

2.6 Mpc Giant Radio Galaxy

--- Summary of MSSS discovery paper ---
(4 mins)

--- Deep LOFAR observations and facet calibration ---
(4 mins)

-- Other New GRG's --
(1 min)

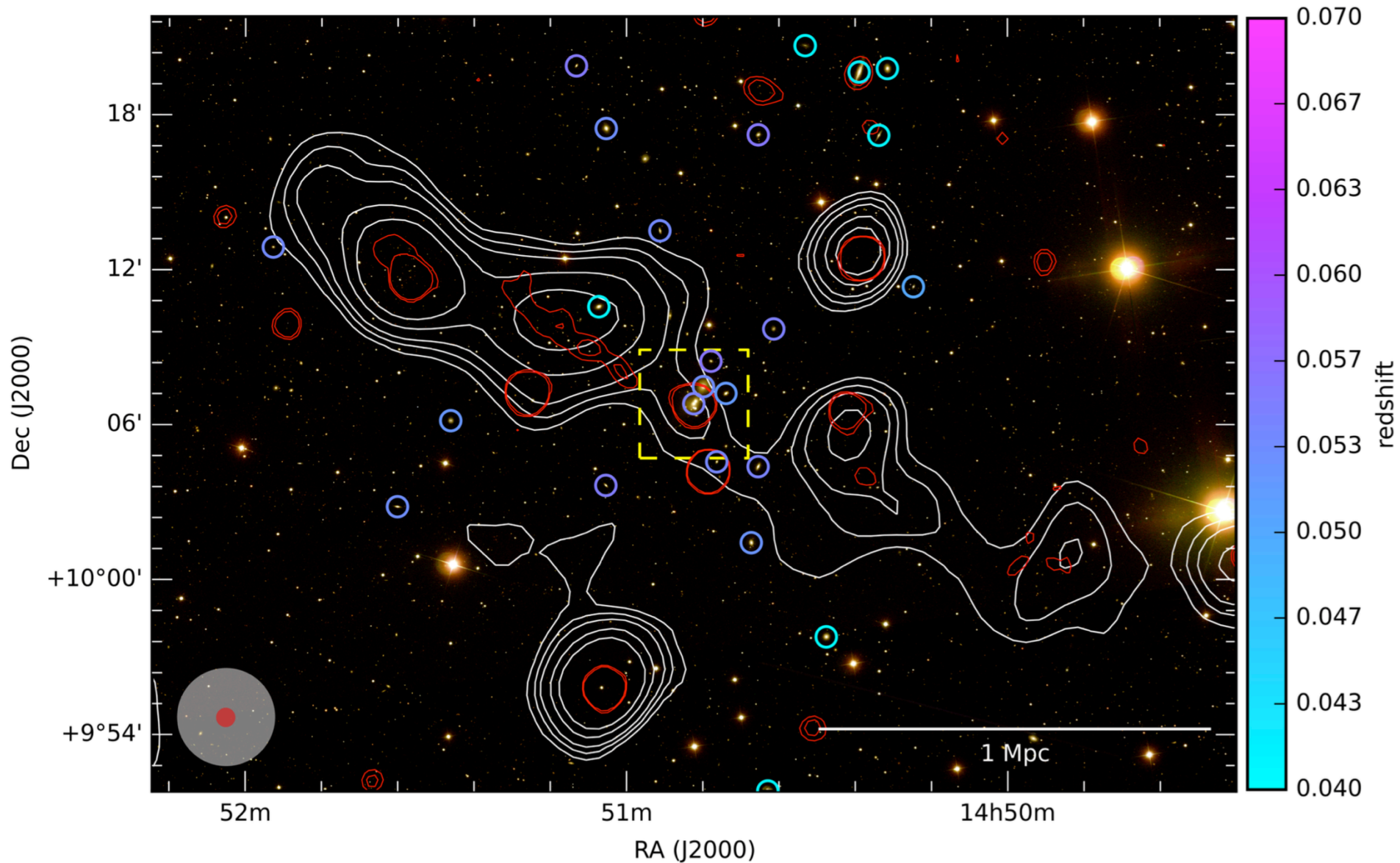
LOFAR
MAGNETISM
Key Science Project

MANCHESTER
1824



Alex Clarke

SDSS host galaxy classification: Broad line galaxy
Spectroscopic redshift: 0.05453



SDSS host galaxy classification: Broad line galaxy Spectroscopic redshift: 0.05453

