# OPTICAL OBSERVATIONS OF NGC 2366 GALAXY IN NARROW BAND [SII] AND H ALPHA FILTERS

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## Abstract

We present preliminary results of observations of NGC 2366 galaxy, made with the 2m RCC telescope at NAO Rozhen, using narrow band [SII] and Hα filters. The main aim of these observations was to identify supernova remnant (SNR) and HII region candidates in this galaxy.

## Observations and Data Reduction

- Observations were carried out during three observational runs - in February 2015, November 2016 and March 2017. We have used 2m RCC telescope at National Astronomical Observatory Rozhen.
- Narrowband imaging was performed using Hα, [SII] and red continuum filters, each wide approximately 3 nm.
- NGC 2366 galaxy was observed in two overlapped fields of view (FOV), as shown in Figure 1. FOV1 was observed for 100 min through Hα, 60 min through [SII] and 160 min through continuum filter. FOV2 was observed for 60 min through each filter.
- Data reduction was done in IRIS[1] using standard procedures.

[1] Available from http://www.astrosurf.com/buil/

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## Optical Detection of SNRs

[SII]\Hα emission line ratio can be used when we want to differentiate between shock-heated SNRs (ratios >0.4, but often considerably higher) and photoionized nebulae (<0.4, but typically <0.2) (Matonick & Fesen 1997).

## NGC 2366 Galaxy

NGC 2366 is a dwarf irregular galaxy, which can also be classified as a cometary galaxy. The head of the comet, in this case, is the high surface brightness part of a supergiant HII region at the southwestern end of the galaxy, while galaxy's low surface brightness body is the tail. NGC 2366 is located at the distance of 3.44 Mpc (Tolstoy et al. 1995), so 1" in our figures corresponds to 17 pc.

## Previous Detections of SNRs in NGC 2366

Chomiuk & Wilcots (2009) detected five radio SNR candidates using high resolution images obtained with Very Large Array radio interferometer, in combination with Hα images published in Hunter & Elmegreen (2004).

## Results

We have detected 59 emission line objects in NGC 2366 galaxy. Detected objects are shown in Hα emission line in Figures 2 and 3. Majority of detected objects are HII regions, with several Hα point sources, which could be planetary nebulae. Out of five radio SNR candidates from Chomiuk & Wilcots (2009) (our objects 5, 22, 28, 32, 35) we suggest only object 35 as a probable SNR candidate, with [SII]/Hα ratio about 0.3. Objects 5, 22 and 32 have strong continuum emission, therefore we rule them out as SNR candidates. Object 28, also a radio SNR candidate, does not emit in [SII] line, so it could be an SNR, but in earlier evolutionary phase. We also detected several objects (15, 23, 45, 53, 56) with strong [SII] emission, whose nature should be further investigated.

