Study of background radio sources in M31's field of view

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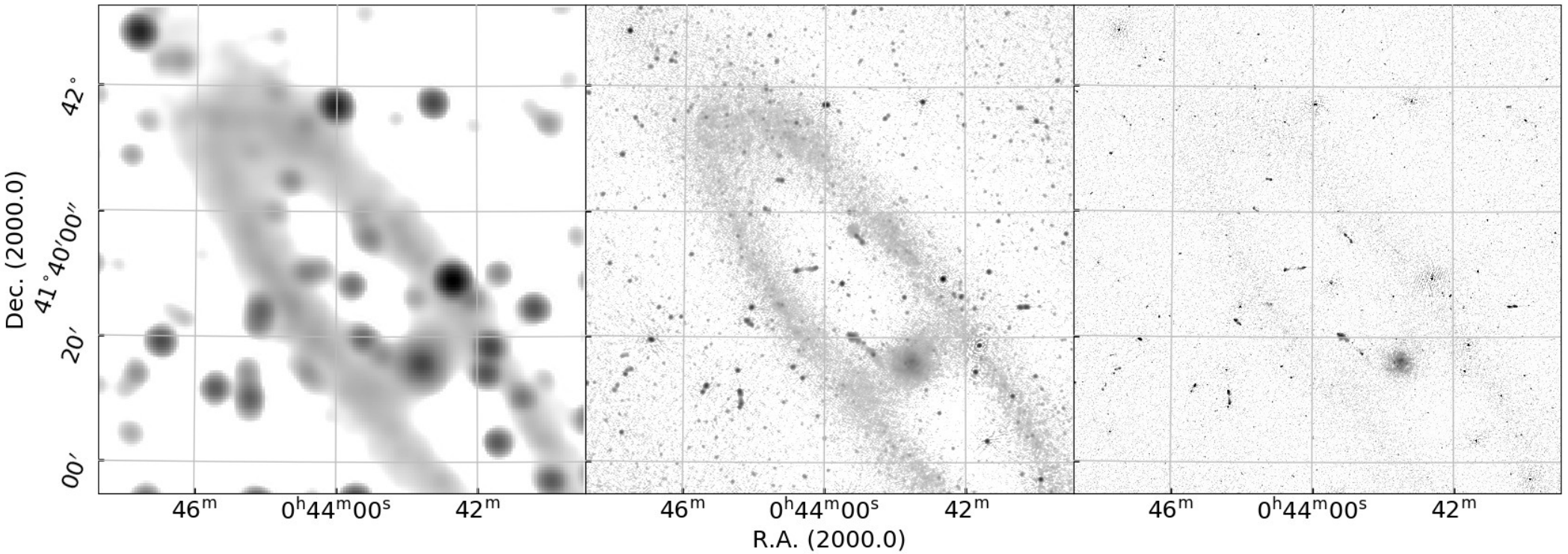
M31 in three resolutions

Low resolution
1.4 arcmin

Intermediate resolution
20 arcsec

high resolution
5 arcsec



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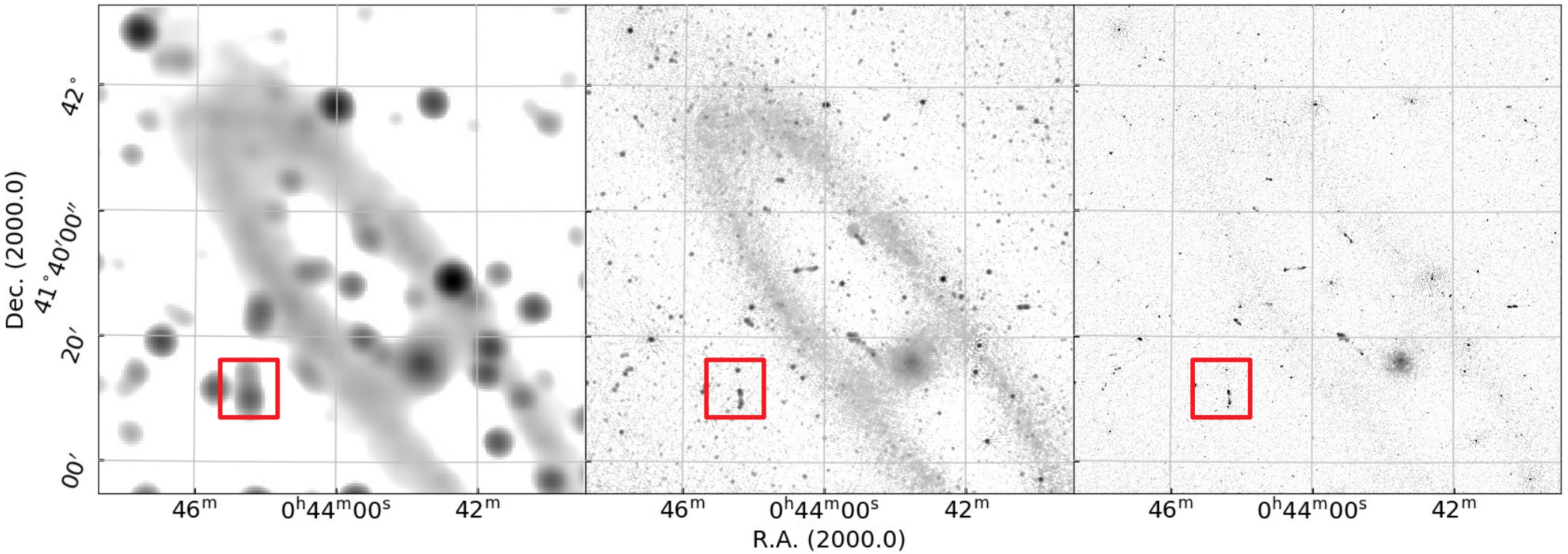