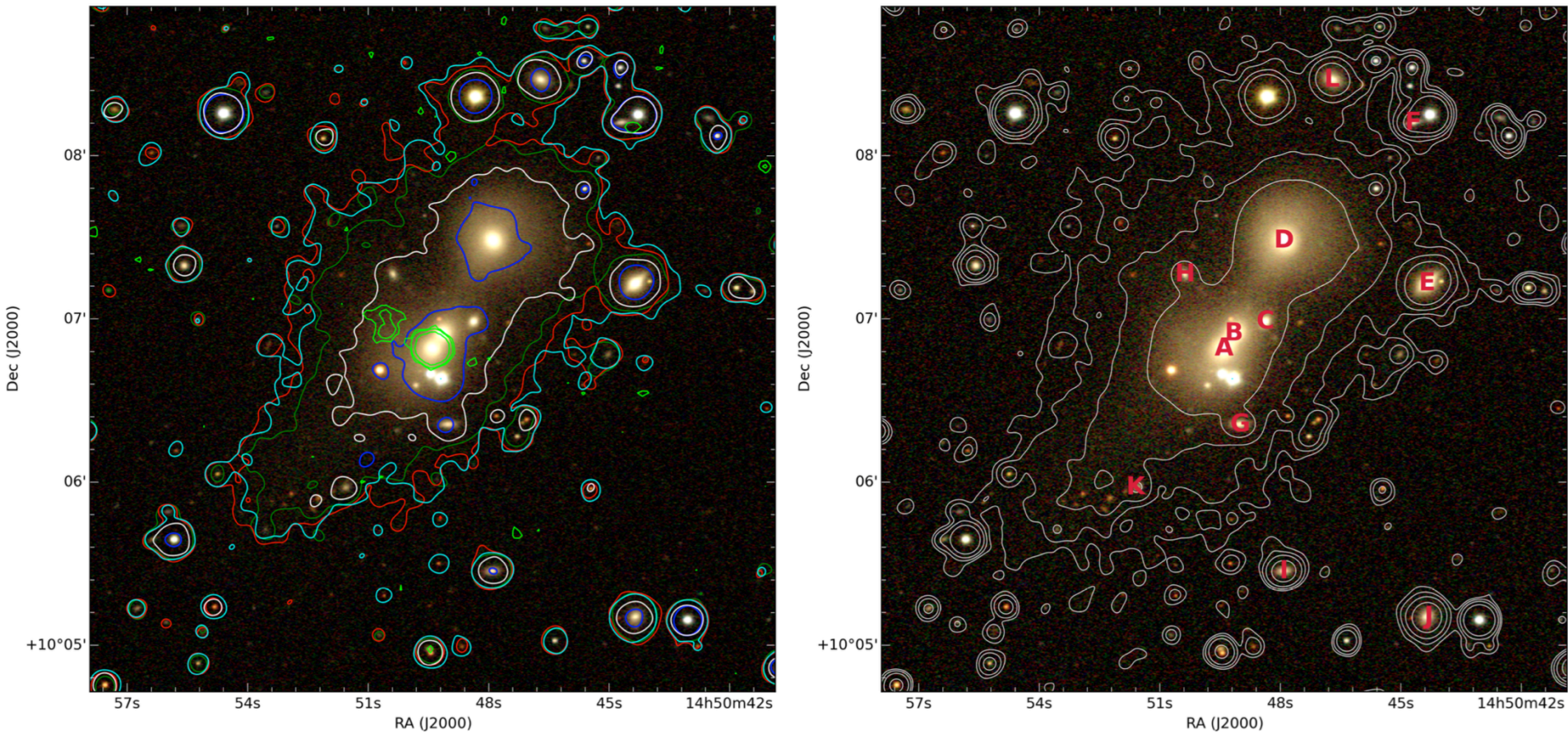


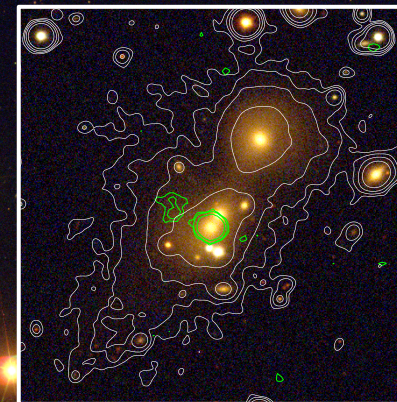
Fig. 2. Left: SDSS image (composite 3 colour image from bands i , r and g on log stretch scale) with SDSS contours at 3 times the RMS noise after smoothing from bands z (white), i (cyan), r (red), g (green) and u (blue). The RMS noise of each band before smoothing in units of maggies is 4.14×10^{-2} (u), 1.44×10^{-2} (g), 2.38×10^{-2} (r), 3.82×10^{-2} (i), 2.1×10^{-1} (z). FIRST contours are shown in lime at 3, 5 and 15 times the RMS noise. Right: SDSS image (composite 3 colour image from bands i , r and g on log stretch scale) with smoothed SDSS contours from the composite image at 3, 5, 10 and 30 times the RMS noise after smoothing. Letters mark the positions of resolved galaxies. All smoothing is performed with a Gaussian kernel of standard deviation $1.72''$. This area is shown by a dashed yellow rectangle in Figure 1.

Property	Value
RA (J2000)	222.70582°
Dec (J2000)	10.113635°
Redshift	0.05453
Luminosity Distance (Mpc)	$251.3 \pm 1 \times 10^{-5}$
Age (Gyr)	12.75
Velocity Dispersion (km/s)	215.86 ± 6.34
Mass (SDSS) ($\log M_{\odot}$)	11.37
Mass (WISE) ($\log M_{\odot}$)	11.56 ± 0.12
Star Formation Rate (M_{\odot}/year)	1.2 ± 0.4
Black Hole Mass ($\log M_{\text{BH}}/M_{\odot}$)	7.98
TGSS-ADR1, $S_{150\text{MHz}}$ (mJy)	40.1 ± 7.6
NVSS, $S_{1.4\text{GHz}}$ (mJy)	55.3 ± 2.1
FIRST, $S_{1.4\text{GHz}}$ (mJy)	47.58
CLASS, $S_{8.4\text{GHz}}$ (mJy)	48.9

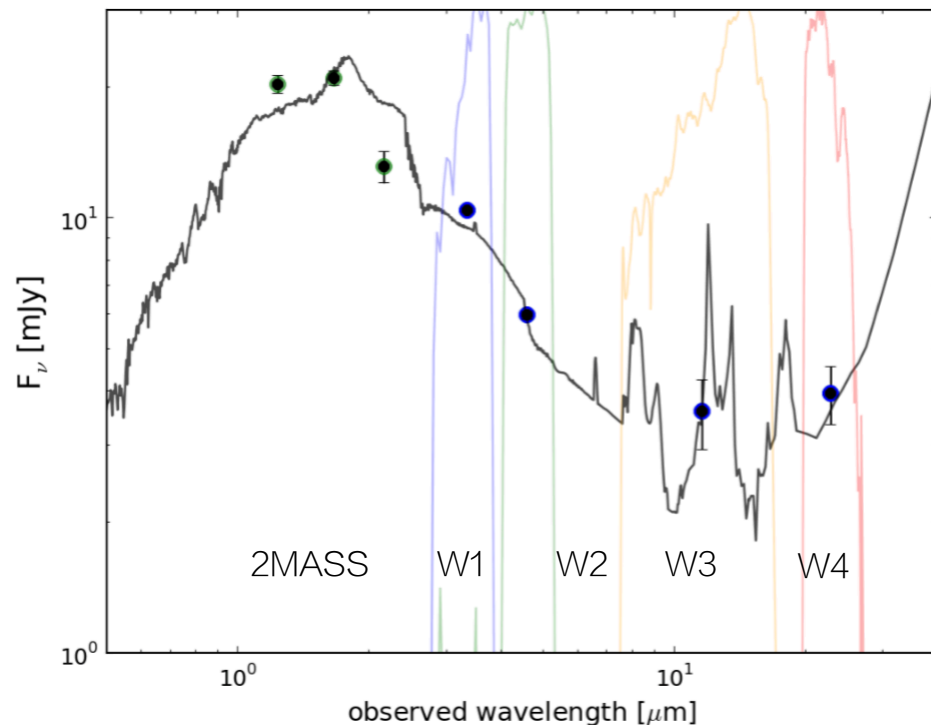
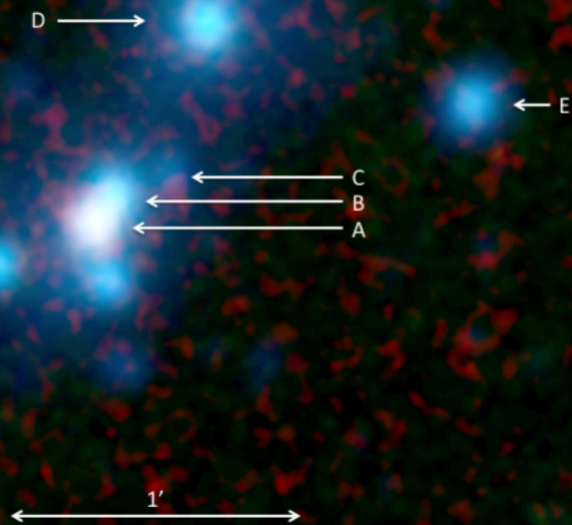
The Host Galaxy

