

Source Finding

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NCRA-TIFR

About PyBDSF

Python Blob Detector and Source Finder (PyBDSF)

<https://github.com/lofar-astron/PyBDSF>

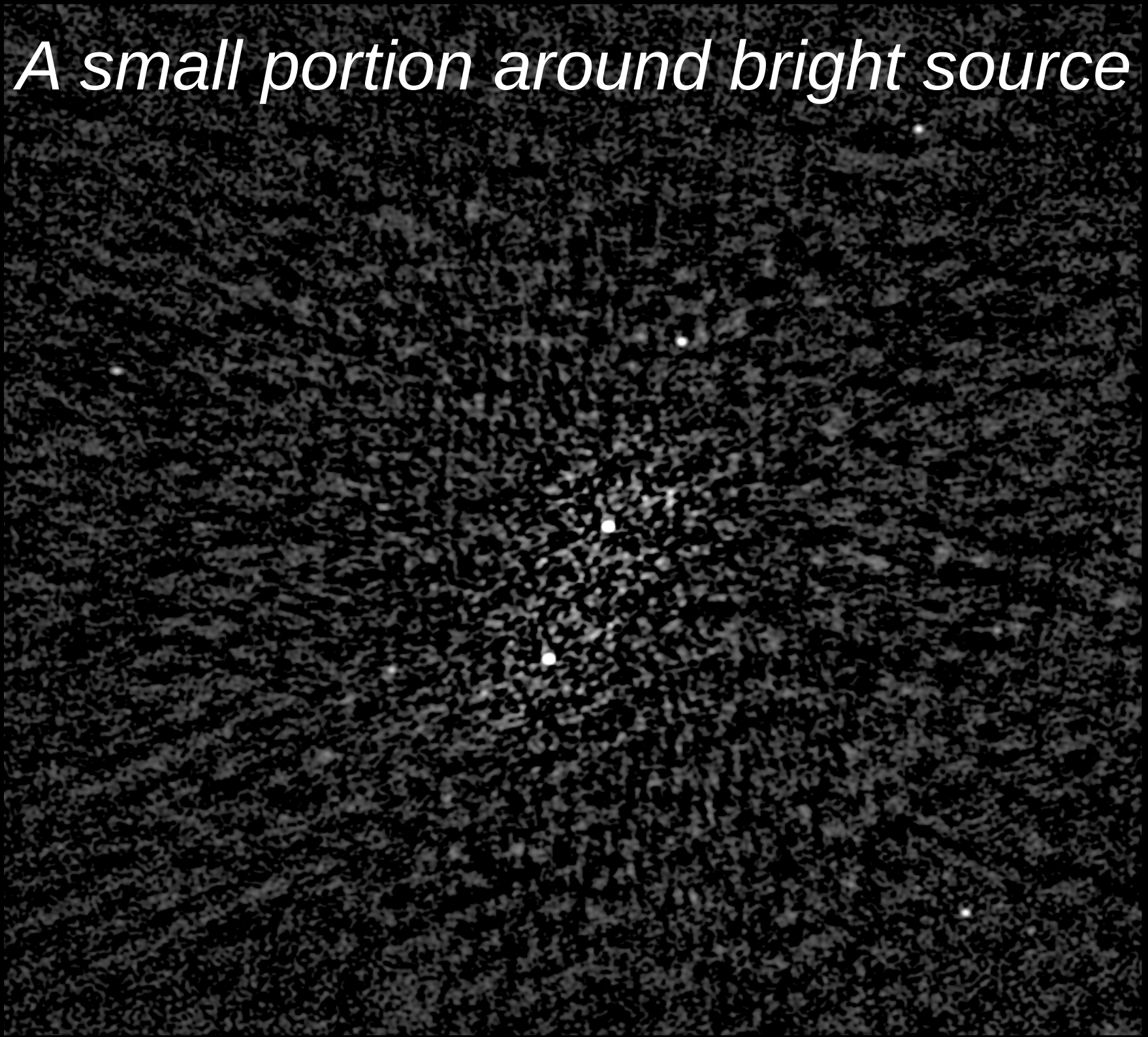
by Mohan, Niruj and Rafferty, David, 2015

is designed to decompose radio interferometry images into sources and make available their properties. PyBDSF can decompose an image into a set of Gaussians, shapelets, or wavelets..

AGEAN

AGEAN is another source finder, won't discuss

A small portion around bright source



Let us run PyBDSF
with default and
with advanced settings.

Default vs Advanced Options

Default parameters:

