Resolved Line Profiles of PNe in NGC 6822

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ABSTRACT
BACKGROUND:
The kinematics of Planetary Nebulae (PNe) in galaxies is a clue to understand the behavior of LIMS and their relation with other components of the galaxies.

OBJECTIVE:
Measure precise radial velocities of PNe (intermediate-old age population), HII regions and A-type supergiant stars (young population) in NGC 6822, we aim to determine if both types of population share the kinematics of the HI disk found in this galaxy.

METHODS:
The heliocentric radial velocities (RV) of the different objects were compared to the velocities of the HI disk at the same position. The RV were measured with a precision better than 5-6 km/s.

RESULTS

HI, HX and HII 08, their RV are very close to those of the HI disk, differences in velocity relative to the HI gas (Δ) are smaller than 9 km/s. HI 18 presents a large Δ of -24.2 km/s.

The two A-stars seem to share the movement of the HI disk. Their Δ are 2.3 km/s and -11.2 km/s.

Most PNe are approaching faster than the HI gas, with Δ from -60 km/s to -12 km/s, except for the cases of PN1, PN2 and PN7 whose Δ are +12.1 km/s, +9.3 km/s and +21.2 km/s respectively.

The PN4 [NII] 6583 line profile shows a central component surrounded by what appears to be a shell with an expansion velocity of 25 km/s.

The PN7 [NII] 6583 line profile shows a central component surrounded by what appears to be a double-shell with an expansion velocity of 140 km/s.

REFERENCES

• de Blok, W. J. G., & Walter, F. 2006, AJ, 131, 143

CONCLUSIONS

• From the analysis of RV it is found that HI regions and A-type supergiants do share the kinematics of the HI disk at the same position, as expected for these young objects.
• The compact HI 18 shows a kinematics closer to the PNe and C stars, with a Δ of -24.2 km/s. This nebula could be a true PNe located near a faint and extended HI region.
• The studied PNe are not moving along with the HI gas and their kinematics is closer to the one presented by the C stars of the stellar spheroid. However, the analysis of a much larger number of PNe is needed to confirm this result.
• The expansion velocities shown by PN4 is 25 km/s, which is a range similar to the one found in other galaxies (Richer et al. 2010). PN7 is a Type I PNe located near the galactic center, however it is receding away from the galaxy at more than 30 km/s and it shows a double-shell with a velocity of about 140 km/s.