



photutils

An `Astropy` Package for Photometry



Photutils is an Astropy coordinated package for source detection and photometry (and related tools).

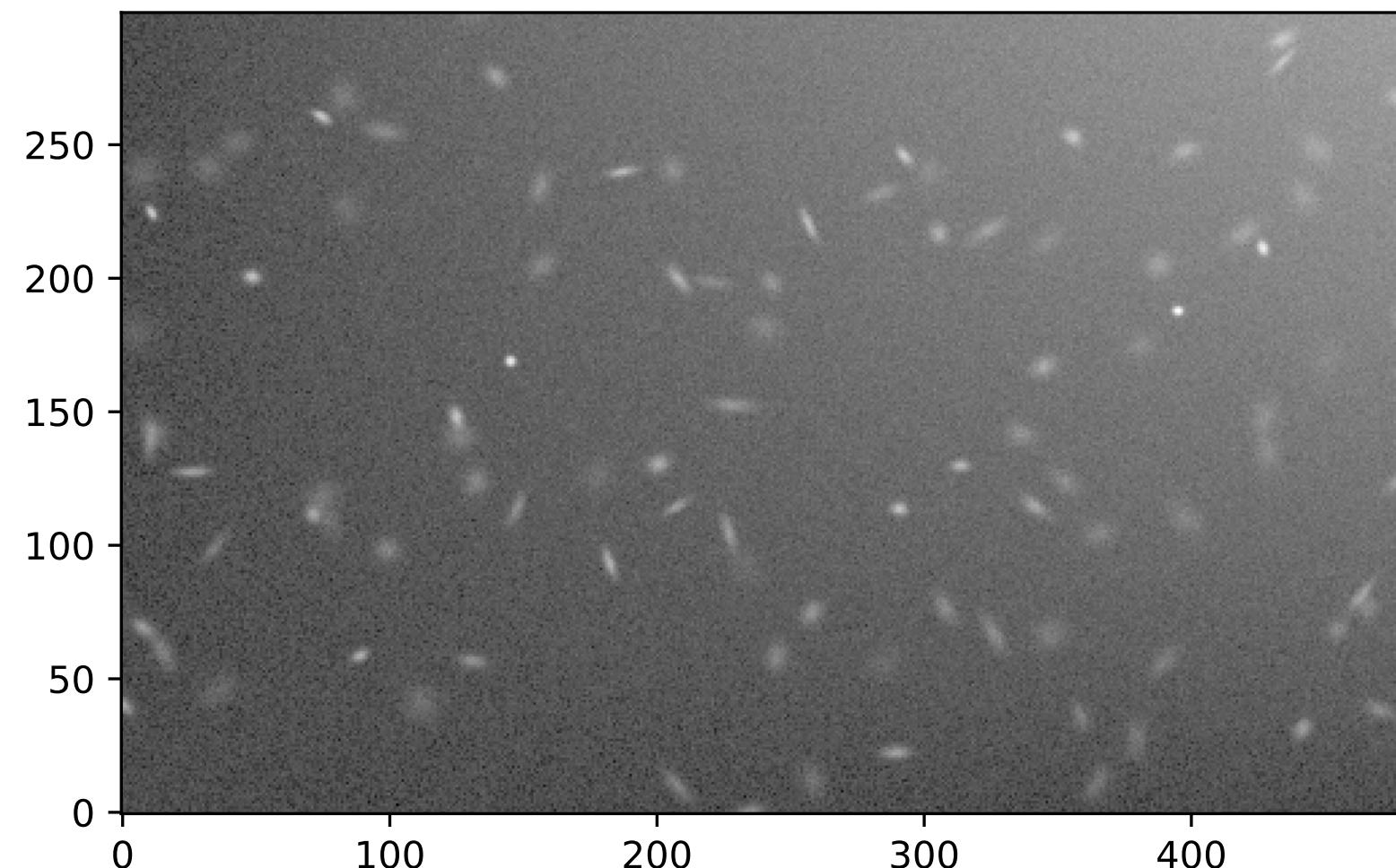
It provides flexible/modular tools for:

- 2D Background (and RMS) Estimation
- Source Detection/Extraction
- Aperture Photometry
- Image Segmentation (incl. Isophotal and Kron photometry)
- PSF-fitting Photometry
- Building an effective PSF (ePSF)
- PSF Matching
- Elliptical Isophotal Fitting and Analysis
- Centroids

