|-------------------------|---------------|-------------|--------------------|
| $V_{\text{rot}}$   | $\Delta V_{\text{rot}}$ | $PA$          | $\Delta PA$ | $y_0$              |
| km s <sup>-1</sup> | km s <sup>-1</sup>      | °             | °           | km s <sup>-1</sup> |
| [1]                | [2]                     | [3]           | [4]         | [5]                |

В пределах ошибок – согласуется с ориентацией структуры в HI, Где  $V_{\text{max}}=30$  km/s

|             |      |      |     |      |     |
|-------------|------|------|-----|------|-----|
| 30 Aug 2011 | 8.7  | ±2.2 | 2°  | ±22° | 0.4 |
| 31 Aug 2011 | 11.2 | ±2.1 | 26° | ±13° | 0.4 |

**Thus we find that both axes are approximately coincident and the sense of rotation of the stars and gas is the same, leading us to conclude that NGC 6822 is not a PRG.**

Несовпадение полученного PA с тем, что видно в распределении плотности звезд  
Никак не объясняют, только констатируют!

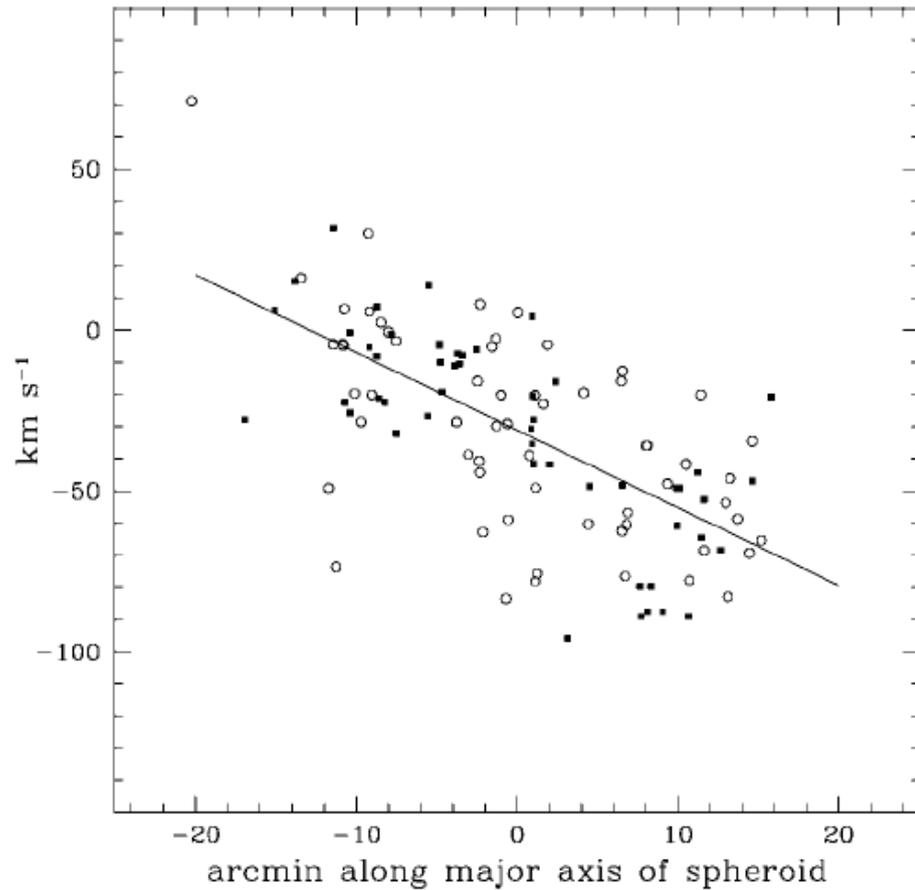


FIG. 2.—Observed radial velocities of C stars. The axis selected has a P.A. = 64°. The filled squares represent the du Pont data, while the open circles represent TNG data.