The best-fit SED: S0-type (lenticular) galaxy

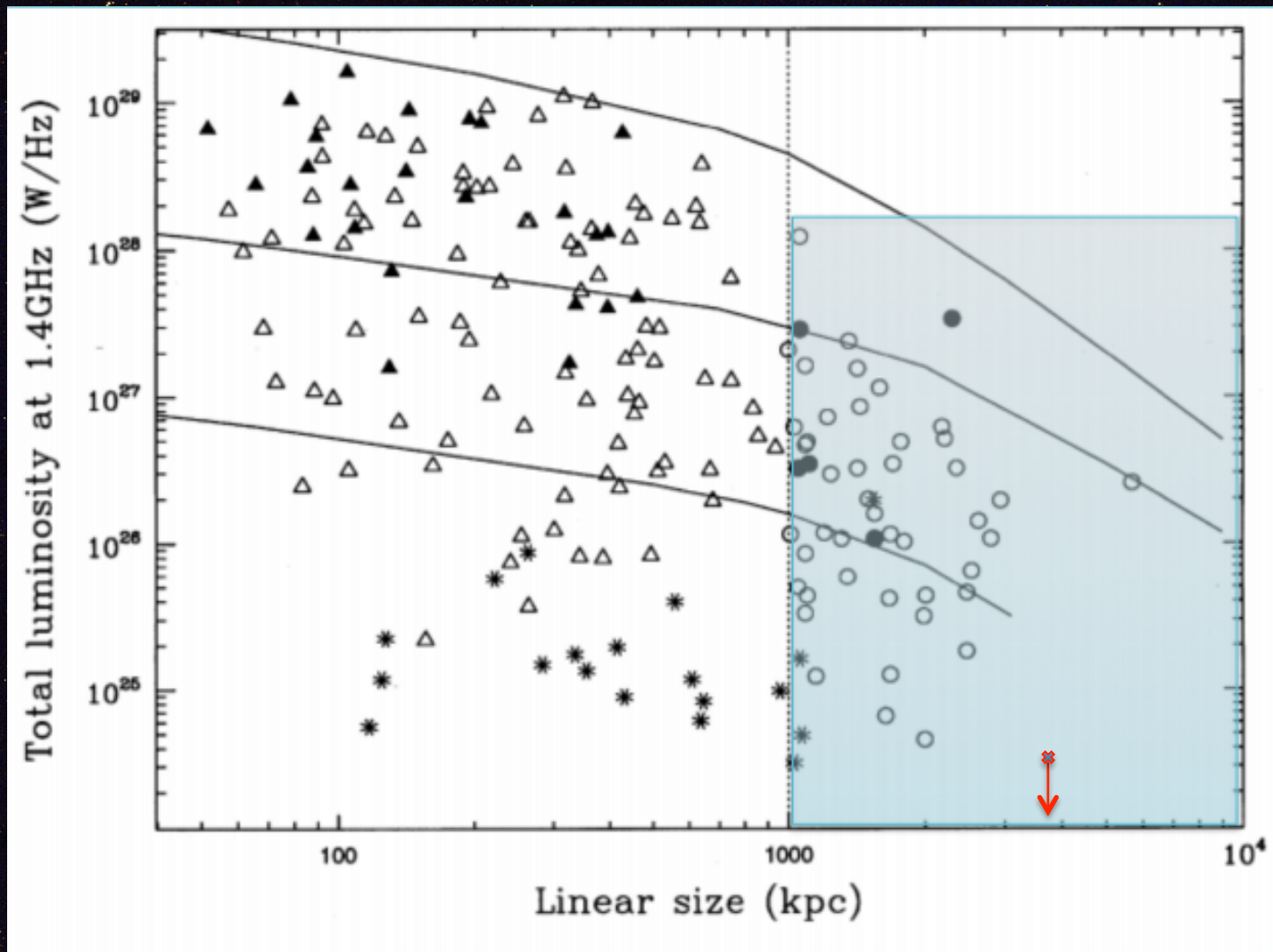
- elliptical appearance in SDSS
- massive stellar component
- infrared excess due to polycyclic aromatic hydrocarbons and warm dust emission