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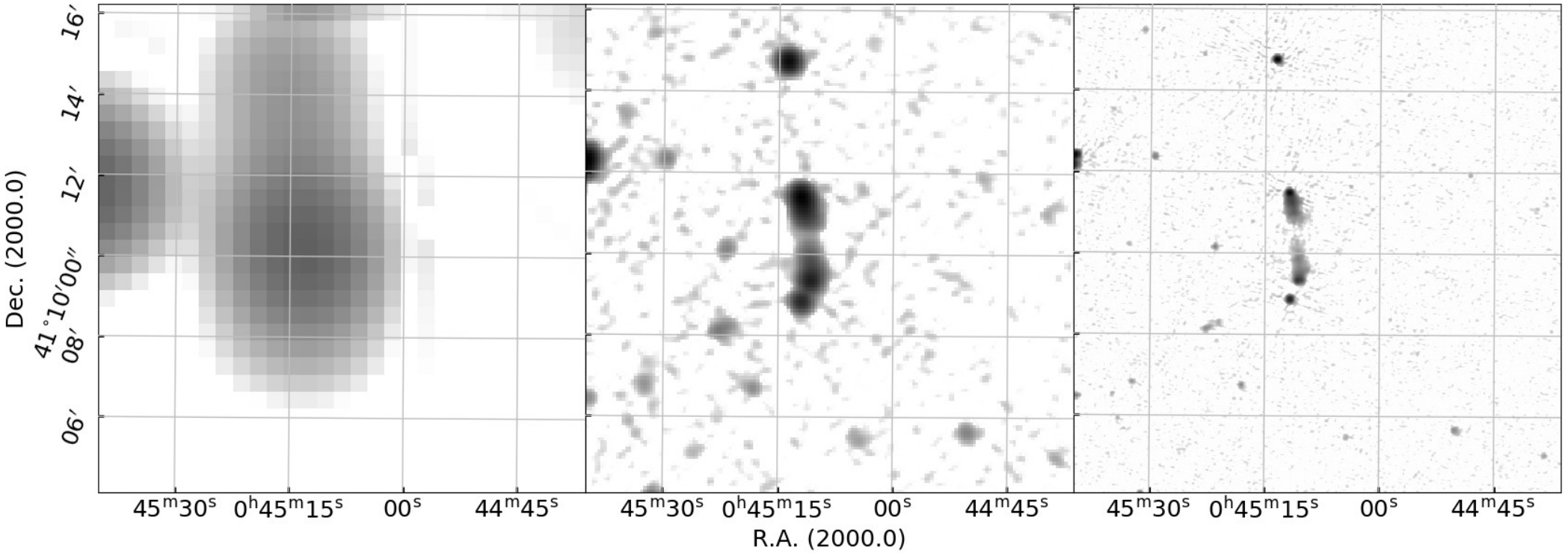
Small scales in three resolution