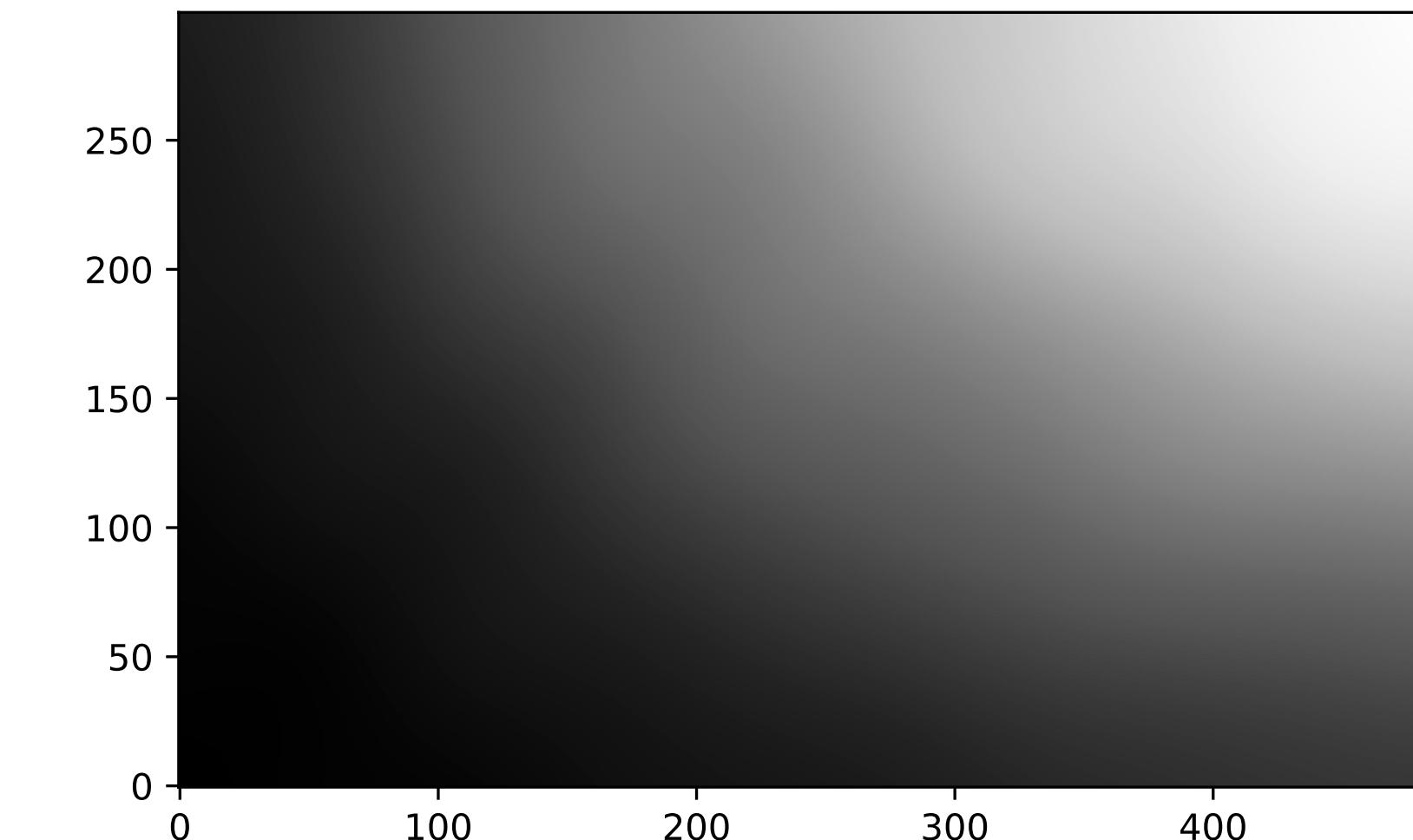
2D Background Estimation

photutils.background

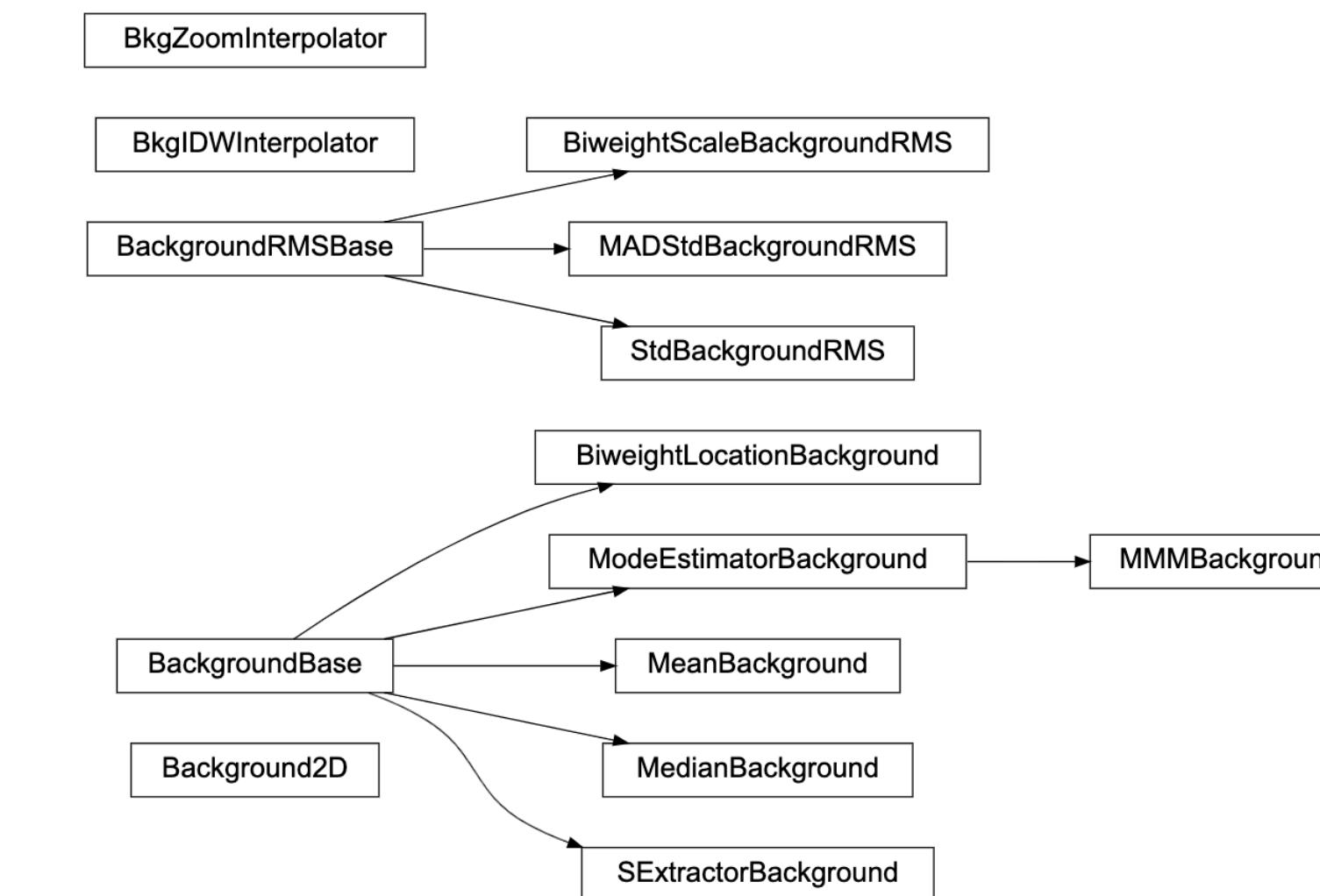
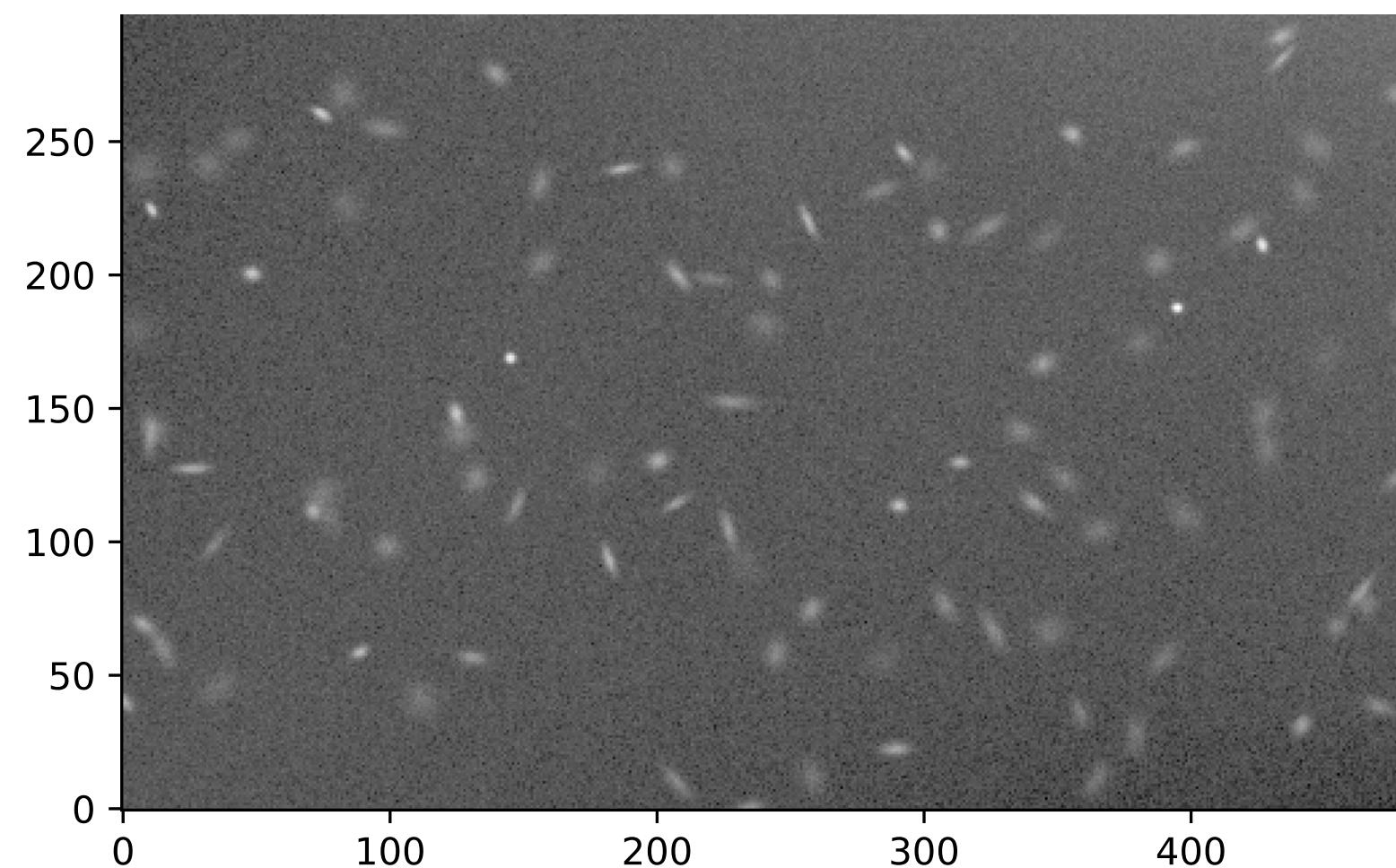
Data + Background



Background



Background-subtracted Data



Source Detection/Extraction

Star Finders (photutils.detection)