Thanks to Tom Jarrett for the WISE analysis

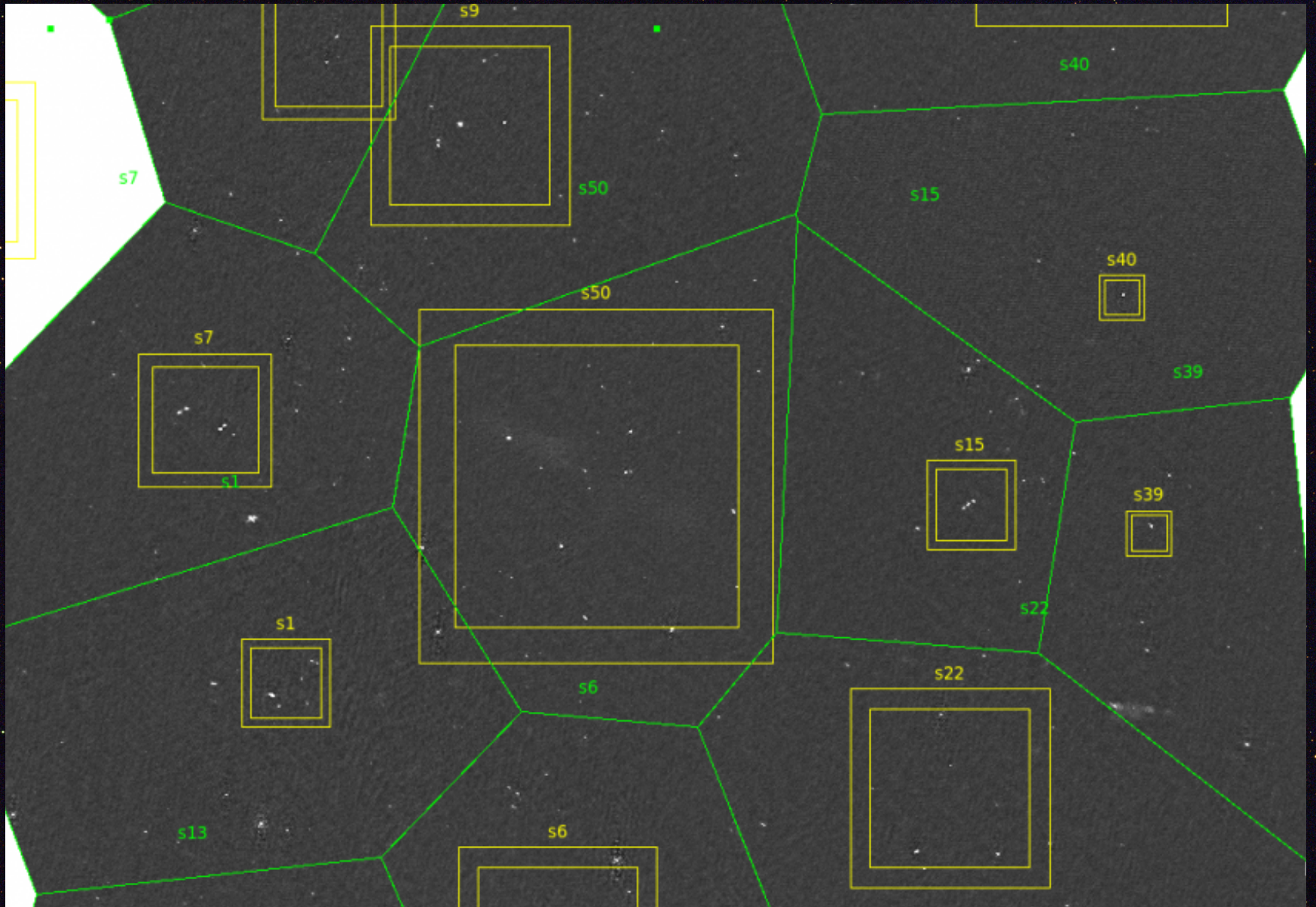


Low Luminosity FR-II

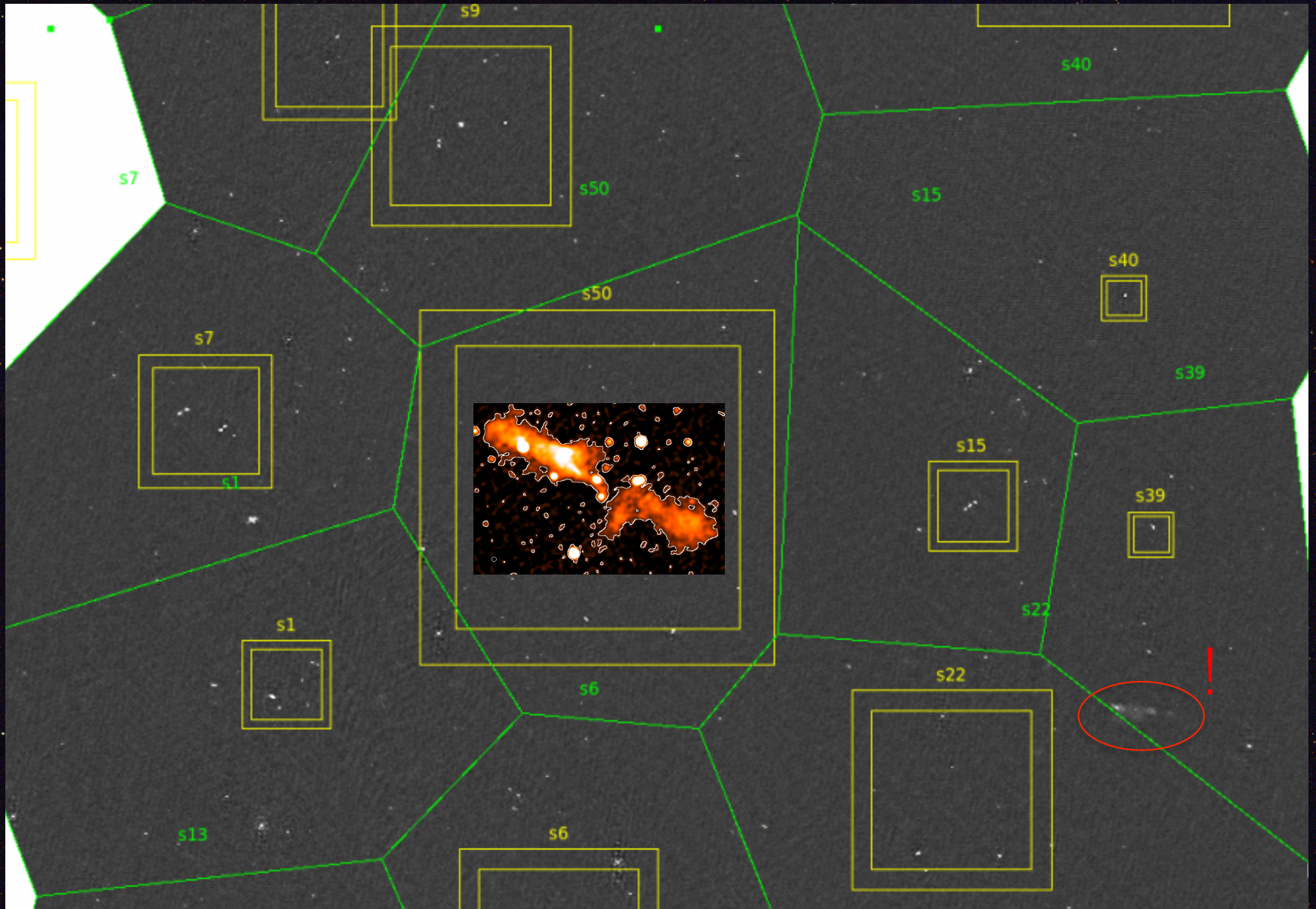


C. H. Ishwara-Chandra 2001
+ evolutionary models from Kaiser et al 1997

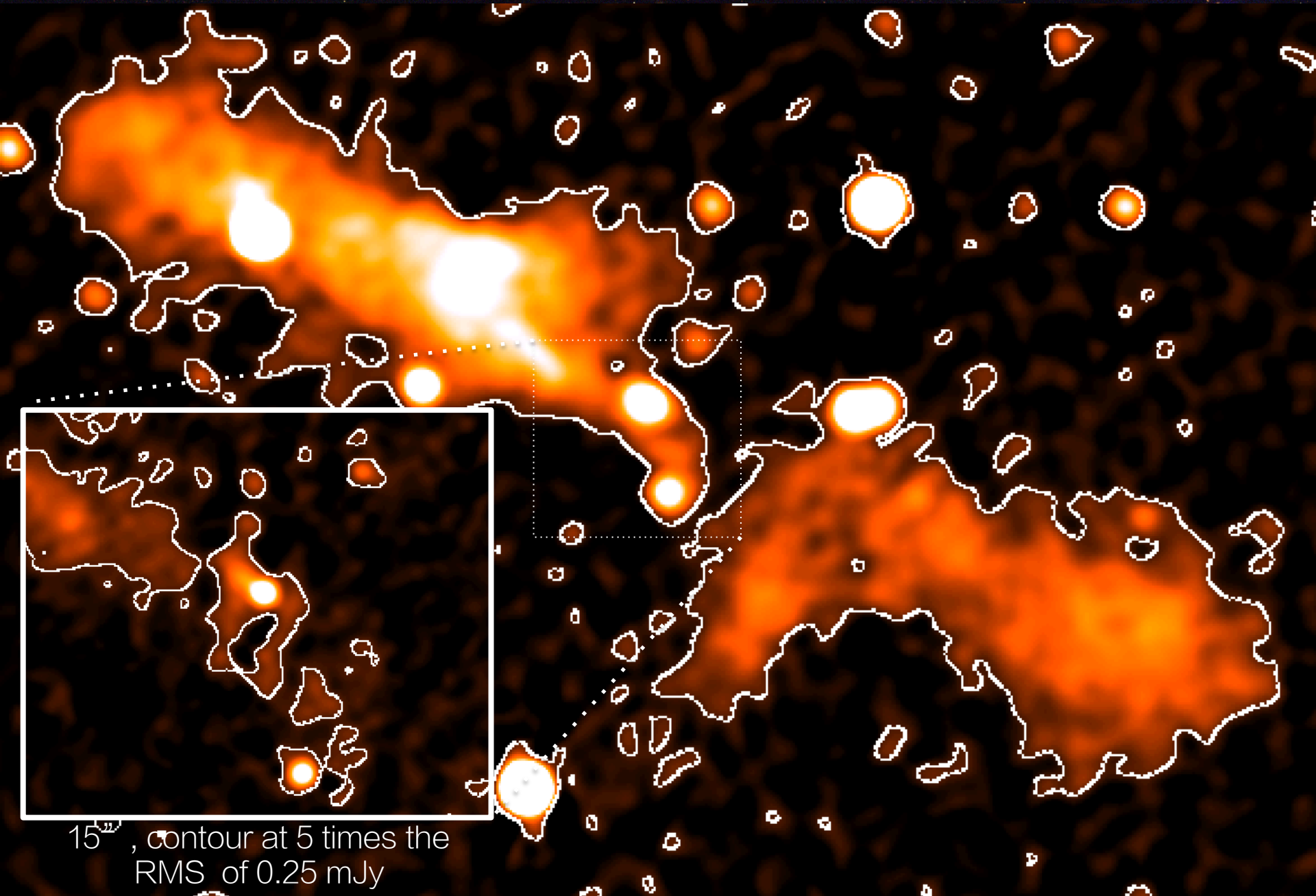