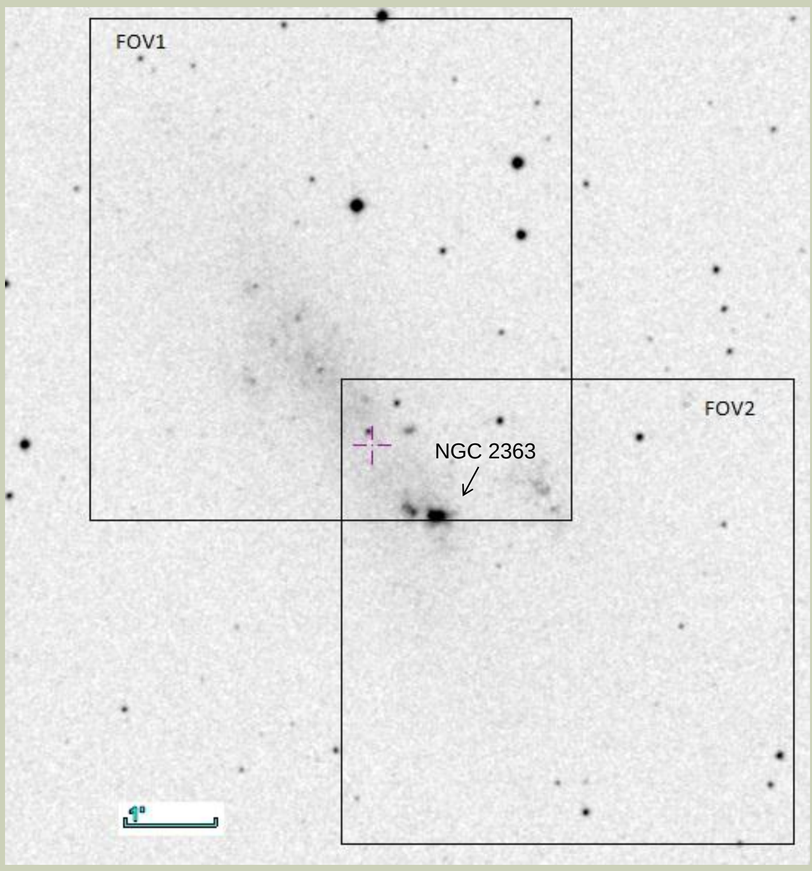


**Figure 1:** Digital Sky Survey image of NGC 2366 galaxy. Observed FOVs are marked. North is to the top, east is to the left.

## References

Chomiuk & Wilcots, 2009, *AJ*, 137, 3869
Hunter & Elmegreen, 2004, *AJ*, 2170, 2205
Matonick & Fesen, 1997, *ApJS*, 112, 49
Tolstoy et al., 1995, *AJ*, 110, 1640