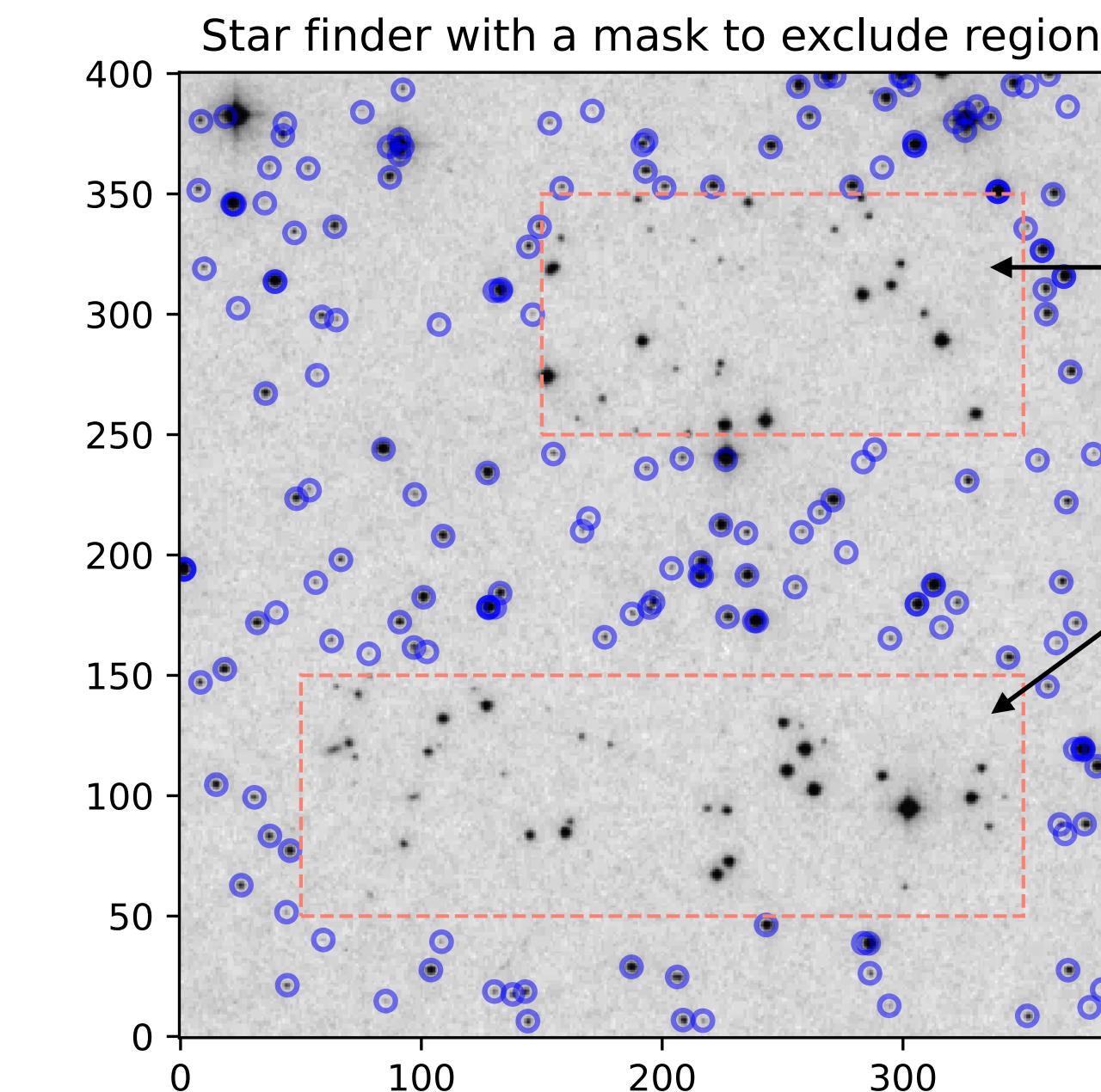
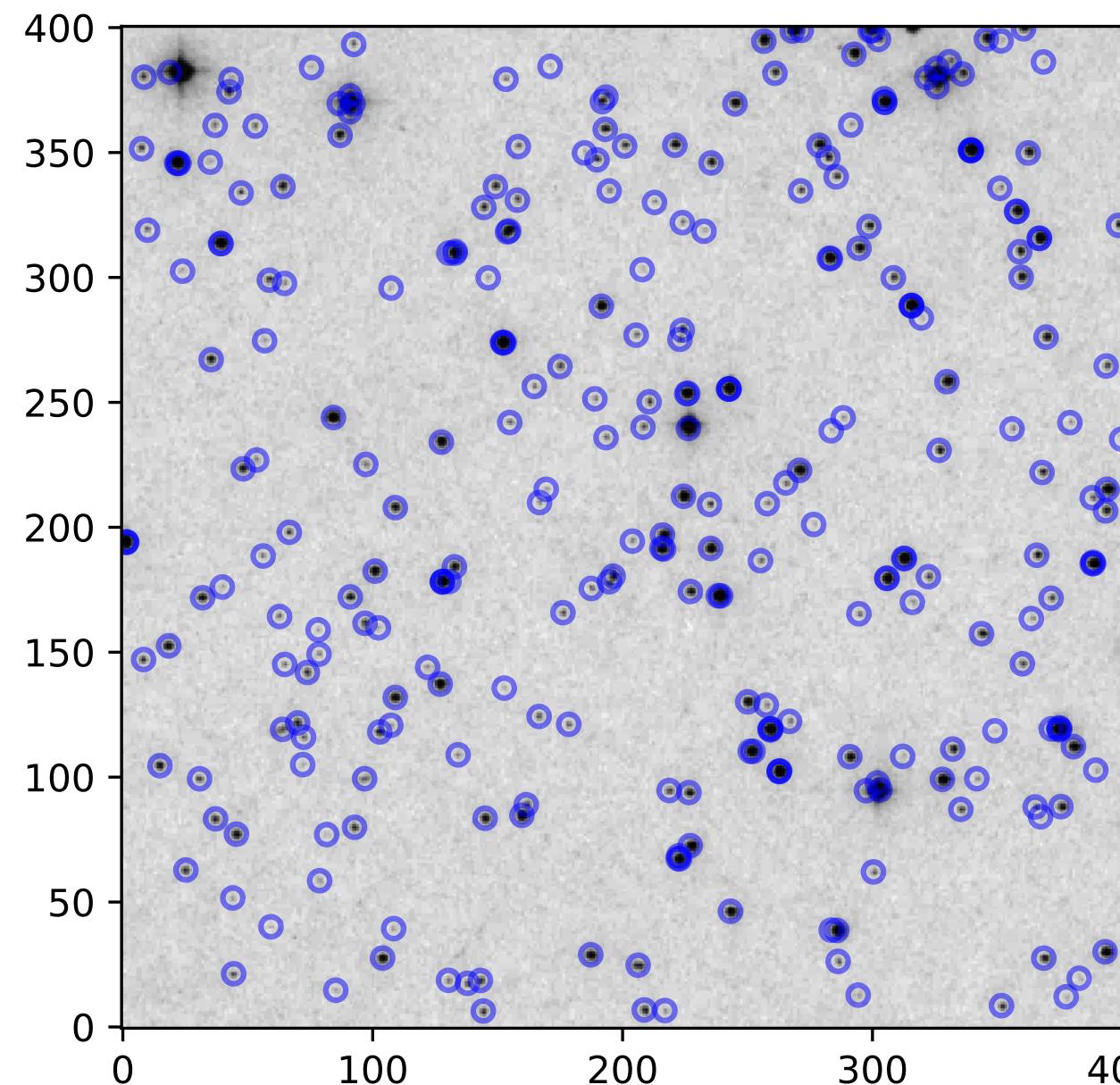


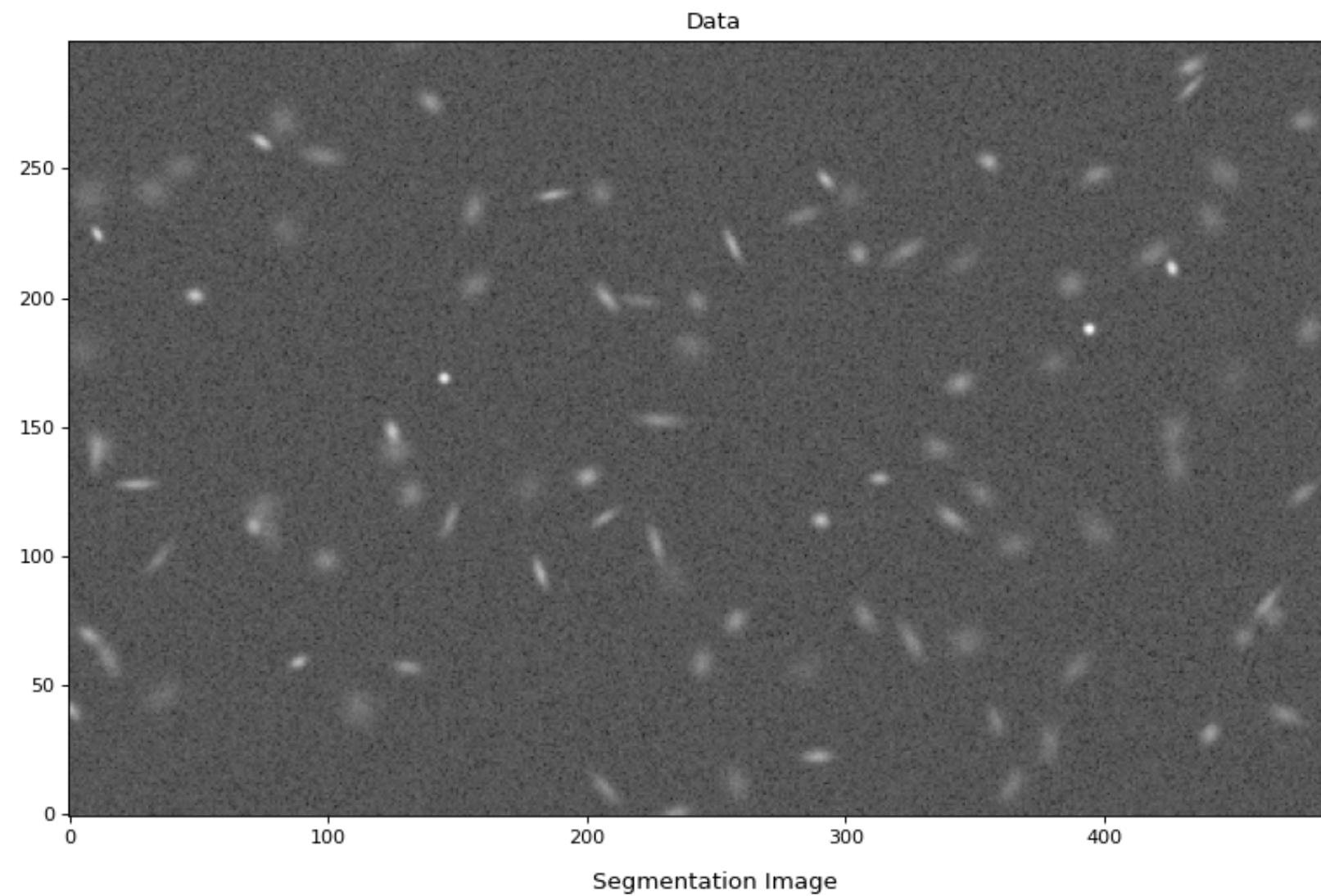
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id	xcentroid	ycentroid	sharpness	roundness1	roundness2	npix	sky	peak	flux	mag
int64	float64	float64	float64	float64	float64	int64	float64	float64	float64	float64
1	144.24757	6.3797904	0.58156257	0.20351244	-0.0082188029	25	0	6903	5.6976747	-1.8892441
2	208.66907	6.8205805	0.48348966	-0.12585138	-0.030811133	25	0	7896	6.7186388	-2.0682032
3	216.92614	6.5775933	0.69359525	-0.70664632	-0.096088688	25	0	2195	1.6662764	-0.55436758
4	351.62519	8.5459013	0.48577834	-0.3415136	0.015124942	25	0	6977	5.8970385	-1.9265849
5	377.51991	12.065501	0.52038488	0.36971562	-0.06508248	25	0	1260	1.1178252	-0.12093477
6	294.27284	12.737191	0.68021892	0.10631228	-0.3445009	25	0	2059	1.4809613	-0.42635928