Low resolution
1.4 arcmin

Intermediate resolution
20 arcsec

high resolution
5 arcsec

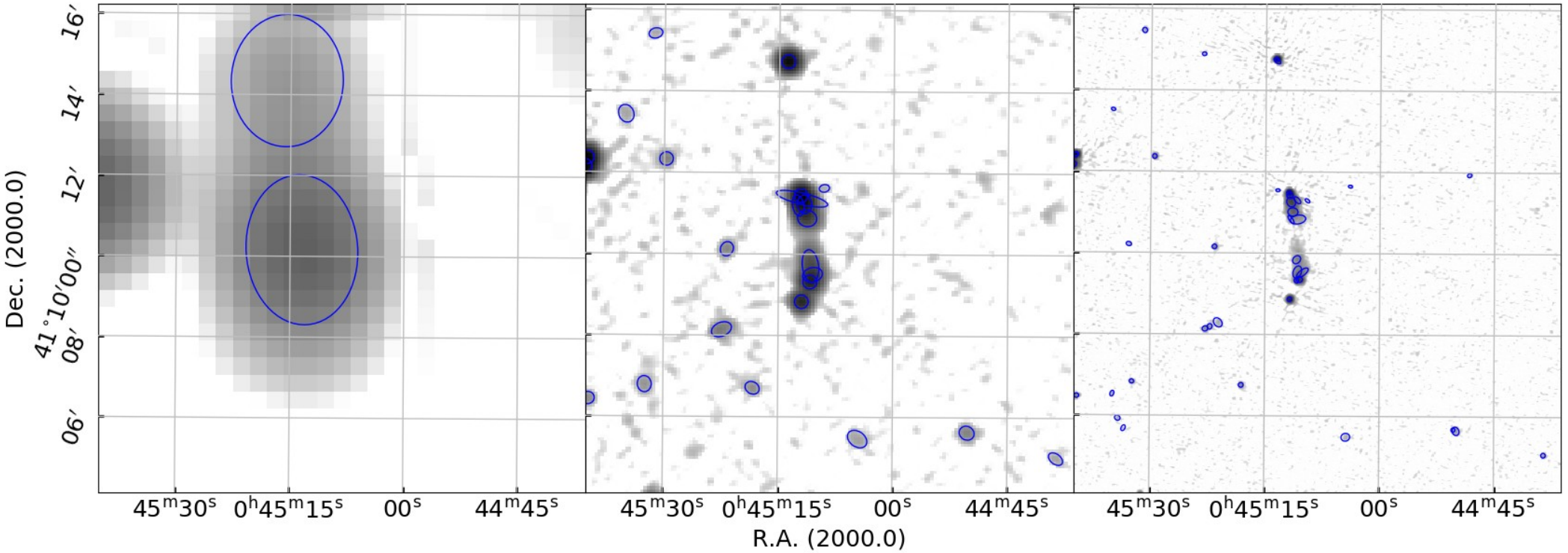


Decomposition into Gaussian sources with PyBDSF

Low resolution
1.4 arcmin

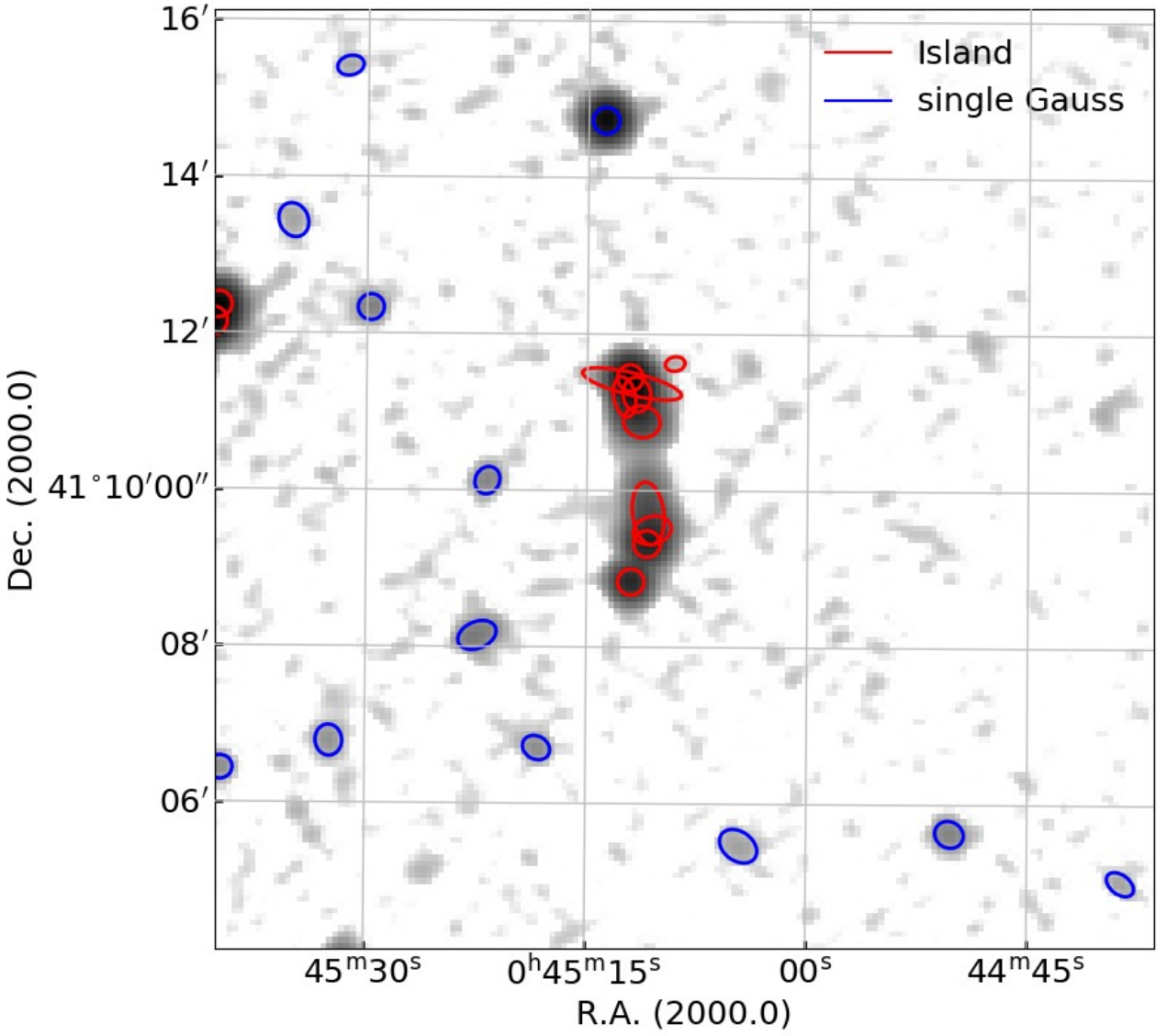
Intermediate resolution
20 arcsec

high resolution
5 arcsec

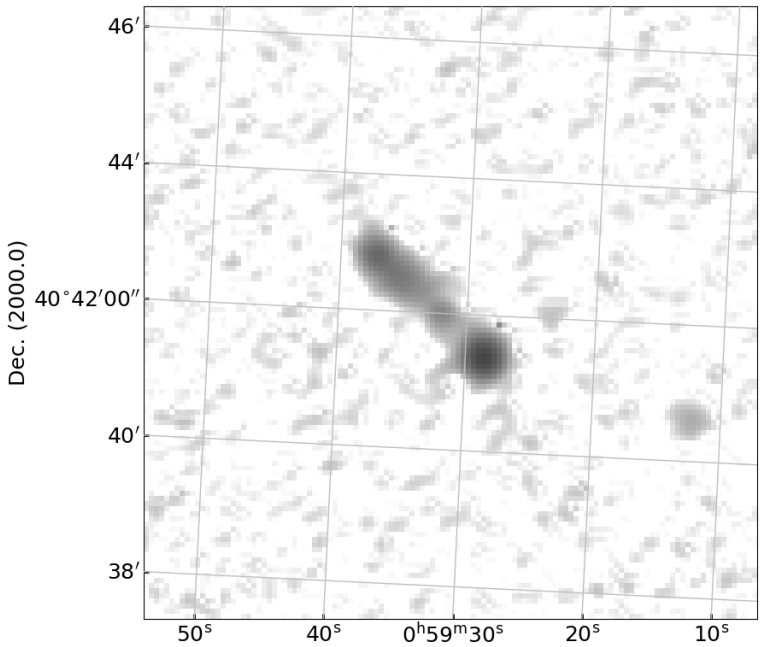


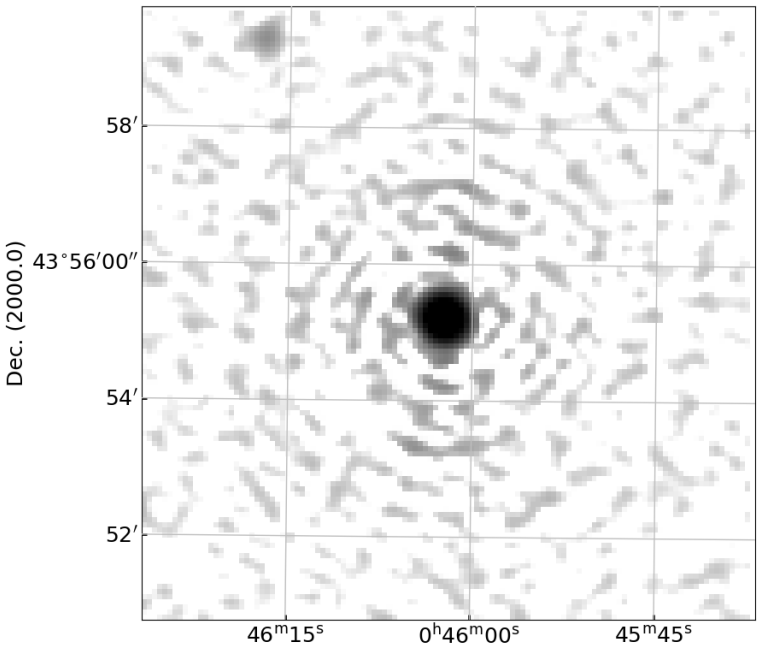
Results with PyBDSF

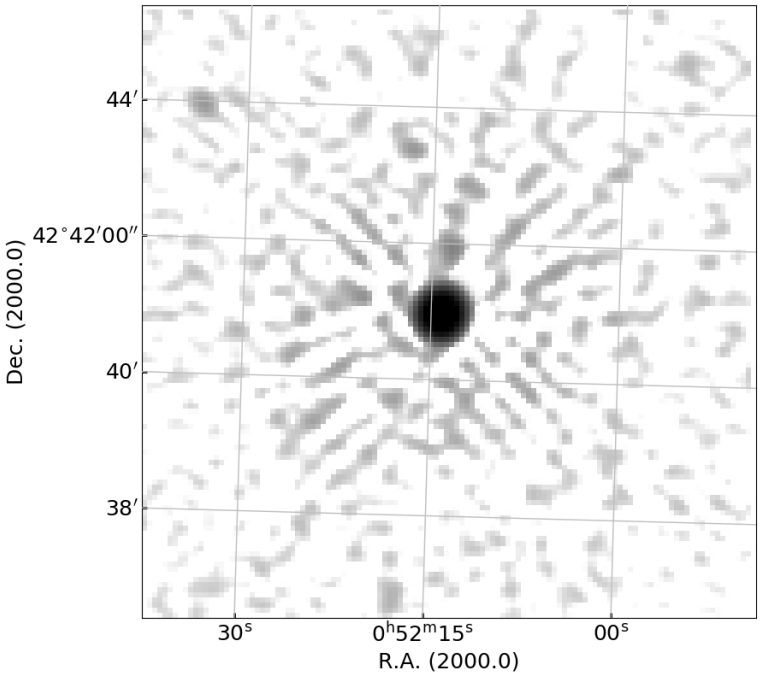
- Single Gaussian components
- Islands of multiple Gaussian components