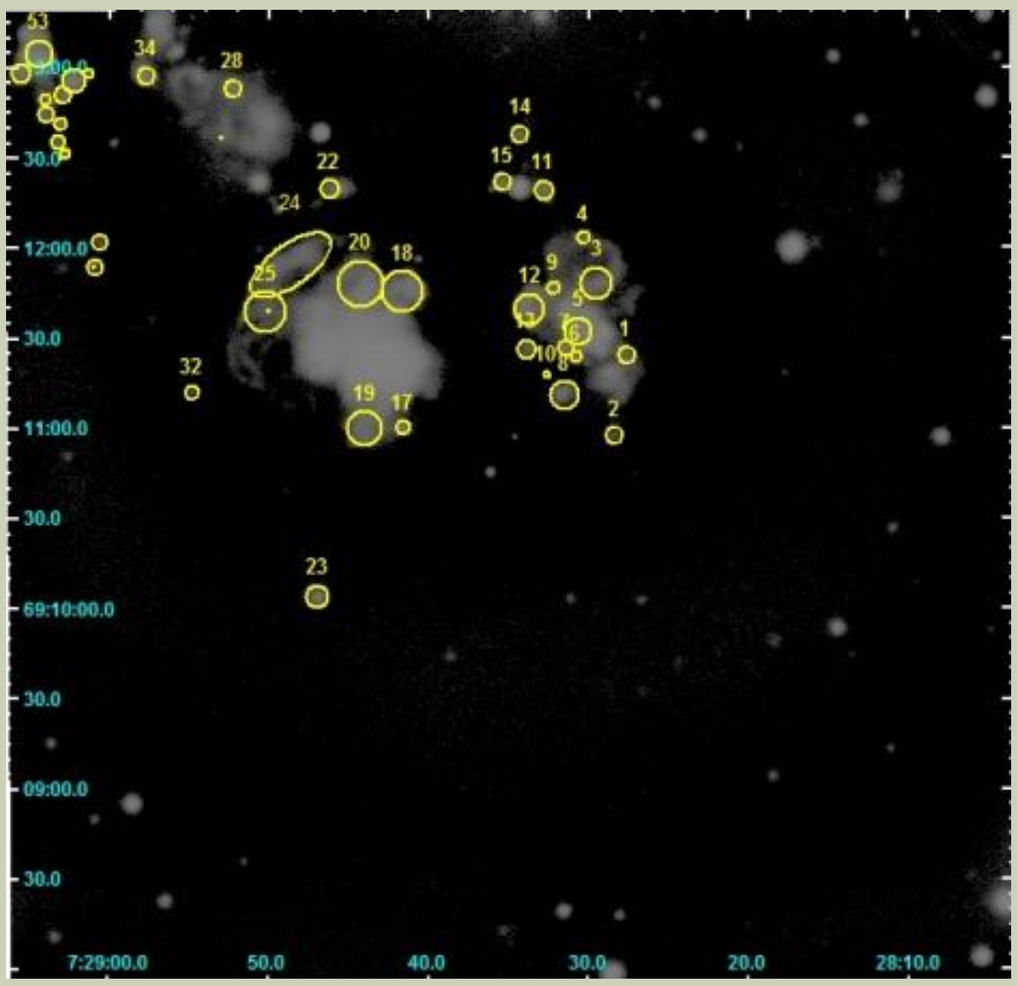


**Figure 2**: Hα image (without continuum subtracted) of FOV1, with marked objects. FOV ~ 5" x 5"

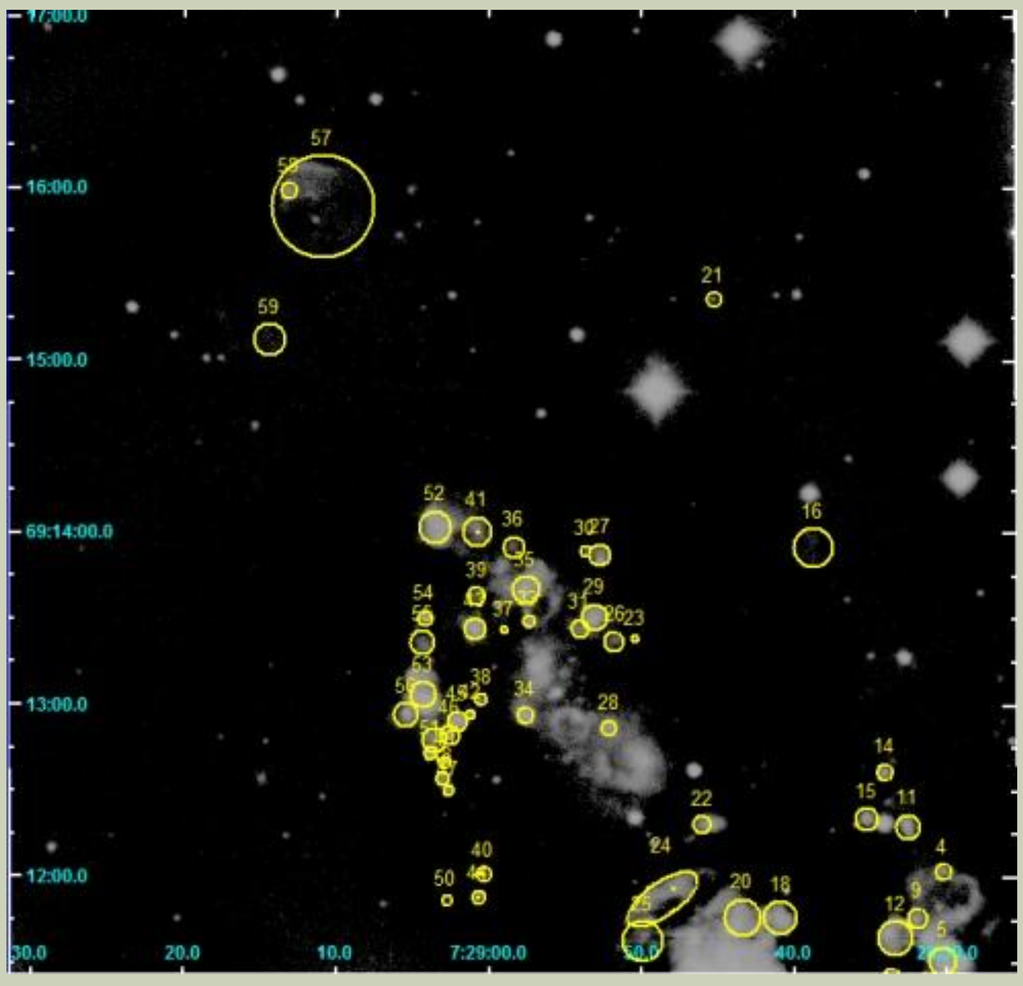


**Figure 3**: Hα image (without continuum subtracted) of FOV2, with marked objects. FOV ~ 5" x 5"