LOFAR: FACET Calibration



LOFAR: FACET Calibration



40" , contour at 5 times the RMS noise of 0.65 mJy



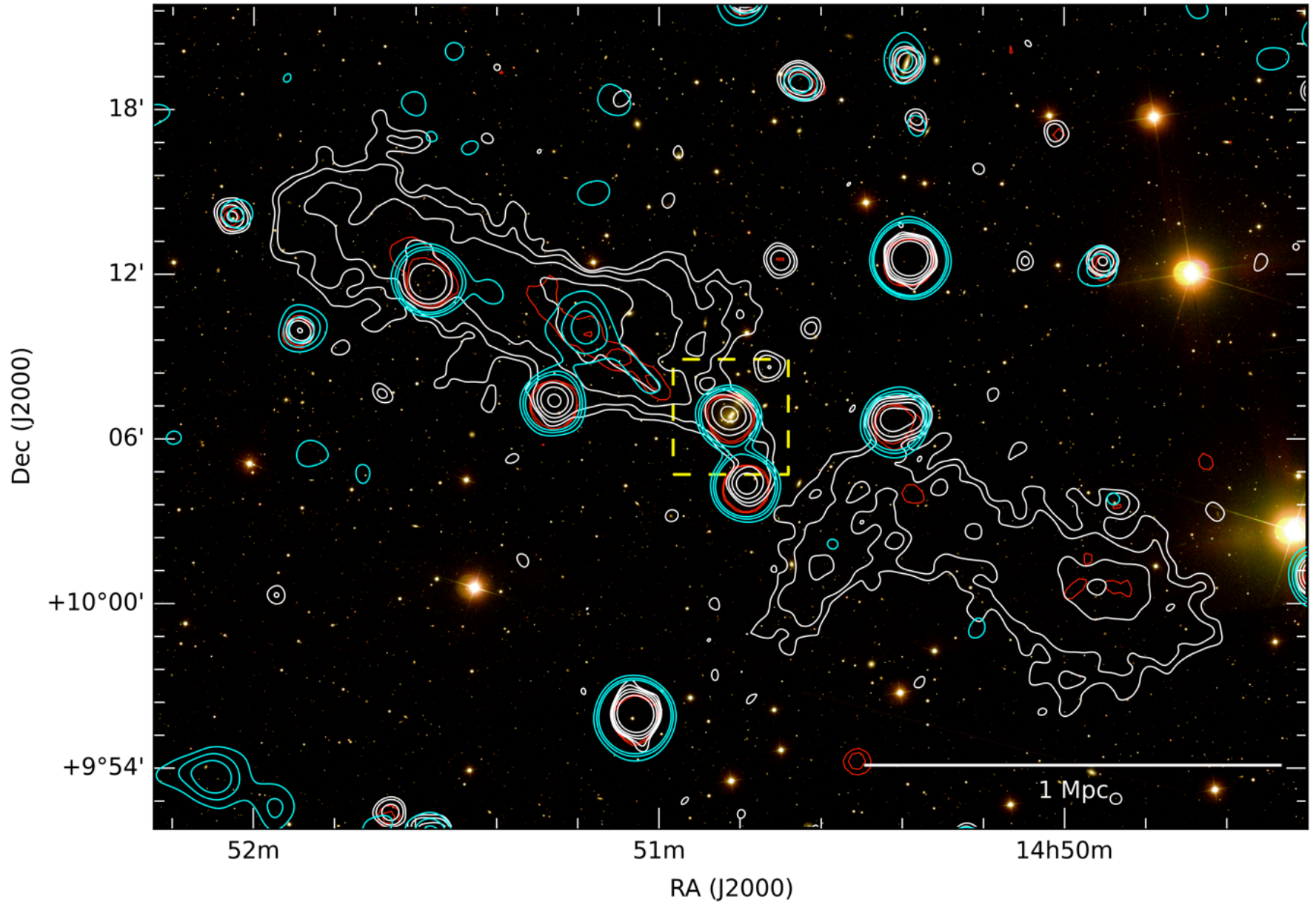
15" , contour at 5 times the
RMS of 0.25 mJy

LOFAR + GMRT + NVSS