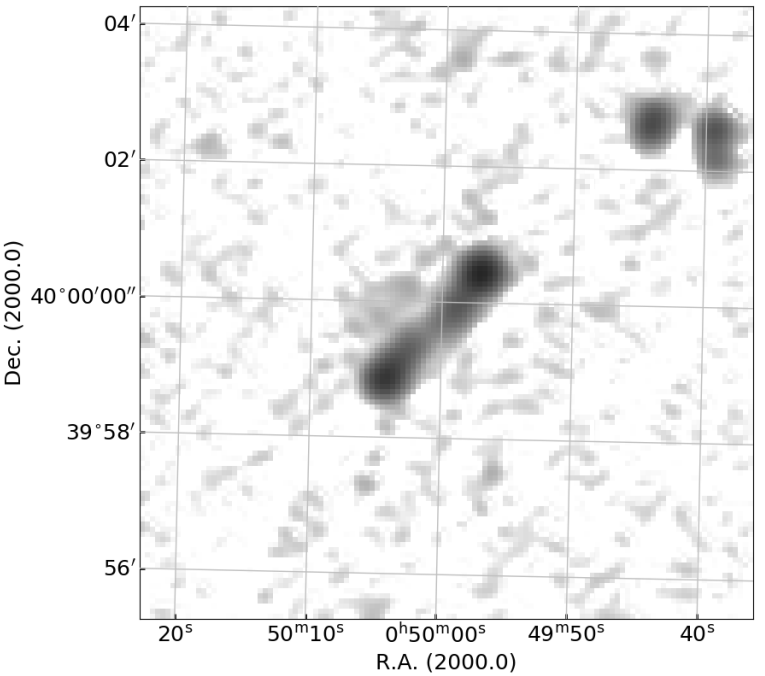


Point source or Jets?









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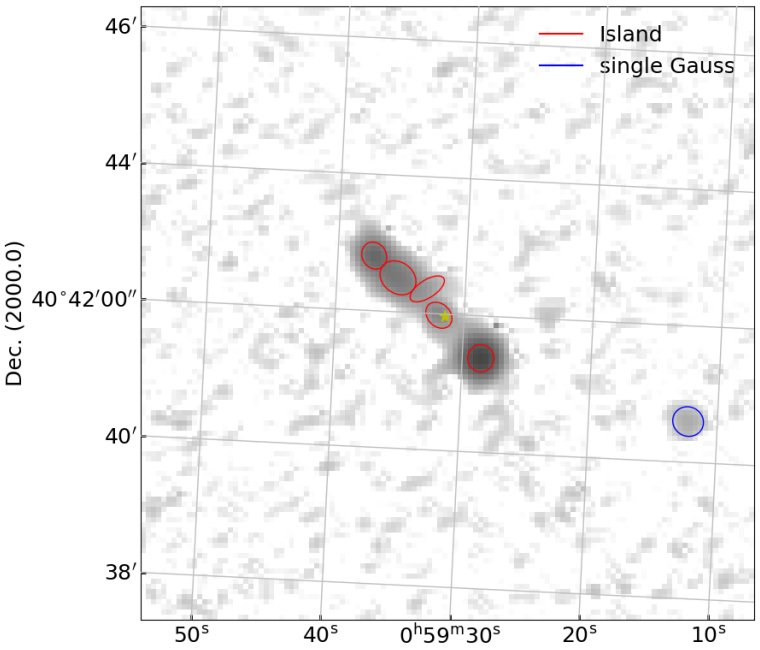
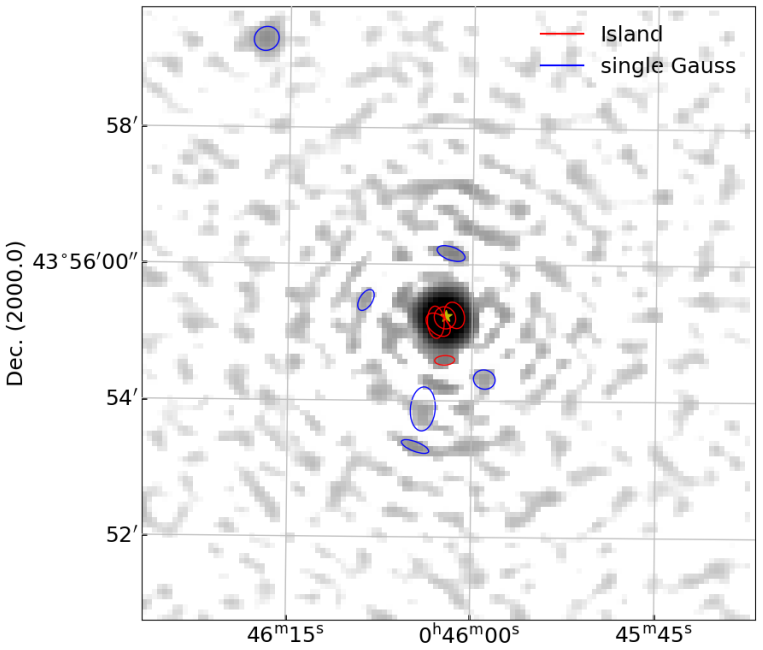
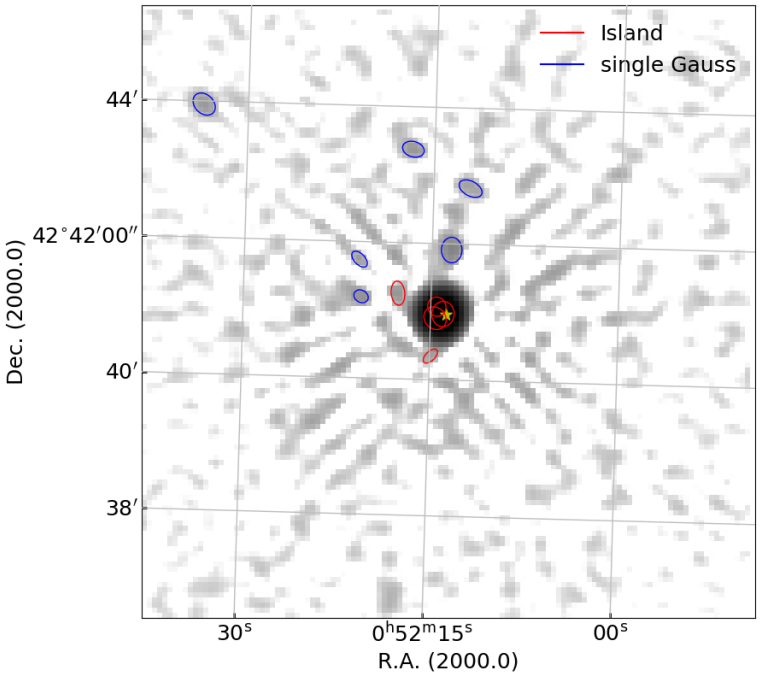
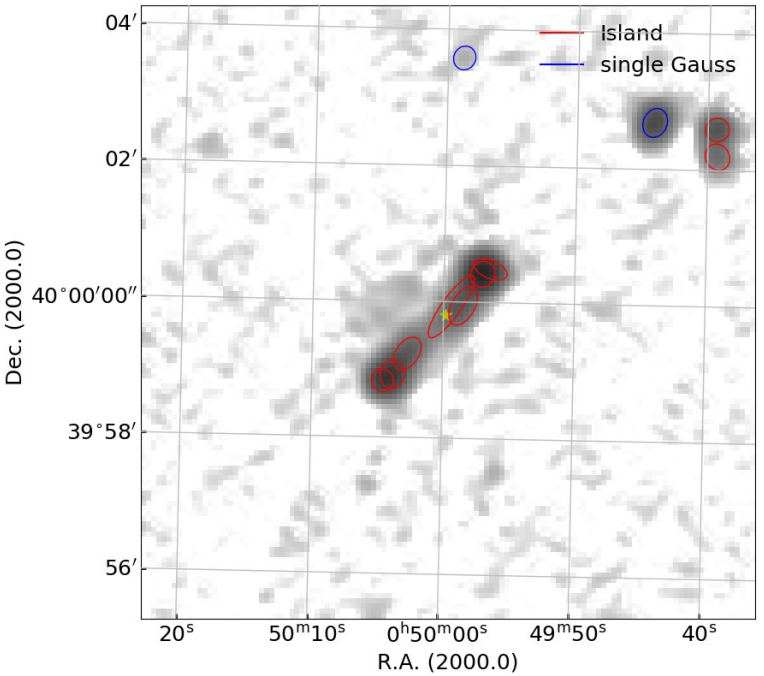
Point source or Jets?