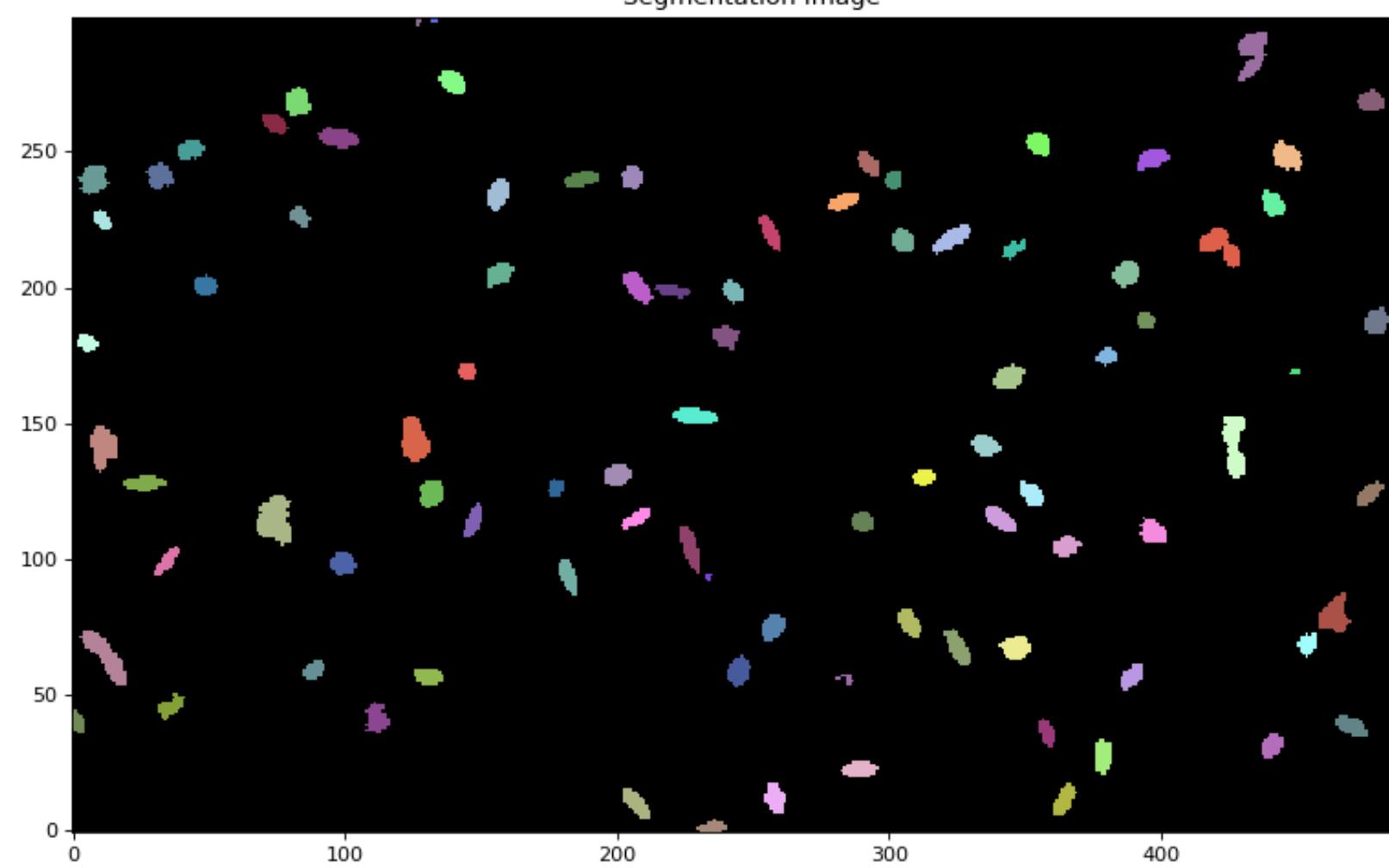
Source Detection/Extraction

photutils.segmentation

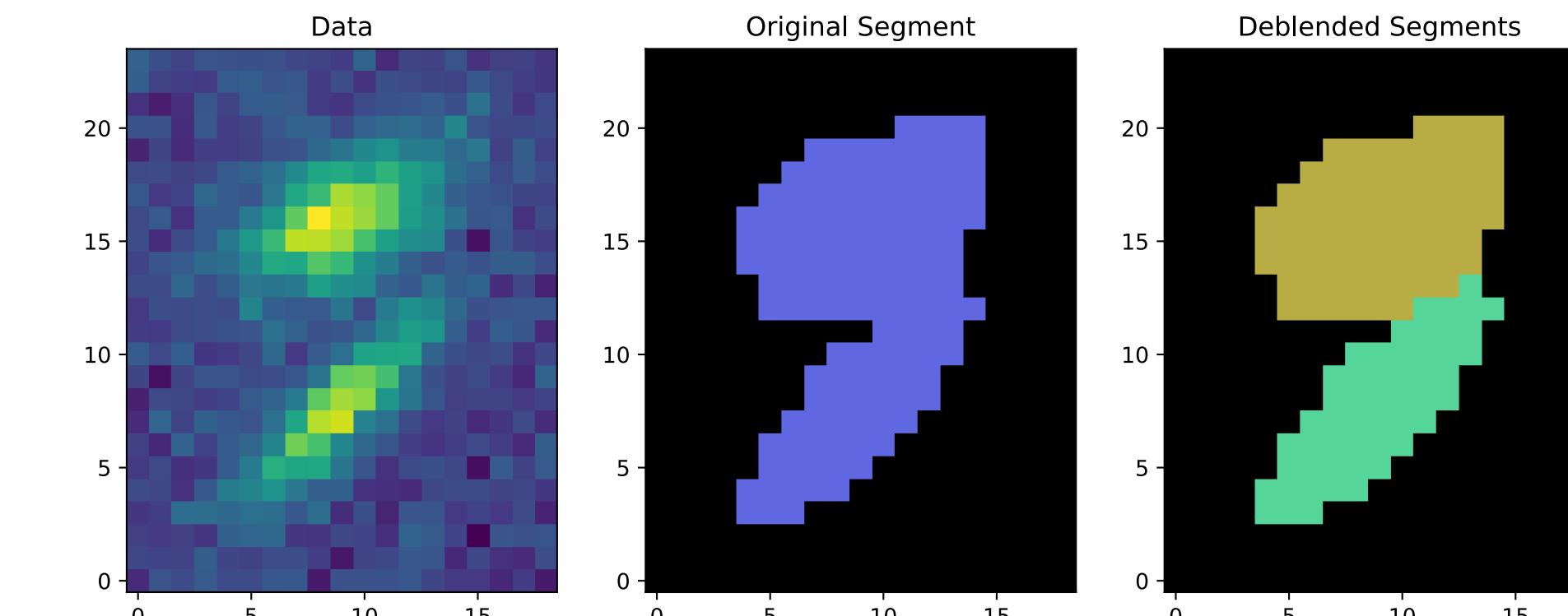
Image Segmentation



Isophotal
footprints



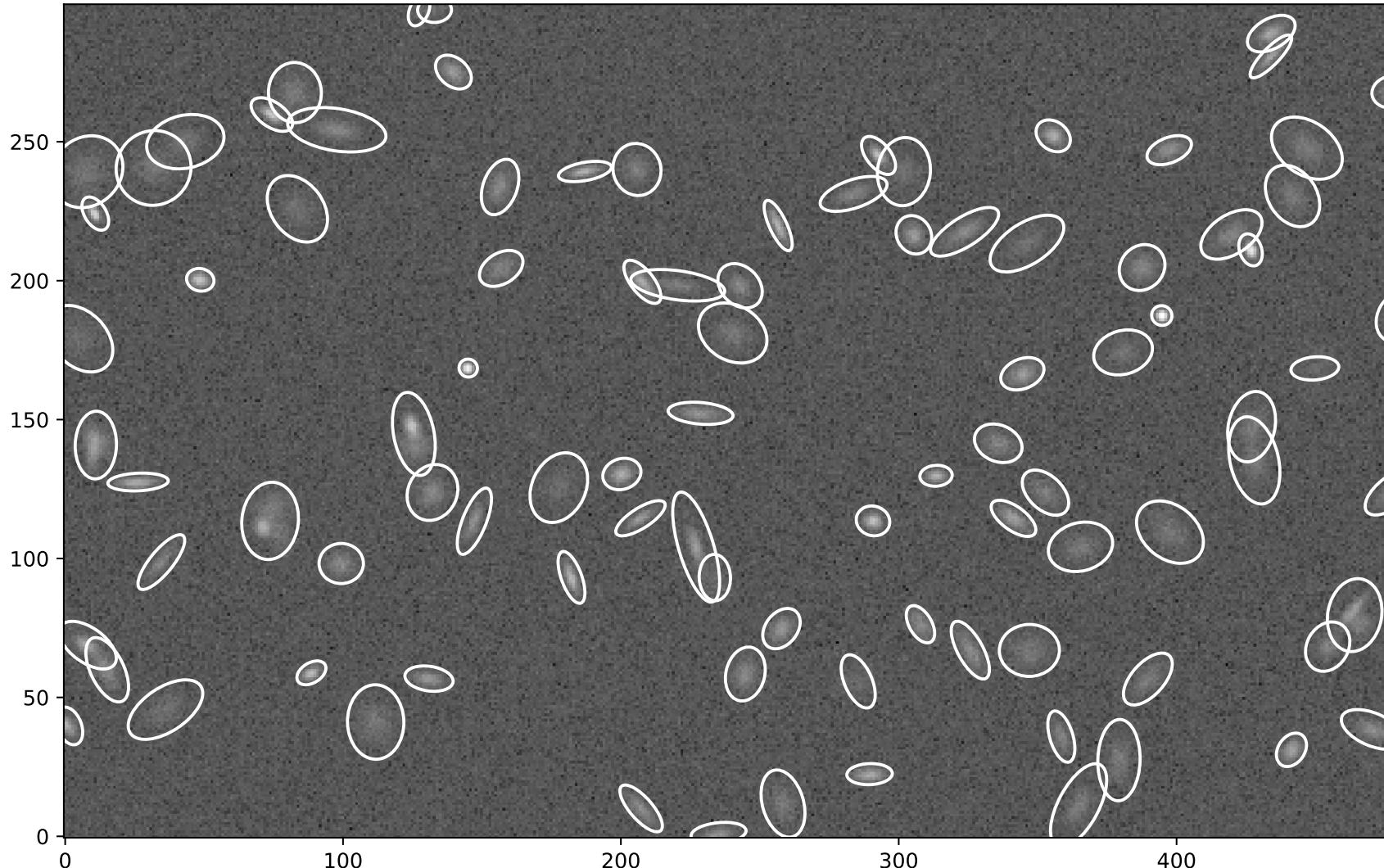
Source Deblending



Segmentation Source Properties

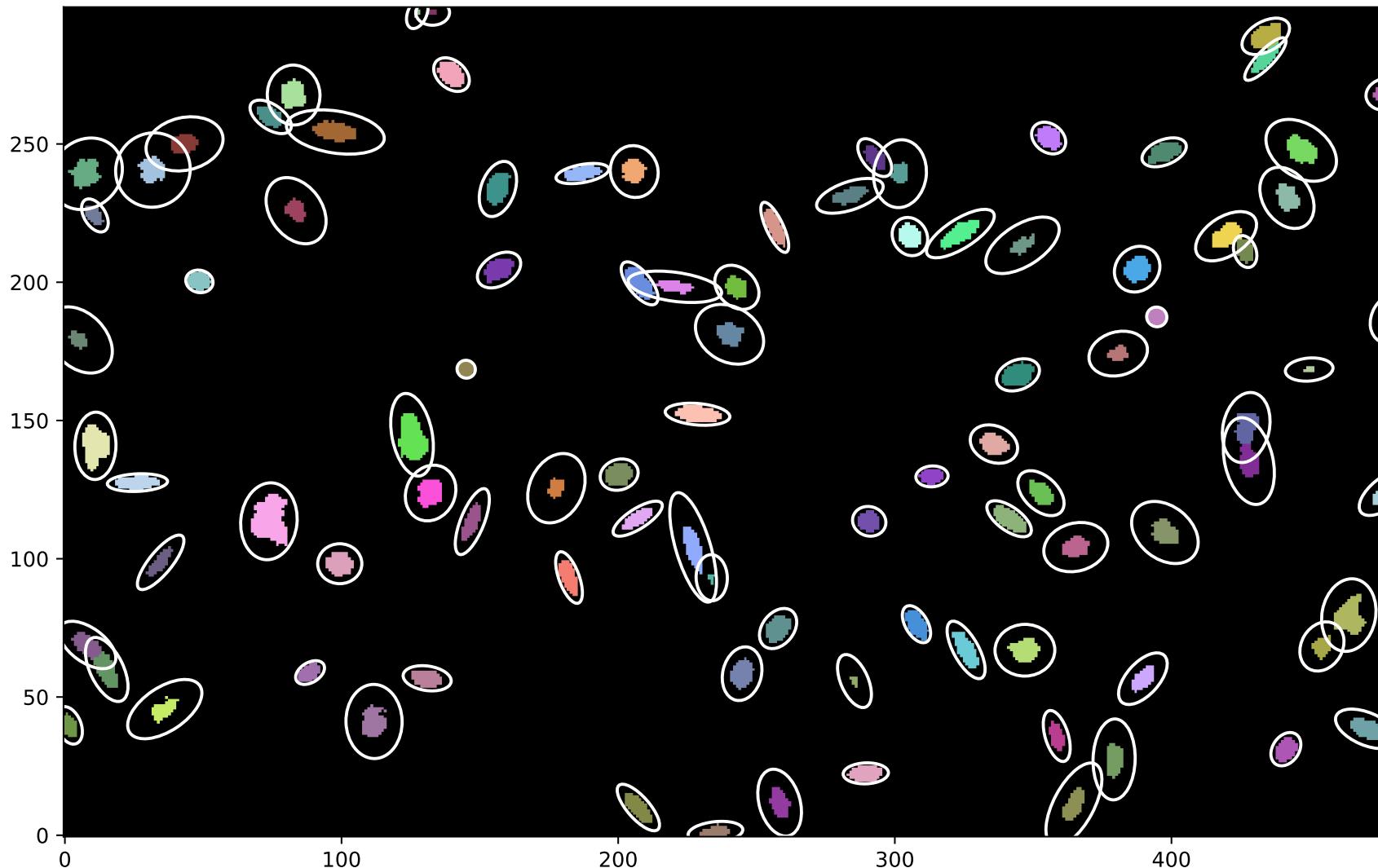
photutils.segmentation

Data with Kron apertures

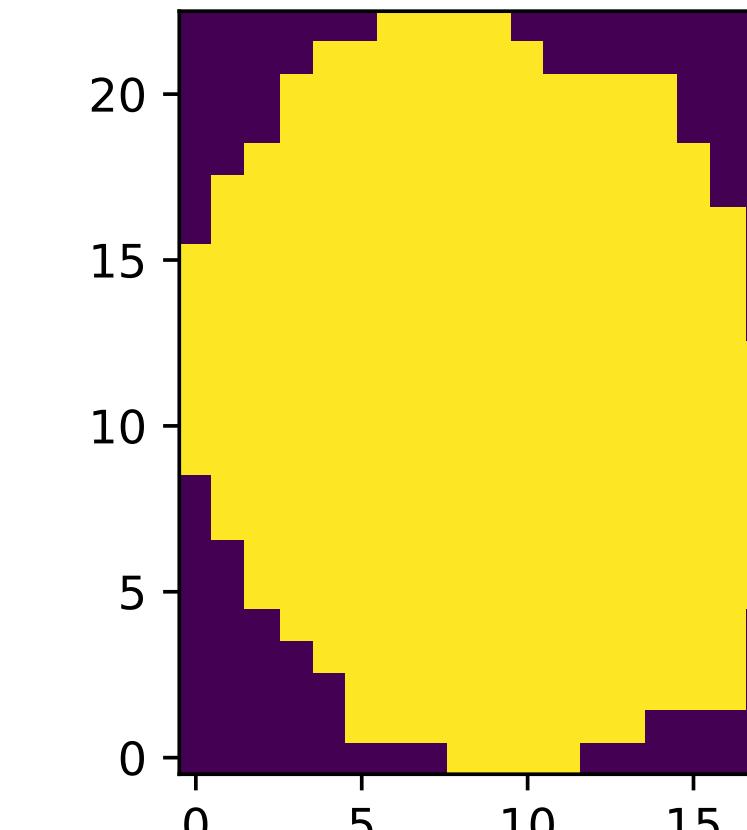


QTable length=96									
label	xcentroid	ycentroid	sky_centroid	bbox_xmin	bbox_xmax	bbox_ymin	bbox_ymax	area	pix2
int64	float64	float64	deg,deg	pix	pix	deg	deg	pix2	
1	235.15994548598488	1.1019363515760263	197.8891333890605						
2	494.1648399473006	5.815935953898595	197.8856485248648						
3	207.290303145485	10.043557337021124	197.8897357404737						
4	364.73470373040815	11.120059964585835	197.8875743005350						
5	258.35830595777417	11.794386115254312	197.8890683924085						
6	289.50776917508296	22.38789345042522	197.888805159201						
7	379.26466328650133	27.43041730313587	197.8877649170074						
8	441.35047241552144	31.13414794240034	197.886991496371						
9	358.5244001571732	35.89964374499677	197.888256852880						
...						
87	127.36799389690849	297.227058646046	197.897756617036						
88	132.94675194989202	297.4816793083705	197.897885238913						
89	15.125460682071289	59.96340390837348	197.8936066873385						
90	8.128010606993607	68.81666446868586	197.8939169395143						
91	427.9702251835680680	135.32252435935993	197.8896844787063						
92	427.00840180006264	147.4561897963997	197.8899889814334						
93	426.62968590768867	211.09852364716932	197.891526054939						
94	419.738453481306	216.63609521504304	197.891755494259						
95	433.9475733797084	280.7111800761216	197.8930999310714						
96	434.0856635403912	288.9265048214162	197.8932956891991						