LOFAR (40'') : 3,5,10,20,50,100 x RMS noise

GMRT (1'') : 3, 5, 7 x RMS noise

NVSS (45'') : 3, 5 x RMS noise



Summary of Properties

Morphology: FRI/FRII

Host: Massive broadline galaxy

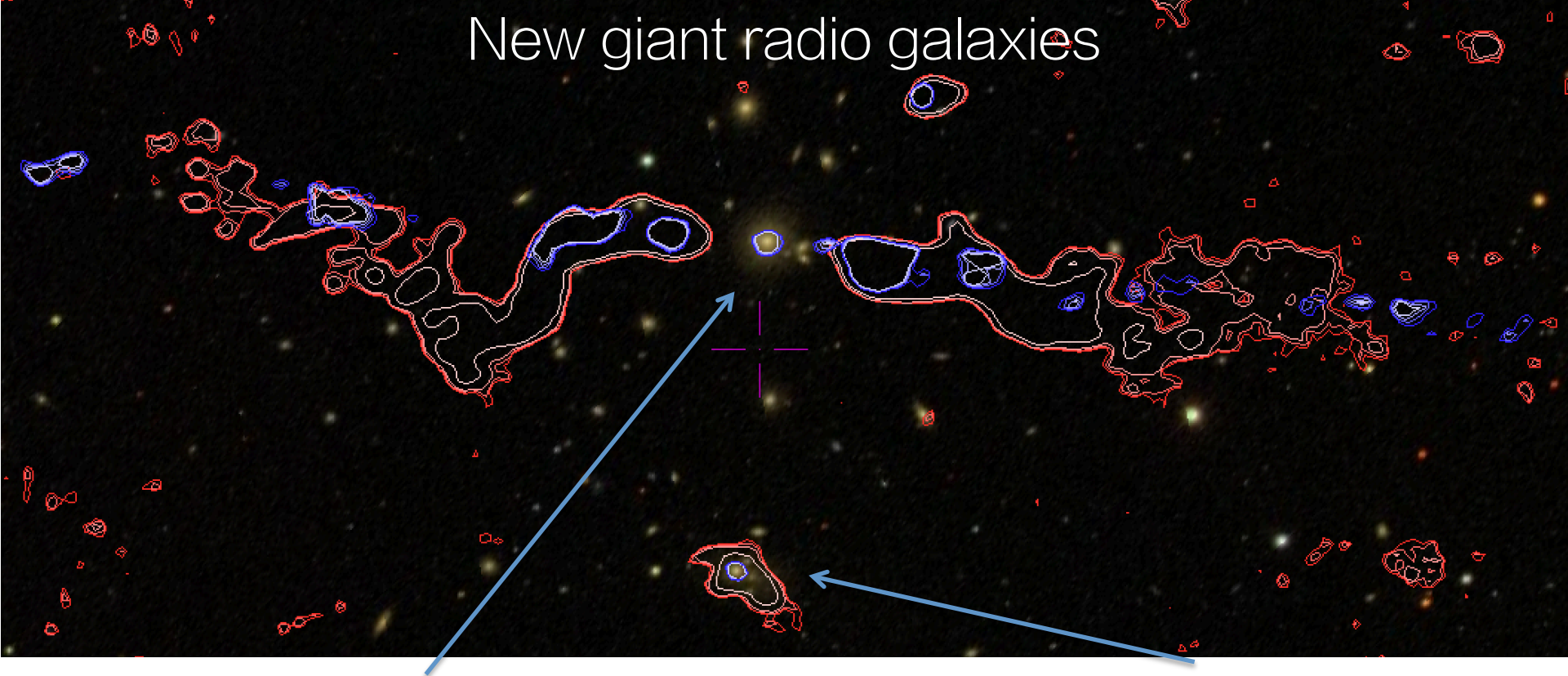
Log(stellar mass) = 11.56 (W1-W2 colour)