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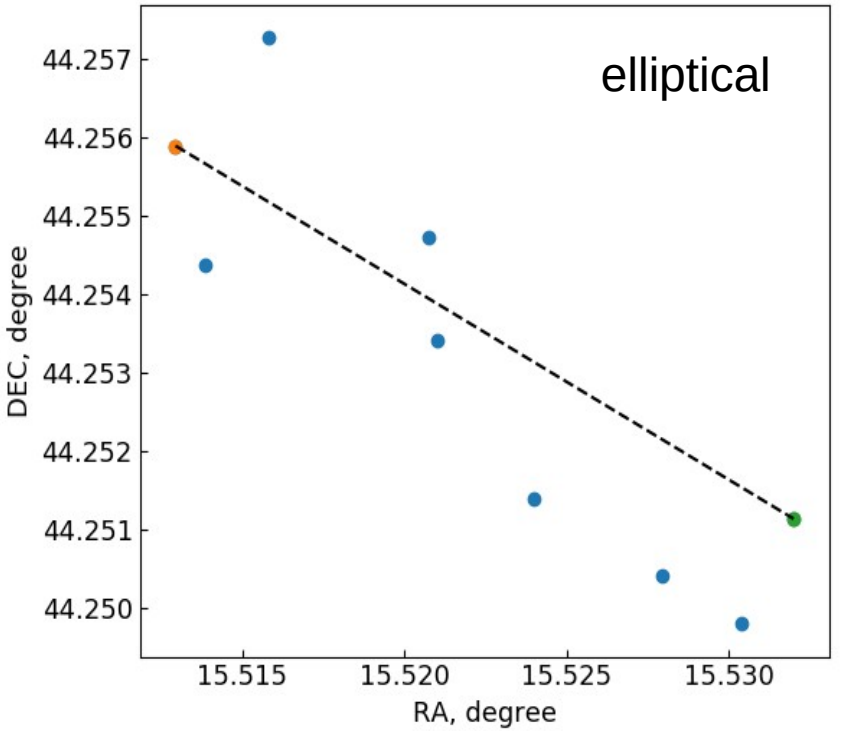
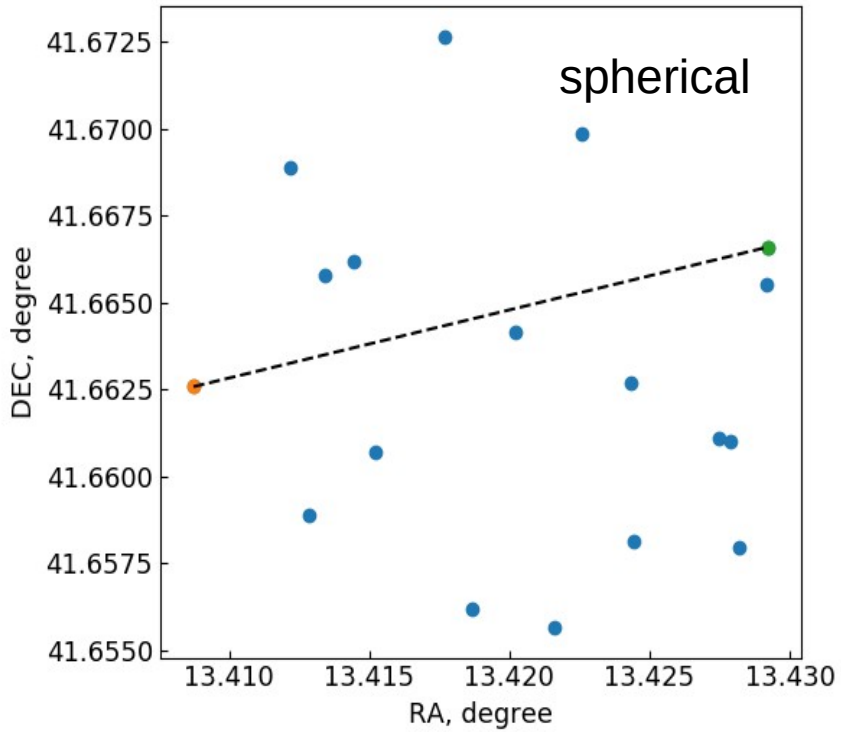
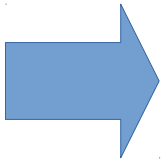
Simple selection criteria

- Number of islands
- Distance between islands
- Ellipticity of Gaussian position

