# New candidate supernova remnants in nearby galaxies

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## Abstract

Supernova remnants (SNRs) are objects of high importance since they provide major amounts of energy to the interstellar medium (ISM), while at the same time they depict the end-point state of massive stars (M > 8 $M_\odot$ ). In order to investigate the physical properties of these objects and their interplay with their environment, we have embarked in an extensive investigation of the SNR populations in nearby galaxies of different morphological types. This effort has been initiated with six galaxies, mostly irregulars, in the northern hemisphere (Leonidaki et al. 2010, 2013). Following this context, we present new candidate SNRs (down to fluxes of $10^{-16}$ erg $sec^{-1}$ $cm^{-2}$ ) of five spiral galaxies in the southern hemisphere (NGC 45, NGC 55, NGC 1313, NGC 1672, NGC 7793), based on deep narrow-band Hα and [S II] images observed with the 4m Blanco telescope at CTIO, Chile. The new detections were achieved by calculating the [S II]/Hα flux ratio, where all sources with [S II]/Hα > 0.4 were considered as candidate SNRs. Furthermore, we use the derived properties of the newly detected candidate SNRs ([S II]/Hα ratios, Hα fluxes) to investigate how they are distributed according to their brightness and their behavior in different environments (irregulars vs spirals).

## Preliminary Results

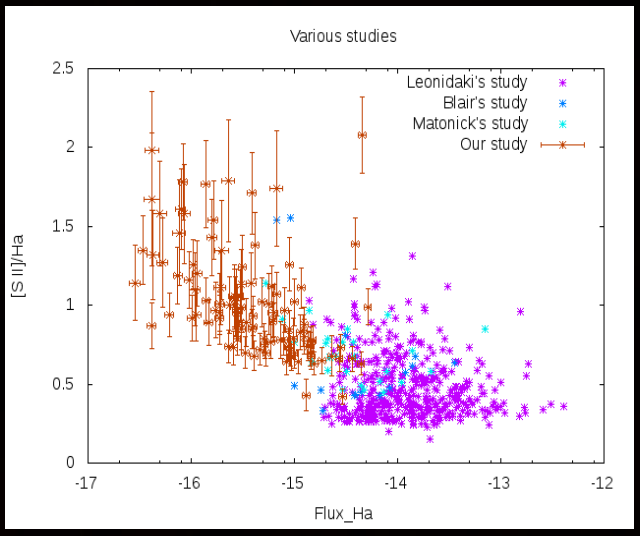



Fig.1: Comparison of our results for the galaxy NGC 7793 with previous studies (Blair, 1996, Matonick et al., 1997, Leonidaki, et al., 2013). The larger telescope (4m Blanco, CTIO) that we used, compared to the previous studies , gave us the ability to detect fainer sources.

| Galaxies | NGC 45 | NGC 55 | NGC 1313 | NGC 1672 | NGC 7793 |
|---|---|---|---|---|---|
| Candidate SNRs | 207 | 143 | 127 | 4 | 162 |

Table 1: The number of new candidate SNRs in our sample of galaxies, observed in the southern hemisphere.

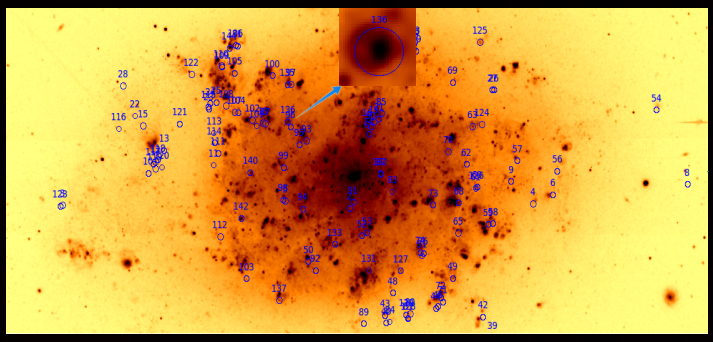
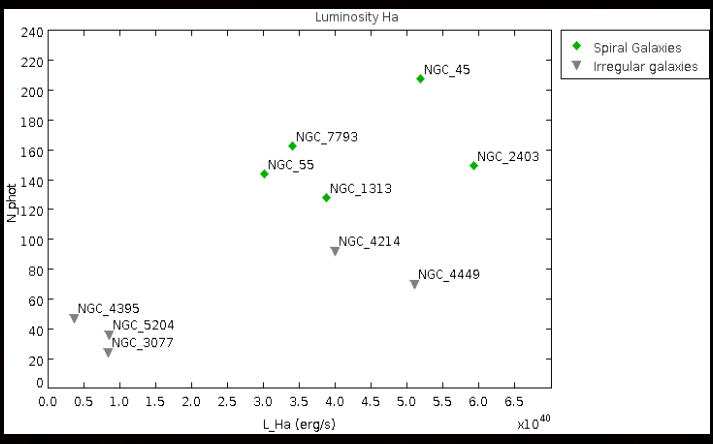


Fig.2: Distribution of candidate SNRs in one of the galaxies of our sample. As expected, most of them have been detected in the spiral arms of the galaxy, where massive stars evolve.

Fig.3 (right): Number of photometric SNRs against the integrated Hα luminosity (Kennicutt et al. 2008). We observe an almost linear correlation between them that is expected, because both high Hα luminosity and a large number of SNRs are indicative of high star formation rate (SFR). There is also a trend for spiral galaxies to be more luminous and have more SNRs compared to irregular galaxies (Leonidaki, et al. 2013) and this is expected too, since spiral galaxies, being younger, present higher SFR.




## References

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