

## Introduction

Compact radio sources are usually unresolved in wide area surveys yet have a range of morphologies, including Fanaroff-Riley type-II (FR-II) like radio sources, can be resolved at mas resolution because of Very Long Baseline Interferometry (VLBI). Such sources could be at an early stage of their evolution or alternatively, they may be at the end of their life-cycle and are small due to being frustrated by the host galaxy interstellar medium.

## Methodology

- Selected compact FR II-like sources from mJIVE-20 and cross-matched with DESI optical data; analysed VLBI images to study morphology.
- Constructed radio SEDs from multi-frequency fluxes and fitted power-law or curved models to estimate spectral indices.
- Performed 2D Galfit Sérsic profile fitting on DESI r-band images to derive host galaxy structural parameters.  $I(R) = I_c \exp\left\{-b_n \left[\left(\frac{R}{R_c}\right)^{1/n}\right]\right\}$

## Results and Analysis

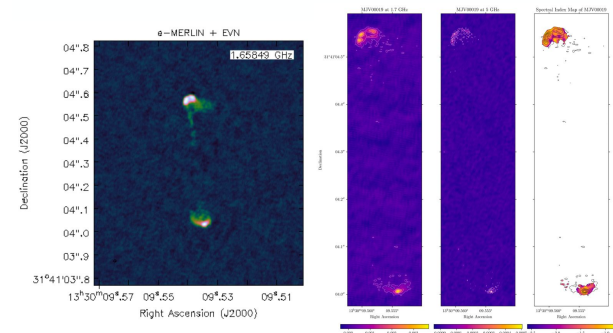


Fig.1 The e-MERLIN and EVN image at 1.7 GHz (Christiana Spingola & John McKean(2019))

- MJV05484-*z*phot = 0.62, Size: 1.8 kpc
- MJV09442-*z*spec = 1.75, Size: 3.2 kpc
- MJV09931- Size:  $\leq 3.4$  kpc
- MJV17491-Size:  $\leq 2.2$  kpc

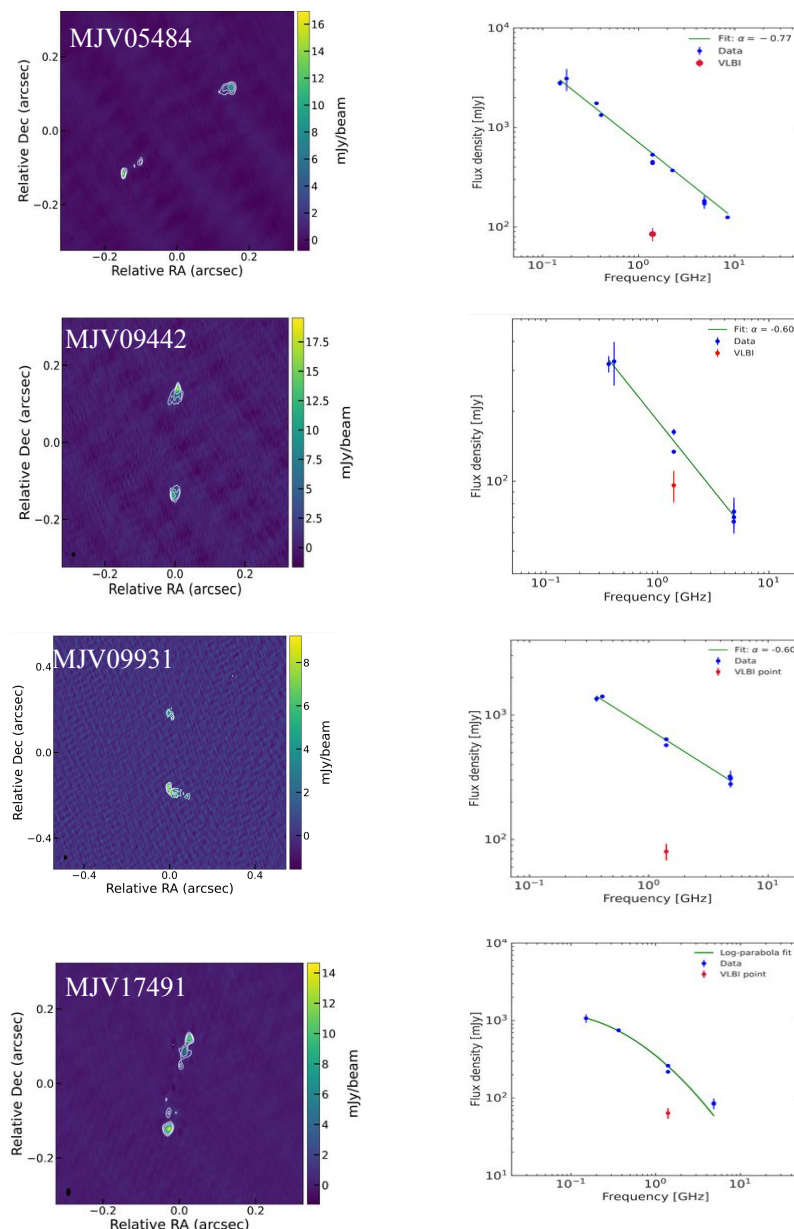


Fig. 2 VLBI Relative RA and DEC radio images(1.4 GHz) and SEDs counterparts

## Optical Imaging

| Source   | ID | RA (deg)   | Dec (deg) | $R_e$ (arcsec) | $n$   | $q = b/a$ | PA ( $^\circ$ ) |
|----------|----|------------|-----------|----------------|-------|-----------|-----------------|
| MJV05484 | 1  | 152.995604 | 25.249583 | 1.279          | 1.354 | 1.000     | 104.40          |
| MJV09442 | 1  | 122.263094 | 40.548942 | 0.743          | 0.655 | 1.000     | 158.89          |
| MJV17491 | 1  | 164.300378 | 20.025536 | 1.475          | 0.617 | 1.000     | 140.58          |

Table 1. Structural parameters derived from Sérsic profile fitting

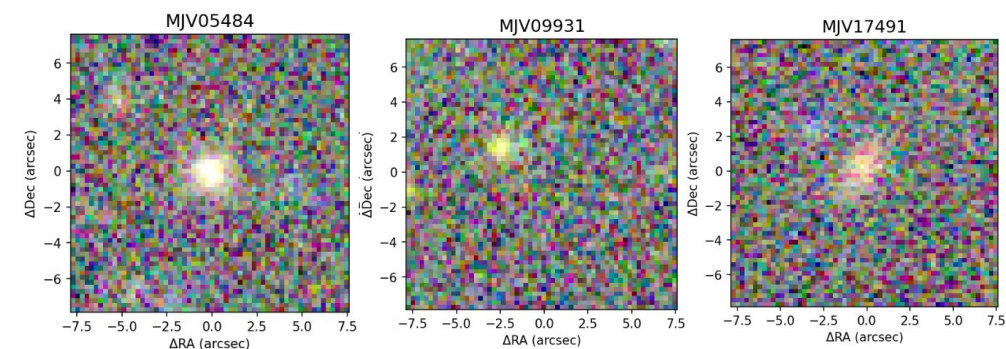


Fig. 3 Color Color diagrams(DESI i,r&z) bands

## Conclusions

- Morphologically these sources look like MSOs
- The host galaxies are disk-like or circular.
- This shows that unresolved radio sources can hide important AGN evolutionary stages.
- Follow up observations (Proposal Code: EM183/E25Ao21)
- Approved with EVN and e-MERLIN at 1.7 and 5 GHz.

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