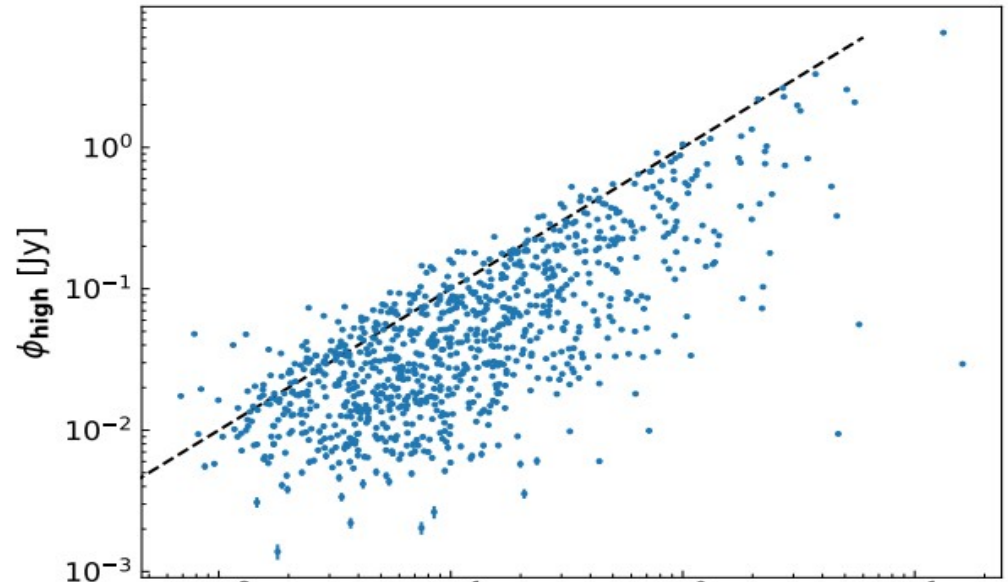


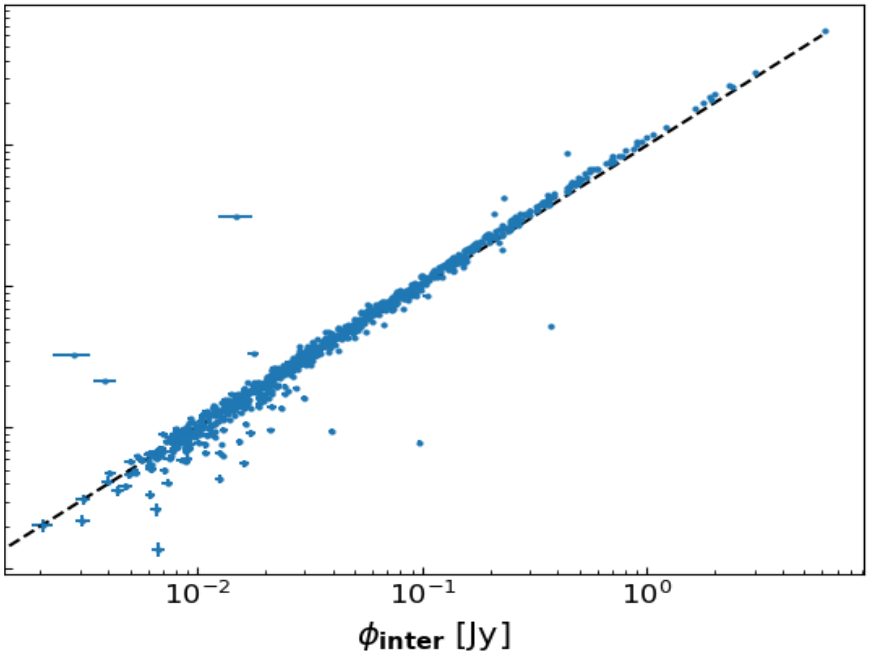


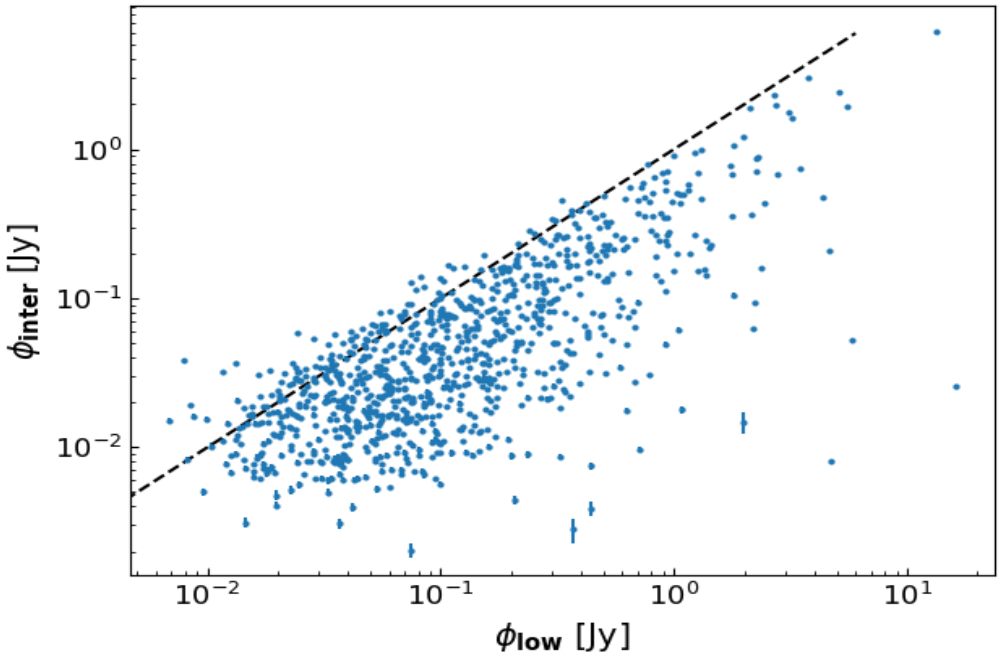


- Select 6689 point sources + 200 jets

Comparison: flux of the 3 resolutions