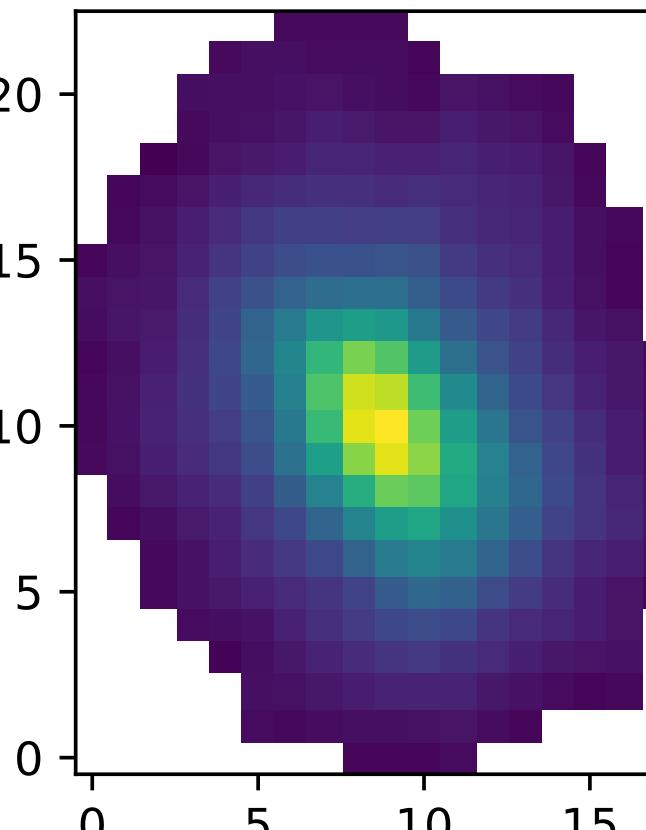
Segmentation Image with Kron apertures



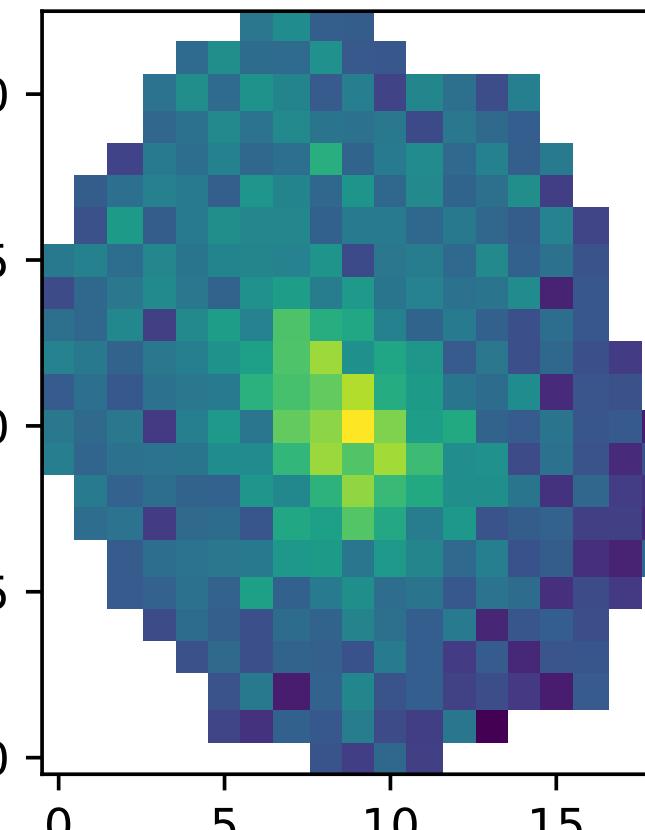
Source label=12 Segment



Source label=12 Data

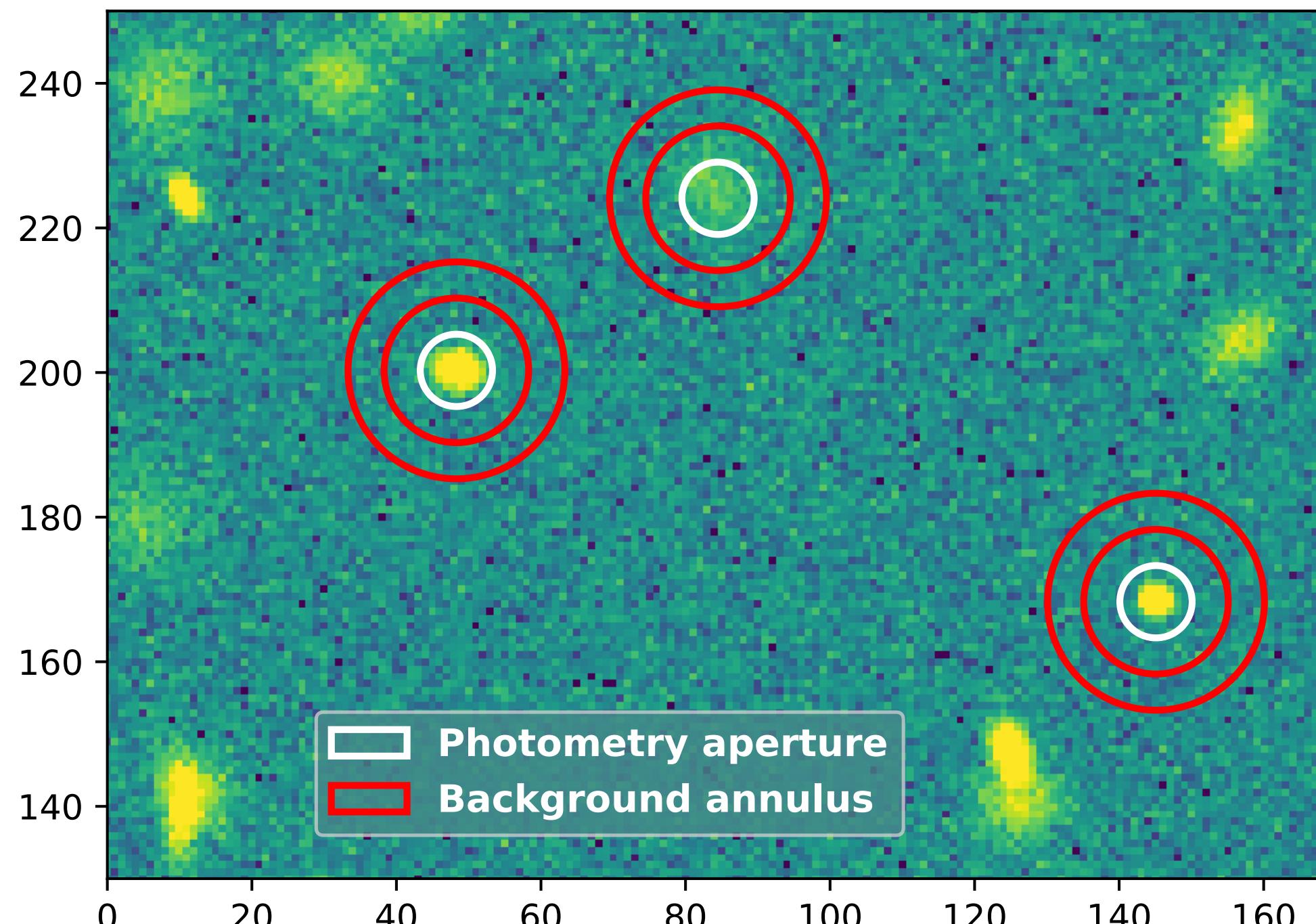


Source label=12 Error



Aperture Photometry

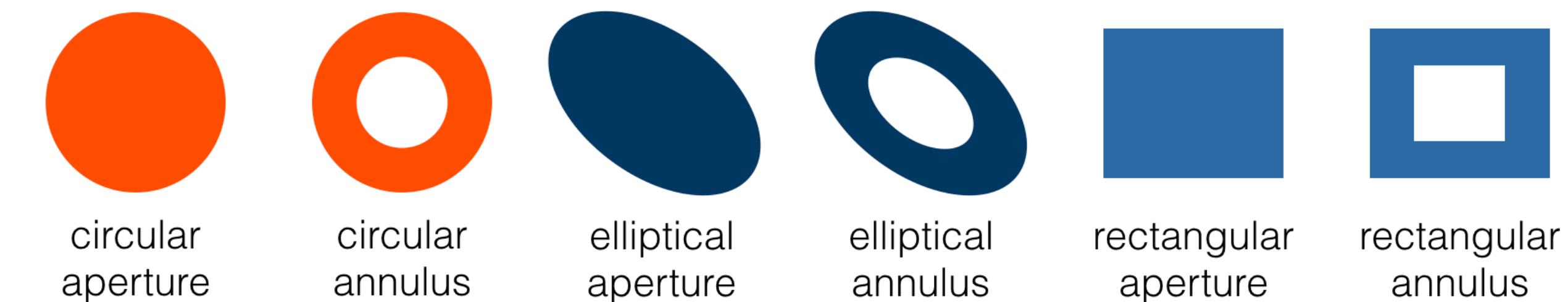
photutils.aperture



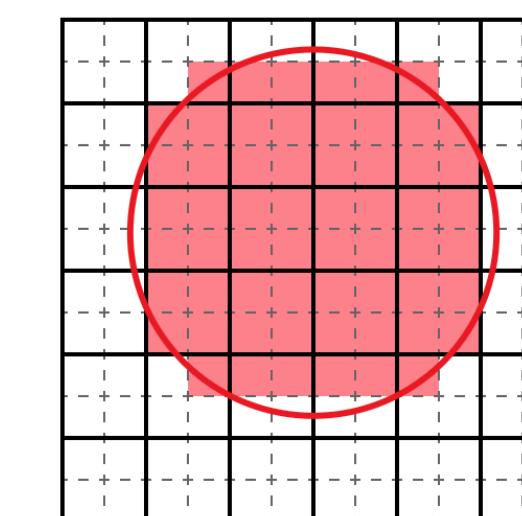
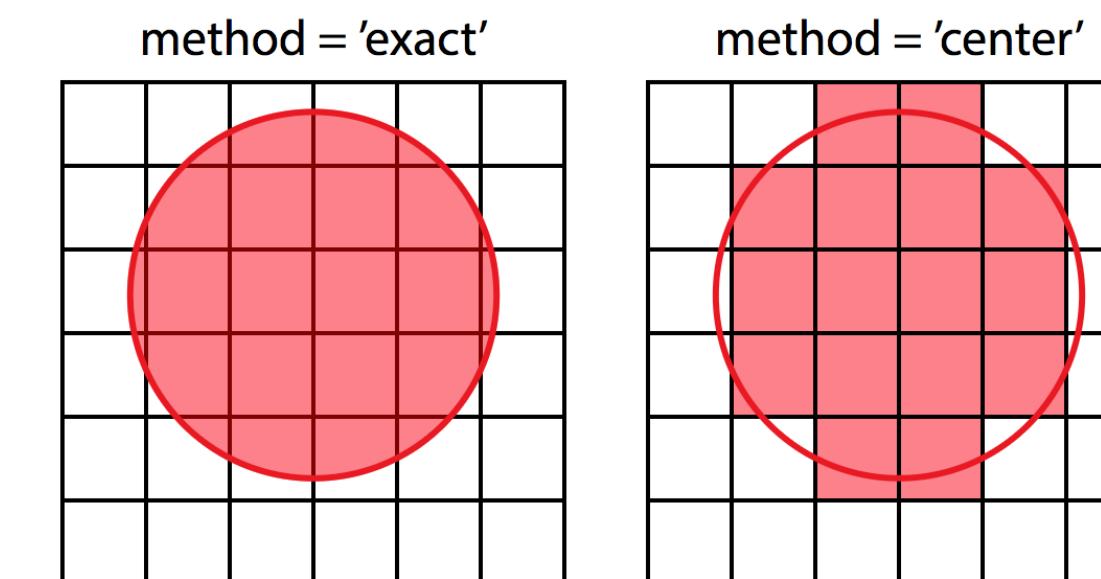
QTable length=3

	id	xcenter	ycenter	aperture_sum_0	aperture_sum_err_0	aperture_sum_1	aperture_sum_err_1
		pix	pix				
	int64	float64	float64	float64	float64	float64	float64
1	1	145.1	168.3	1131.5794219396346	23.35849263294723	1950.1741825747145	47.225615152137244
2	2	84.5	224.1	746.160643858321	20.999164191036634	2004.473120746215	51.63625874462207
3	3	48.3	200.3	1250.2185660077996	22.122686708826034	1947.6843963275142	50.422058132736446