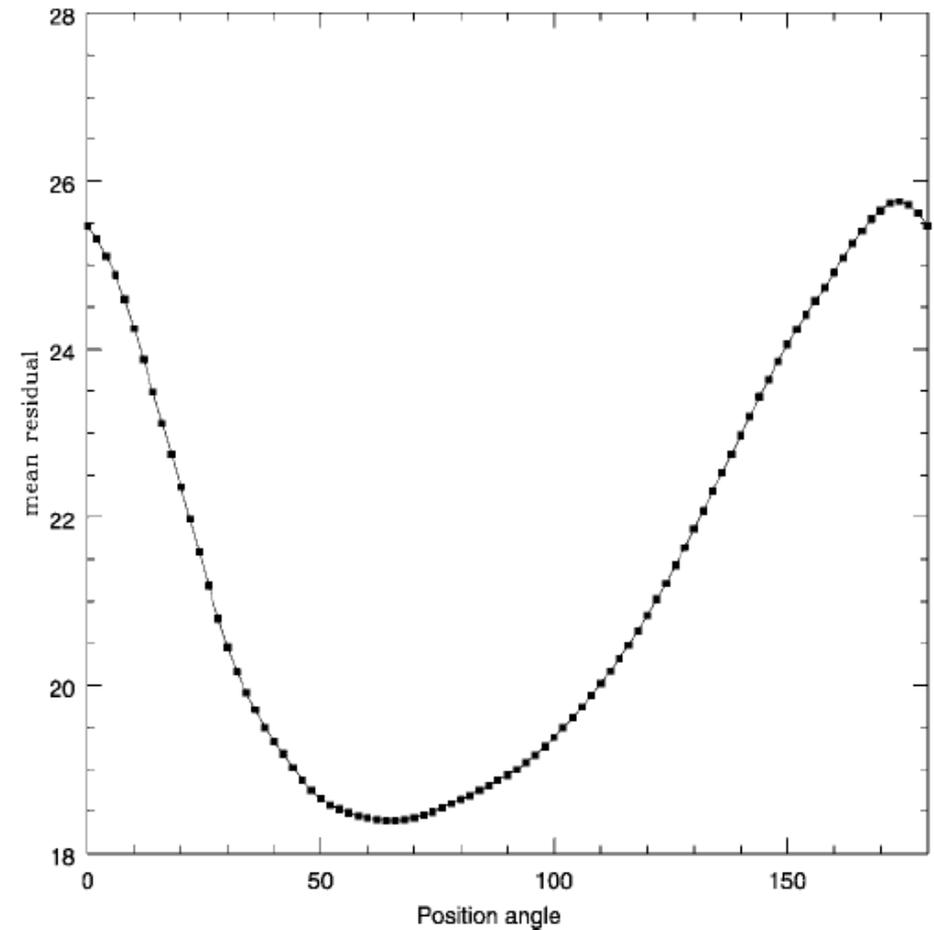
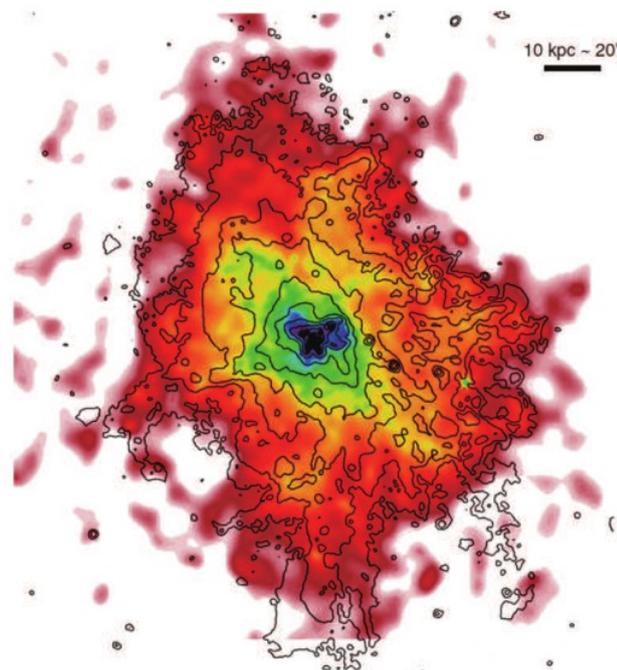
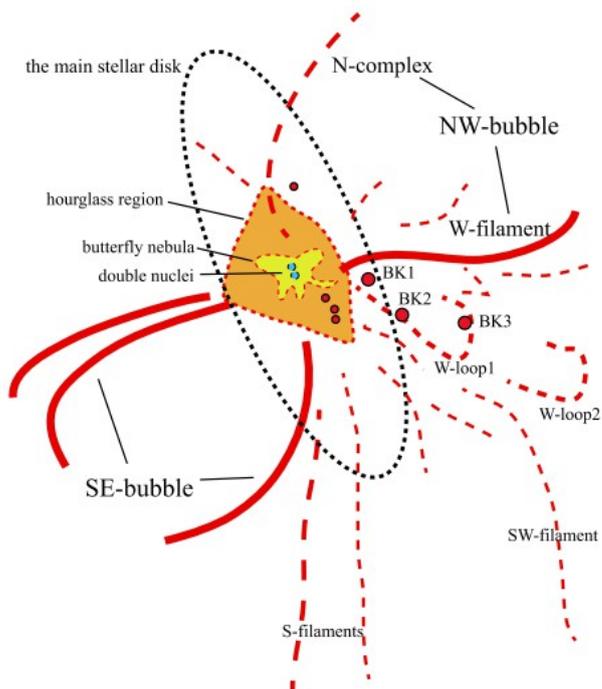
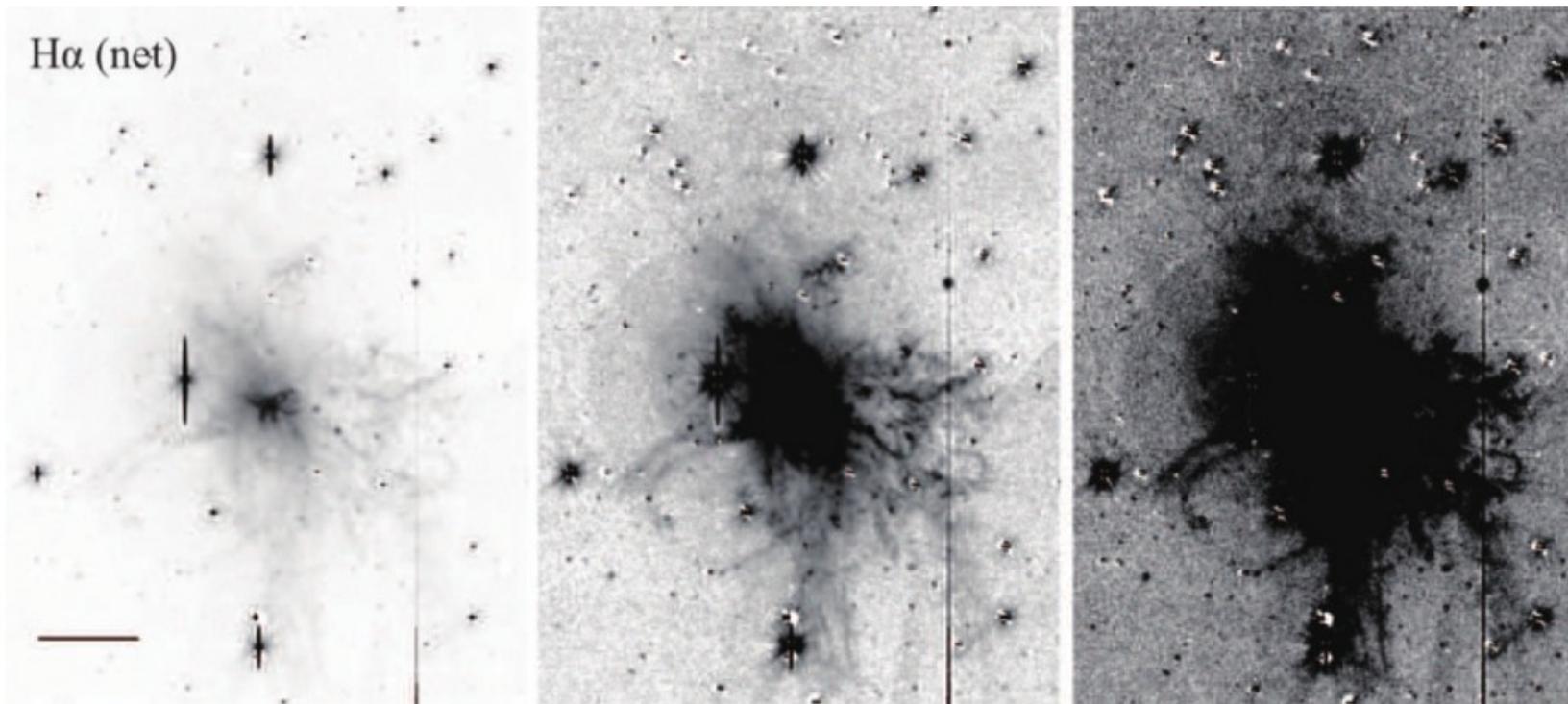


FIG. 3.—Mean residuals of the radial velocities of C stars for various position angles of the major axis.



Плотность газа и фактор  
заполнения - из равновесия с  
горячим газом ( X-ray)  
 $f=10^{-4}-10^{-5}$

Возбуждение туманности –  
ударные волны  $[NII]6583/H\alpha=1$

UV- в основном за счет  
рассеяния излучения звезд диска  
на пыли