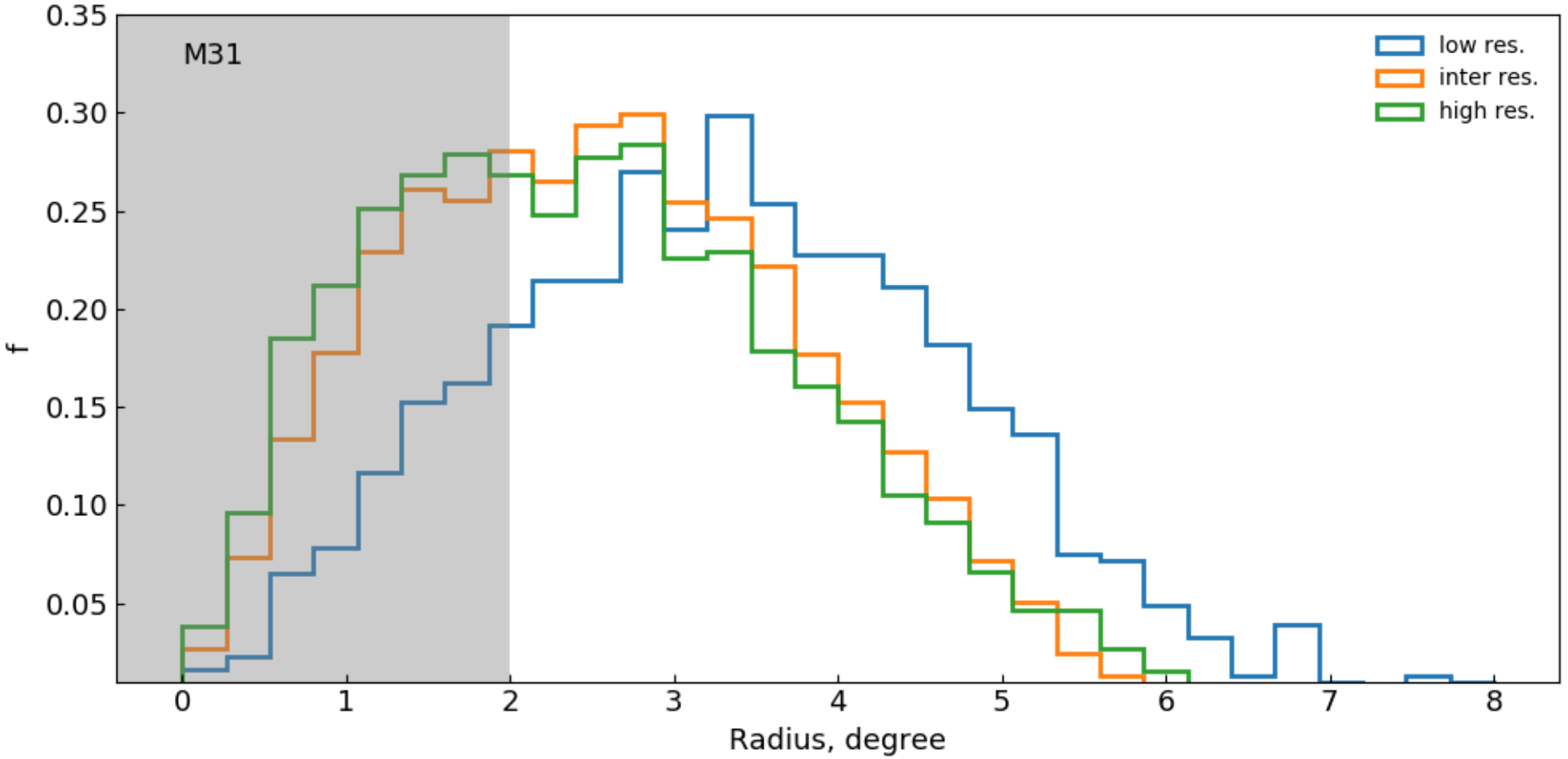






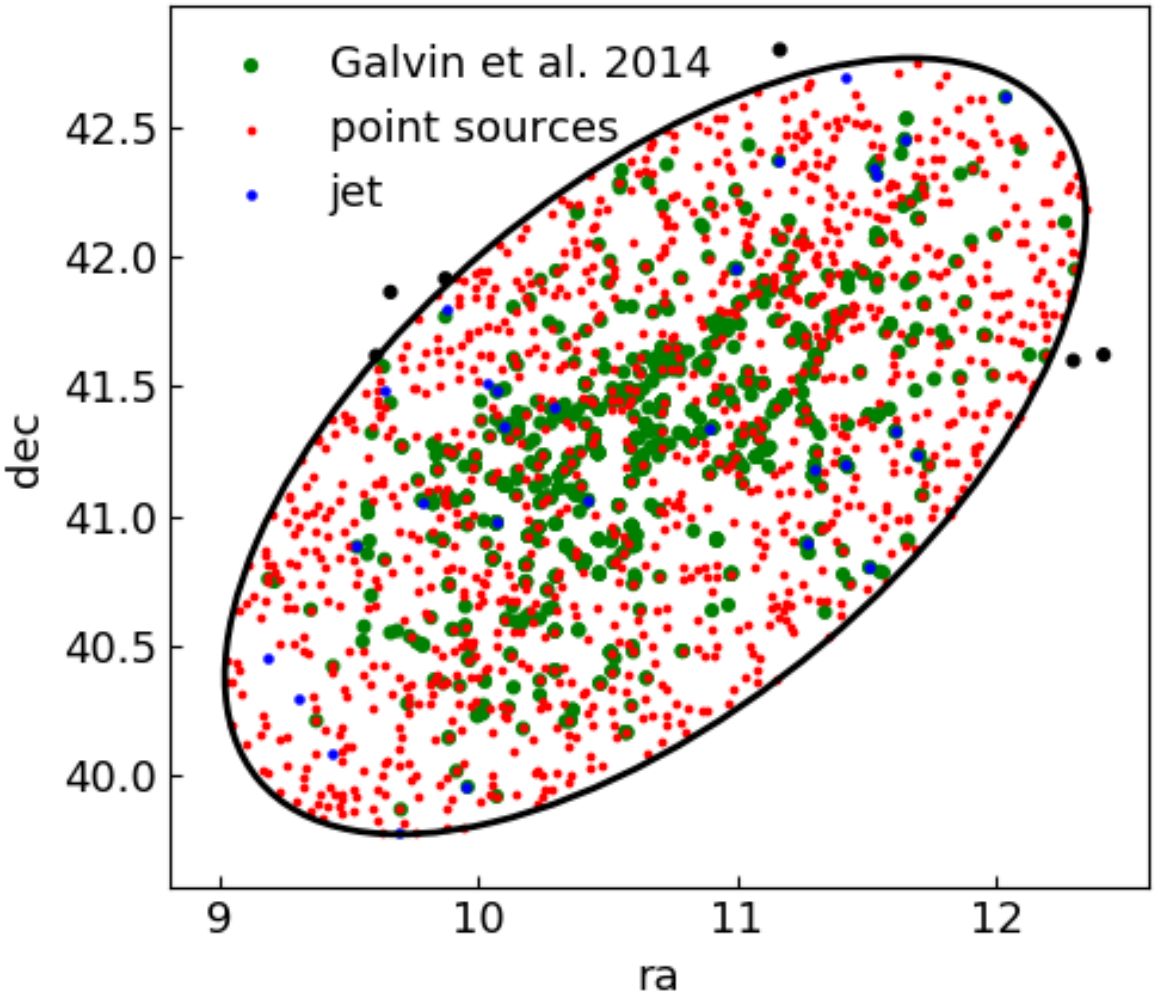
- under estimation in high resolution
- Good agreement for intermediate and high resolution