Total number of Gaussians fit to image .. : 714

Grouping Gaussians into sources

Number of sources formed from Gaussians : 649

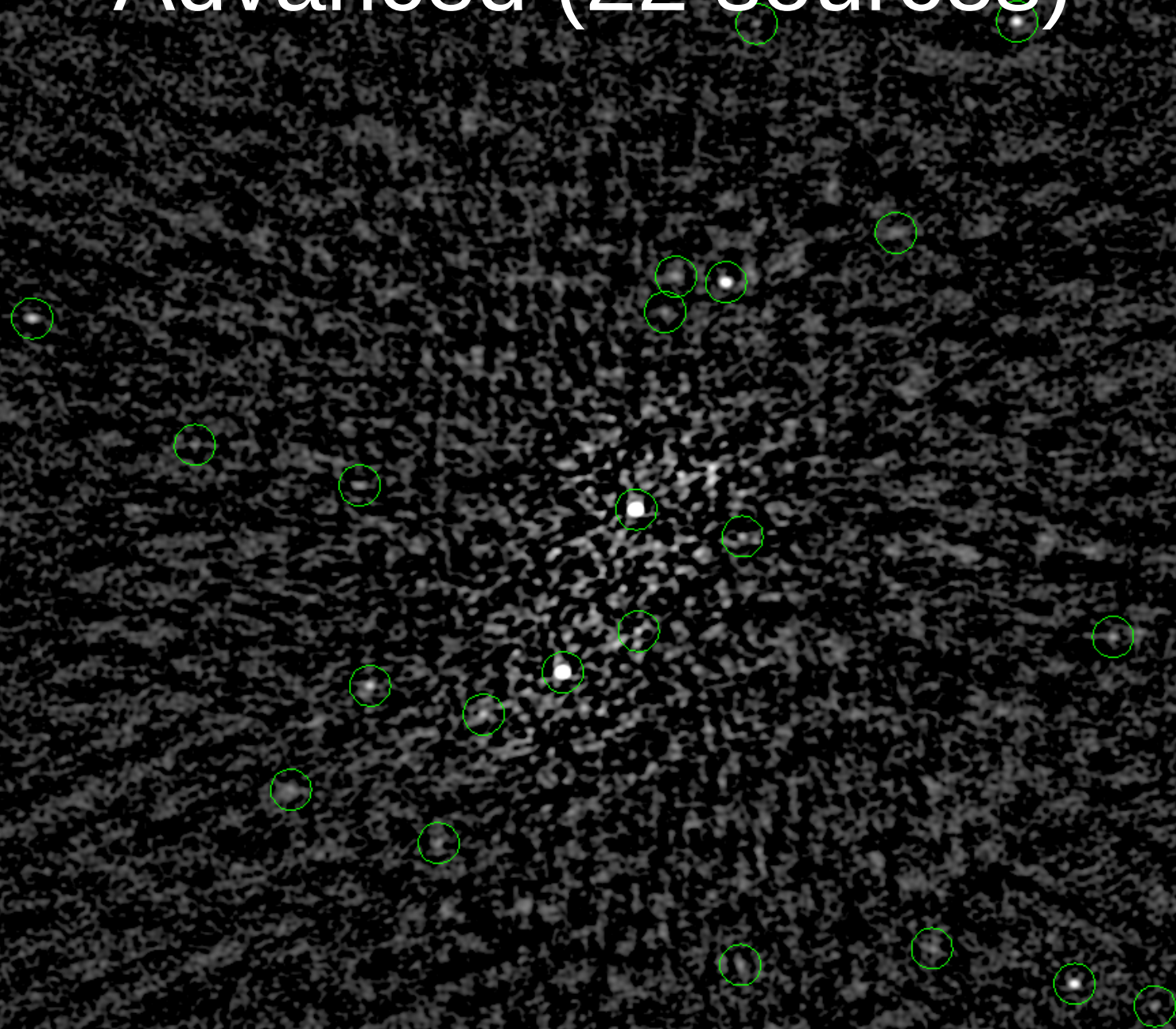
Advanced Options:

Total number of Gaussians fit to image .. : 321

Grouping Gaussians into source

Number of sources formed from Gaussians : 280

Advanced (22 sources)



Default (101 sources)



Key difference in default vs advanced

Smaller rms box near bright source (~ 5 beams)

Reasonable size (< 10 beams) normal rms box

Grouping gaussians within same island

Understanding the output

Output Image

'**gaus_resid**', 'shap_resid', '**rms**', 'mean', '**gaus_model**',
'shap_model', 'ch0', 'pi', 'psf_major', 'psf_minor', 'psf_pa',
'psf_ratio', 'psf_ratio_aper', 'island_mask'

Catalog Types

Source (srl)

Gaussian Component (gaul)

Shapelet (shap)

Understanding the output

Source list for EW05.FITS

Generated by PyBDSM version 1.9.0

Reference frequency of the detection ("ch0") image: 6.07504e+08 Hz

Equinox : 2000.0

```
# Source_id Isl_id RA E_RA DEC E_DEC Total_flux E_Total_flux Peak_flux E_Peak_flux
RA_max E_RA_max DEC_max E_DEC_max Maj E_Maj Min E_Min PA E_PA Maj_img_plane
E_Maj_img_plane Min_img_plane E_Min_img_plane PA_img_plane E_PA_img_plane DC_Maj
E_DC_Maj DC_Min E_DC_Min DC_PA E_DC_PA DC_Maj_img_plane E_DC_Maj_img_plane
DC_Min_img_plane E_DC_Min_img_plane DC_PA_img_plane E_DC_PA_img_plane Isl_Total_flux
E_Isl_Total_flux Isl_rms Isl_mean Resid_Isl_rms Resid_Isl_mean S_Code
0 0 244.93723965596047 0.00010788307776 55.57421312843387 0.00006281636302
0.00075661294443 0.00014281698964 0.00053247589451 0.00006420543952
244.93723965596047 0.00010788307776 55.57421312843387 0.00006281636302
0.00186431631709 0.00025429239820 0.00138354068767 0.00014747618728
94.02814644701714 20.19598181910427 0.00186418617955 0.00025429239820
0.00138353057413 0.00014747618728 93.05881912559795 20.19598181910427
0.00119785341458 0.00025429239820 0.00053506755046 0.00014747618728
101.08938585926994 20.19598181910427 0.00119776432924 0.00025429239820
0.00053506608300 0.00014747618728 100.12005853785075 20.19598181910427
0.00066597038781 0.00008291528773 0.00006115405995 -0.00000021810811 0.00002201505413
0.00000060565964 S
```