= 11.37 (SDSS)

Environment: Small galaxy group with merger evidence and tidal interactions

Radio lobes and star formation triggered by recent merger

New giant radio galaxies

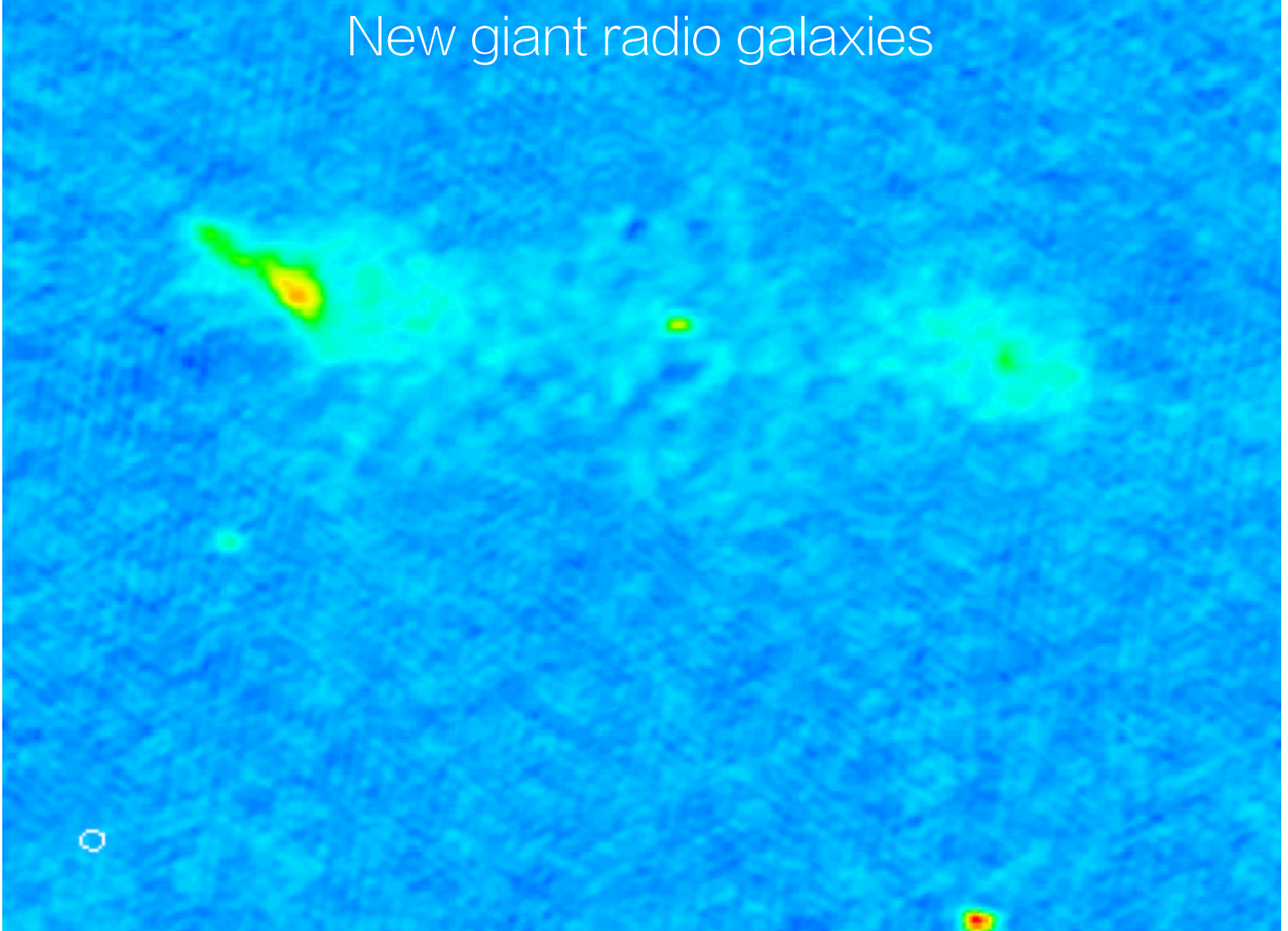


Another new GRG
1.1 Mpc
Redshift 0.07

Recently started radio
galaxy?
Redshift 0.1

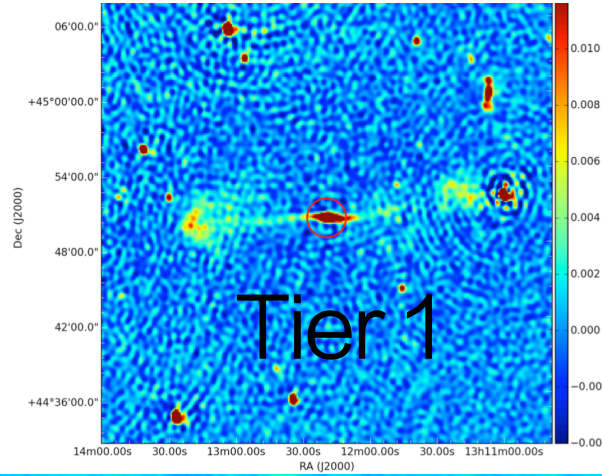
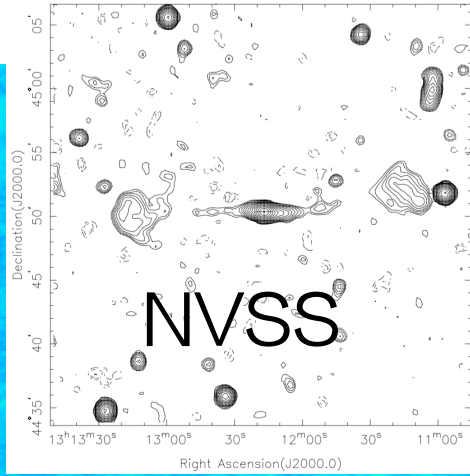
LOFAR (10") contours in red at 3, 5, 10 x RMS noise
FIRST (4") contours in blue at 3, 5, 10 x RMS noise