Radial dependency



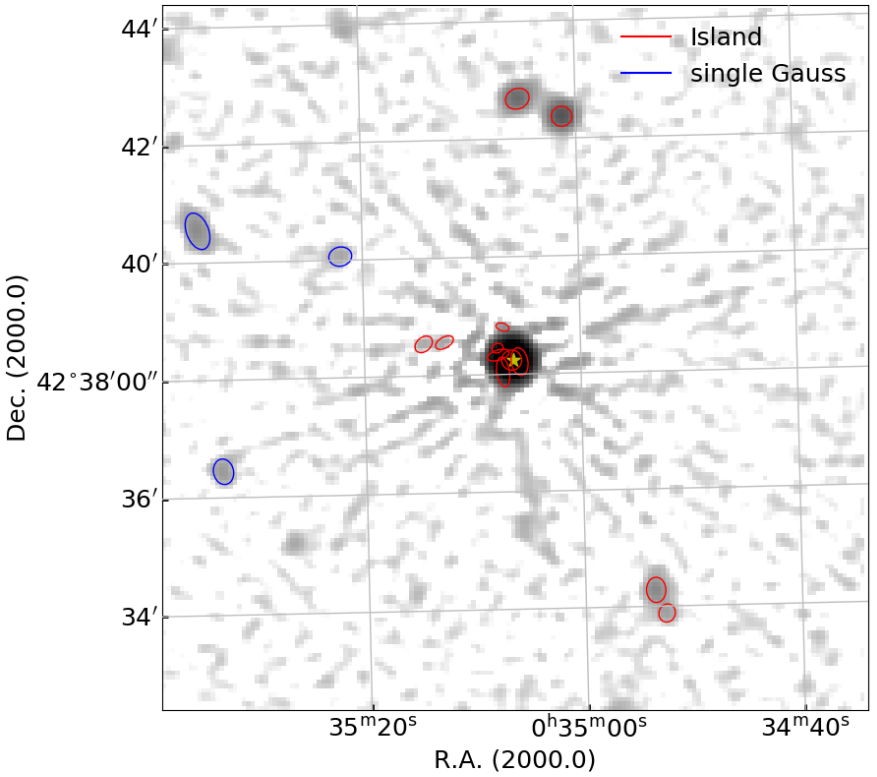
Cross-match with other radio observation

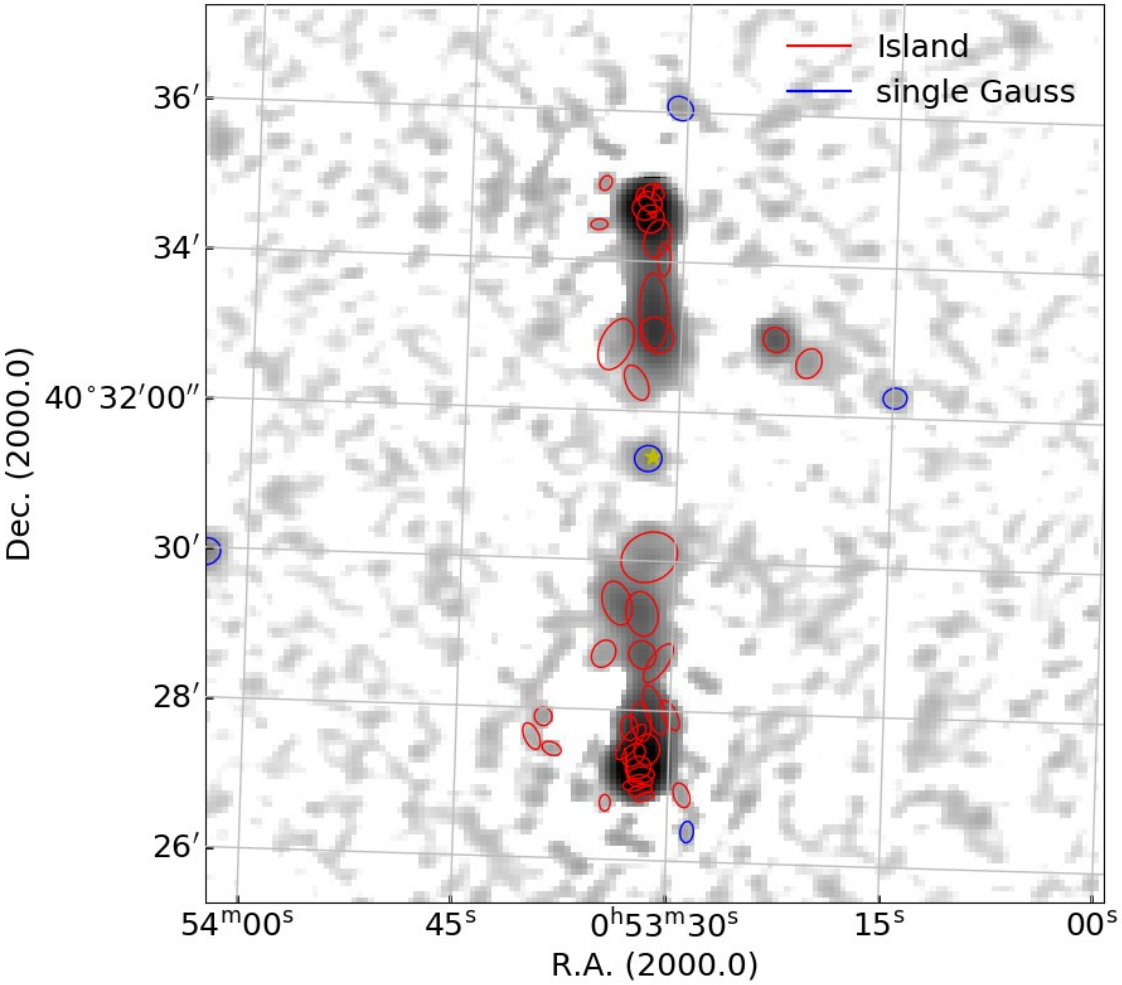
- Galvin et al. 2014: 916 unique VLA radio sources at ~20cm
- With LOFAR: 1164 point sources and 29 jets
- ~10% agreement of point sources and ~50% for jets



Cross-match witch identified QSO around M31

- LAMOST: 35 QSO in LOFAR M31 field of view
- We detect: 22
- Only 2 with jets





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Summary

- Performed a **Gaussian decomposition** with PyBDSF
- *First* classification between **point sources** and **jets**
- **Cross-match** with previous works

Next steps

- Improve point source/jet classification and position finder
- Associate radio sources with observations in other wavelengths
- Multi wavelength study of star formation mechanisms

Thank you for your attention!

Questions?