SUPERGIANT SHELLS AND HOT GAS IN NGC 4449

D.J. BOMANS AND Y.-H. CHU
Univ. of Illinois, Dept. of Astronomy
1002 West Green St., Urbana, IL 61801, USA

AND

U. HOPP
Universitätssternwarte München
Scheiner Str.1, 81679 München, Germany

Supergiant shells are the largest interstellar structures in galaxies. They are outlined by long H II filaments enclosing an inner space containing very little warm or cold gas. In the LMC, two supergiant shells have been detected in X-rays indicating the existence of hot gas: LMC 2 (Wang & Helfand 1992) and LMC 4 (Bomans et al. 1994). It is not yet clear whether the hot gas in a galactic halo is supplied by such supergiant shells.

NGC 4449, at a distance of ~3 Mpc, is an irregular galaxy, quite similar to the LMC. A number of supergiant shells have been discovered in deep Hα images of NGC 4449 (e.g. Hunter & Gallagher 1992).

We have analyzed a 7850 sec ROSAT PSPC observation (RP600137) centered on NGC 4449, and compared it to our optical data. The ROSAT X-ray image shows three bright point sources and a widespread diffuse emission. In the west a large diffuse X-ray emission region is nicely delineated by long Hα filaments, indicating the existence of hot gas within a supergiant shell. This supergiant shell has an Hα morphology as spectacular as LMC 2 and a shell size and X-ray luminosity surpassing LMC 4 (the largest supergiant shell in the LMC). The X-ray luminosity of this supergiant shell is 9×10^{37} erg s^{-1}. It is remarkable that this supergiant shell extends hot gas to more than 2 kpc into the halo of NGC 4449!

References

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