New giant radio galaxies

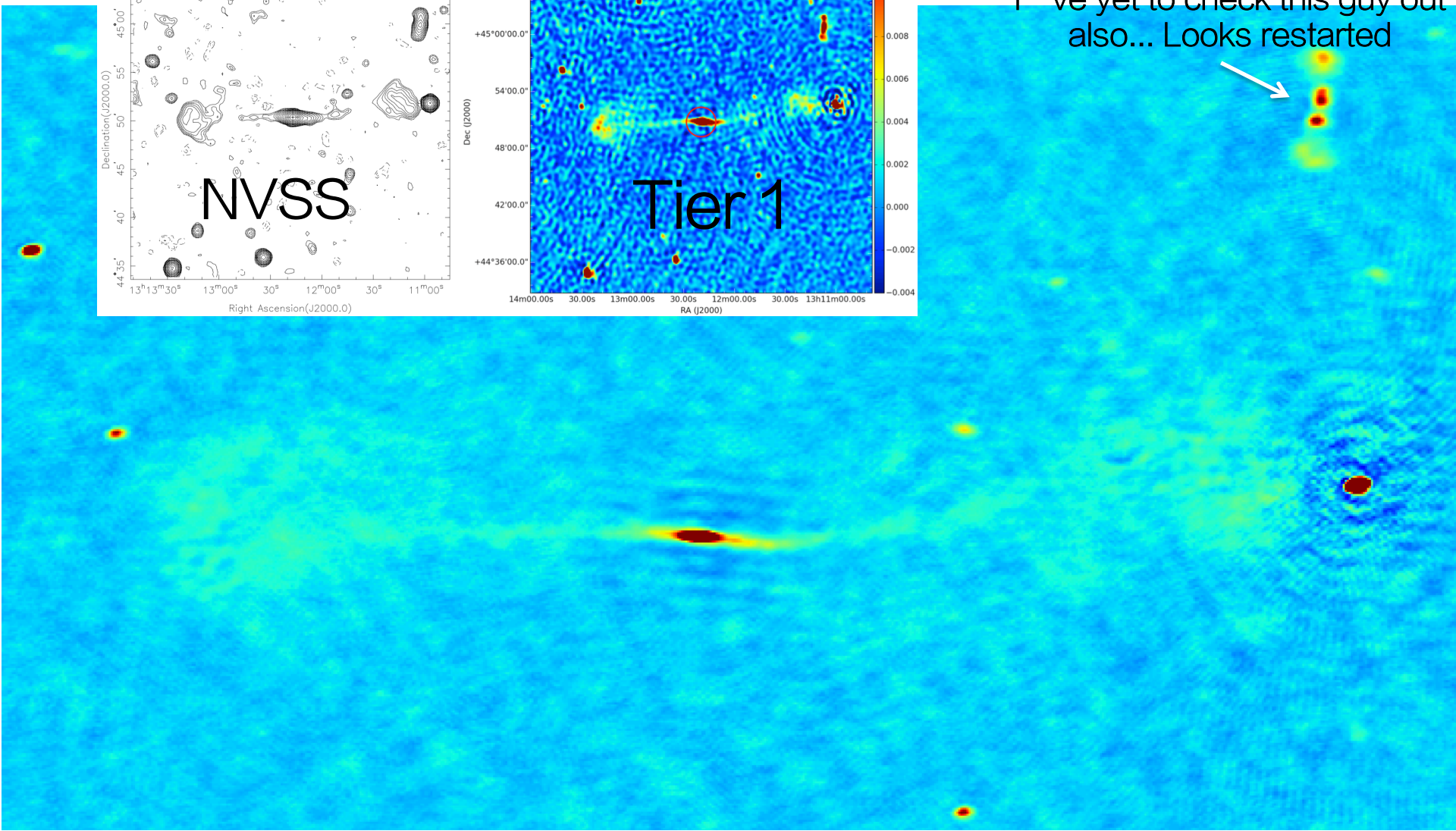


A facet from the 2.6 Mpc GRG field - another new GRG, ~1 Mpc
10" resolution

A facet from the A1682 field - this known ~ 1 Mpc GRG comes out very nicely at 10 arc second resolution

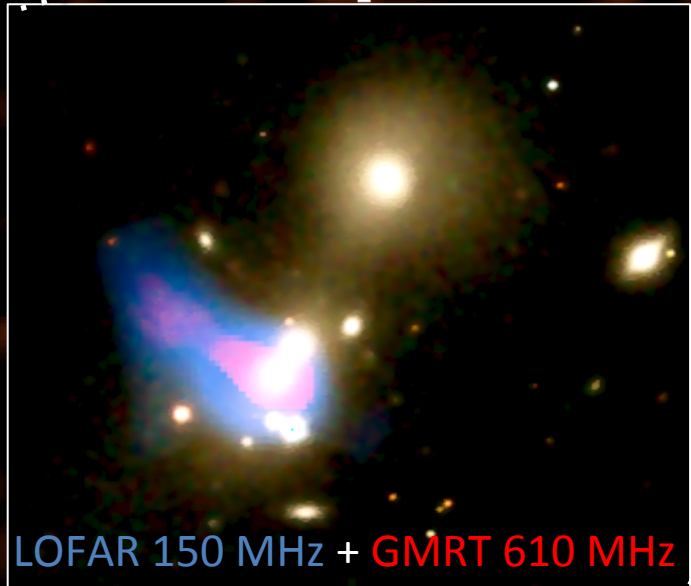


I've yet to check this guy out also... Looks restarted



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- Discovery paper coming out soon - investigating MSSS data and SDSS properties
- Main LOFAR paper in preparation with spectral index analysis
- Complementary data from the GMRT, eMERLIN, EVN to be analysed + potential for X-ray



- Polarisation investigation have potential at low resolution