

Starformation in Ram-pressure Stripped Gas Tail in the Virgo Cluster

YAGI, Masafumi, HATTORI, Takashi
(NAOJ)

GU, Liyi, NAKAZAWA, Kazuhiro, MAKISHIMA, Kazuo
(University of Tokyo)

FUJITA, Yutaka
(Osaka University)

AKAHORI, Takuya
(University of Sydney)

YOSHIDA, Michitoshi
(Hiroshima University)

We investigated starformation in the tail of NGC4388, a galaxy in the Virgo cluster. The tail is one of the most prominent ram-pressure stripping event in nearby universe [1,2,3]. Its 30 kpc ionized tail was first discovered by Suprime-Cam/Subaru imaging with a narrow-band filter of $H\alpha$ at the redshift of the Virgo cluster [1], and 110 kpc of HI tail was discovered by radio observation [3] (Fig. 1). Recently, we investigated the tail with X-ray data [4]. In the study, we analysed public archived data of the region and found several $H\alpha$ -excess regions (HaRs), which would be associated with the tail [5].

We spectroscopically observed two HaRs at 66 kpc from NGC4388 (Fig. 2) and another two at 35 kpc with the FOCAS/Subaru. The redshifts of the four HaRs were consistent with the HI tail and $[NII]/H\alpha$ vs $[OIII]/H\beta$ plot indicated that they would be starforming regions.

With multiwavelength data from UV to MIR, we

estimated that their metallicity is comparable to solar abundance, and the stellar age is several to ten Myr. The total stellar mass of HaR-1 is estimated to be $< 10^3 M_{\odot}$, and those of other three are also as small as $10^{4-4.5} M_{\odot}$. The high metallicity and young age imply that they formed after the gas was stripped from the NGC4388.

As HaR-1,2 are in front of the halo of M86, we can see associated dark clouds. The extinction estimated from Balmer decrement of the HaRs ($E(B-V) \sim 0.6$) is larger than that estimated from imaging ($E(B-V) \sim 0.05$), which suggests that the starformation is ongoing in high density regions. We also found that the positions of the stars and the gas have an offset in HaR-2, which would be the same phenomenon as “fireballs” found in the Coma cluster [6]. It means that ram-pressure is still effective at 66 kpc away from the parent galaxy.

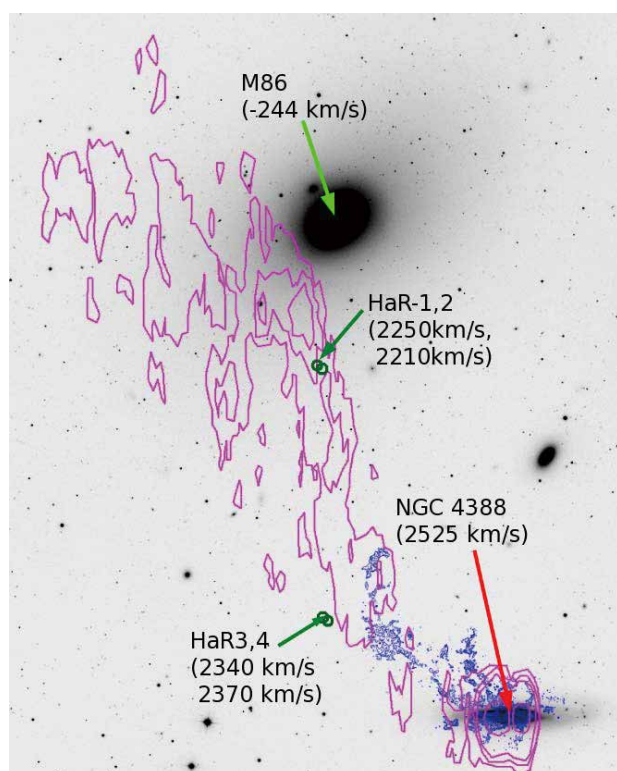


Figure 1: The tail of NGC4388. Background image is taken from Sloan Digital Sky Survey. Blue contours show $H\alpha$ tail [1] and magenta contours show HI tail [3]. The HaRs in this study are shown as HaR-1,2,3, and 4.

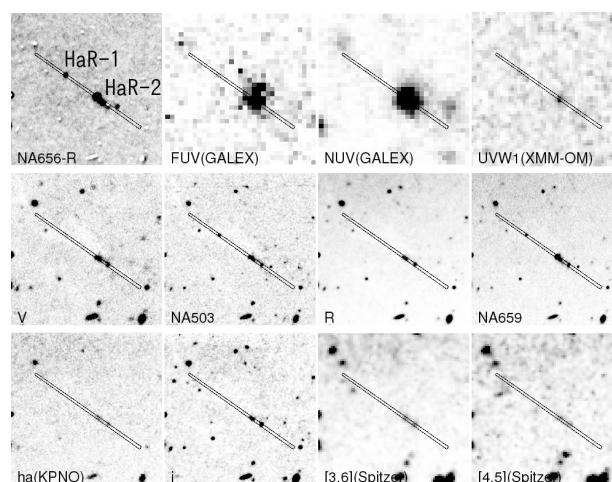


Figure 2: HaR-1,2 in multi-wavelengths.

References

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- [2] Yoshida, M., et al.: 2004, *AJ*, **127**, 90.
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- [6] Yoshida, M., et al.: 2008, *ApJ*, **688**, 918.