
Interactions and starburst activity in galaxy groups: the case of Tol 9 in Klemola 13 group

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We are performing a multiwavelength analysis of galaxy groups hosting starburst galaxies in order to understand their general properties, environment, star formation history and the importance of the interactions and mergers between galaxies in their evolution. Some important results concerning the galaxy groups HCG 31 [1] and Mkn 1087 [2] have been already published. We present here our new ATCA HI map of the starburst galaxy Tol 9 within the Klemola 13 group.

1 The starburst Tol 9 within the Klemola 13 group

The Klemola 13 group (HIPASS J1034-28), located at 43.3 Mpc, contains at least 7 galaxies with different morphological types including an intense starburst galaxy, Tol 9 (ESO 436-42). This galaxy seems to host an important population of Wolf-Rayet stars indicating both the youth and the strength of the starburst [3]. Several independent objects are found in the neighbourhood of Tol 9, remarking the nearby spiral galaxy ESO 436-46 (at 20.2 kpc).

The analysis of the optical, NIR and H α images and the optical spectroscopy of Tol 9 is presented in [3]. An old stellar population bridge from Tol 9 towards a dwarf companion object located 5.9 kpc (28") at SW indicates probable interaction phenomena. The continuum-subtracted H α emission map and the kinematics of the ionized gas suggest that an outflow of material or a galactic wind exists in Tol 9. The estimated oxygen abundance in Tol 9 is $12+\log(\text{O}/\text{H})=8.57$ and their nitrogen to oxygen ratio is $\log(\text{N}/\text{O})=-0.81$.

The HIPASS HI spectrum reveals a considerable amount of atomic gas, therefore we carried out H I ATCA observations. The H I intensity map (Figure 1) shows that the neutral gas is mainly found in two regions: one located around the spiral galaxy ESO 436-46 and the other embedding Tol 9 and two nearby objects (W cloud). We also detect H I emission in the far object ESO 437-04 (no shown in Figure). Although we should expect that the neutral gas

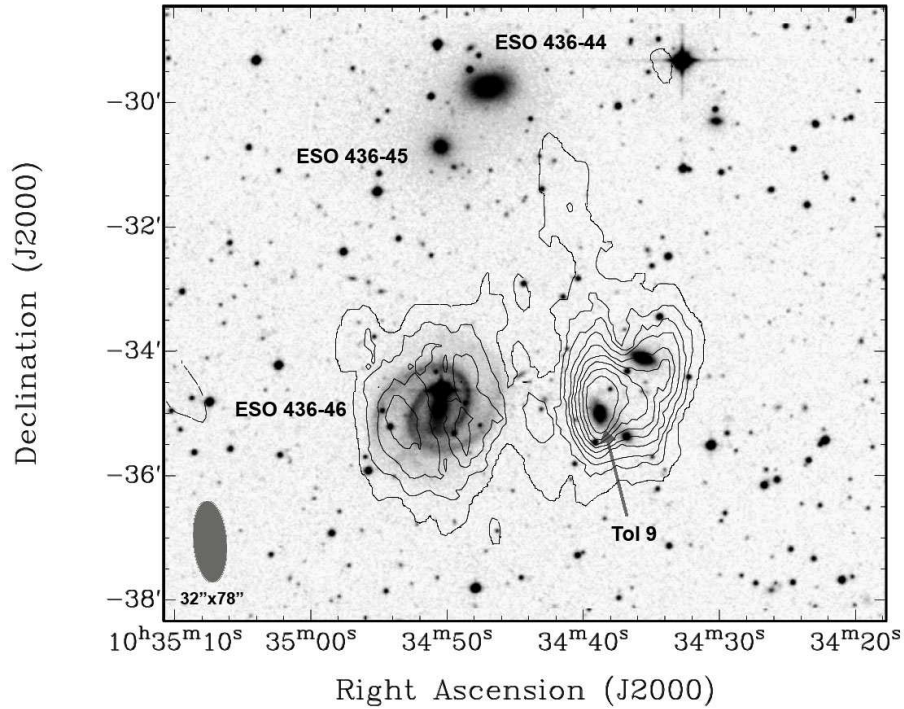


Fig. 1. Contours of the H I distribution in the Klemola 13 group overlapped a *R*-band image from DSS. The most important objects are labelled.

is mostly associated with ESO 436-46, the maximum of H I column density is actually found in Tol 9. Our H I map also reveals a long H I structure at the north of the W cloud in direction to ESO 436-44 and ESO 436-45. These two galaxies, composed by an old stellar population, do not show H I emission.

The H I kinematics are very intriguing. The H I cloud around ESO 436-46 reveals the rotation pattern expected for a spiral galaxy. But this characteristic is also found in the H I cloud embedding Tol 9 and its surrounding dwarf galaxies. Indeed, only seeing the H I velocity field it seems that they constitute one single object. The kinematics of the long tail at the north of the W cloud suggest that it is a tidal tail formed from material striped from this cloud.

References

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