Aperture Shapes



Aperture/Pixel Overlap Methods

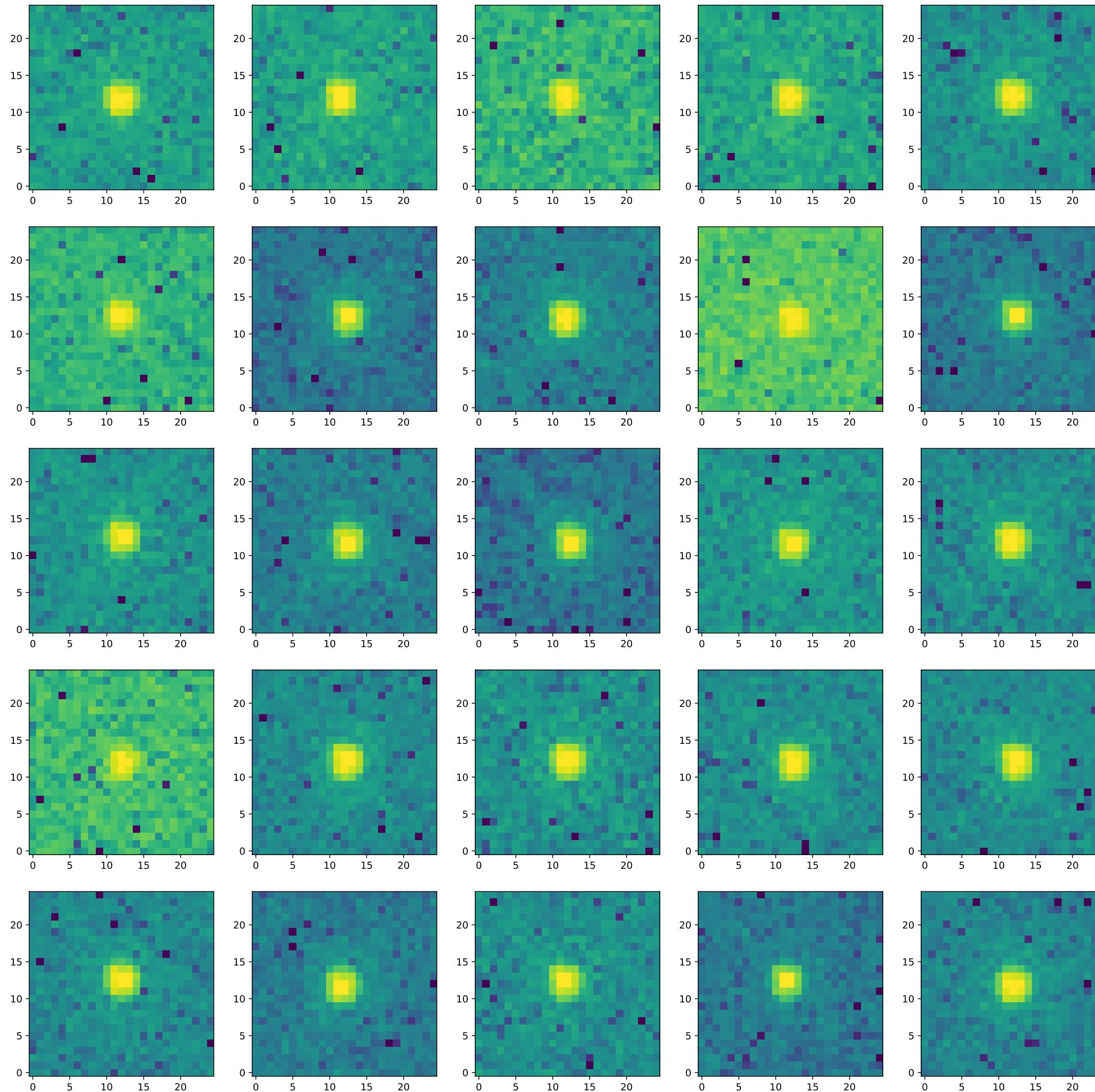


method = 'subpixel'
subpixels = 2

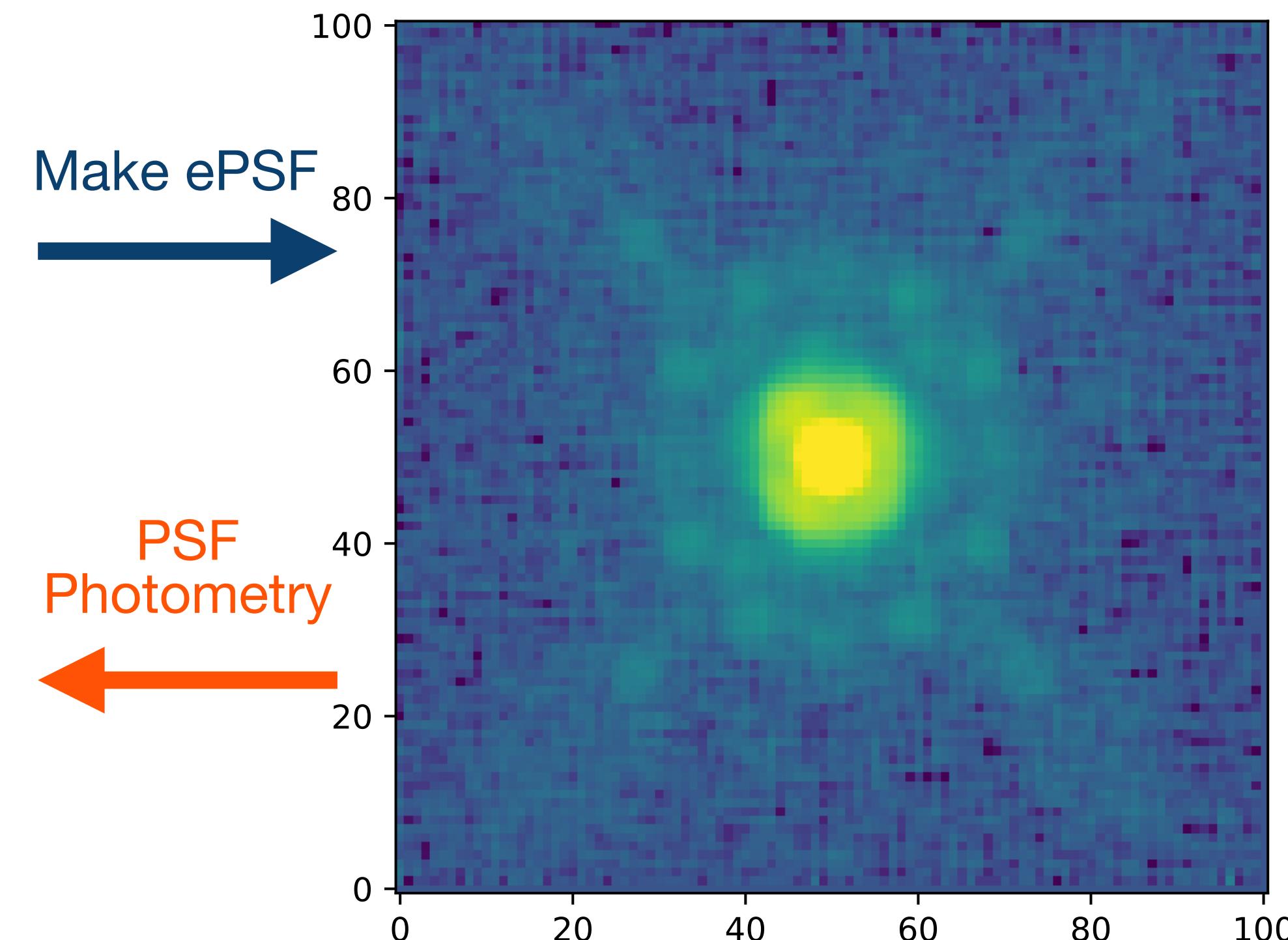
Effective PSF (ePSF) Building

photutils.psf (EPSFBuilder)

Extracted Stars

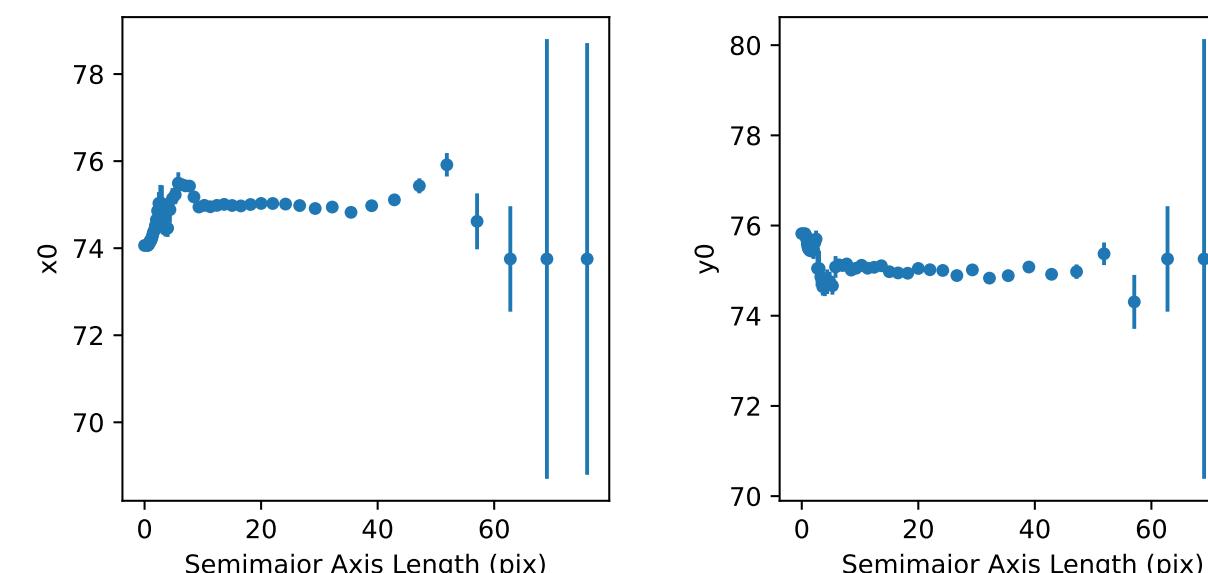
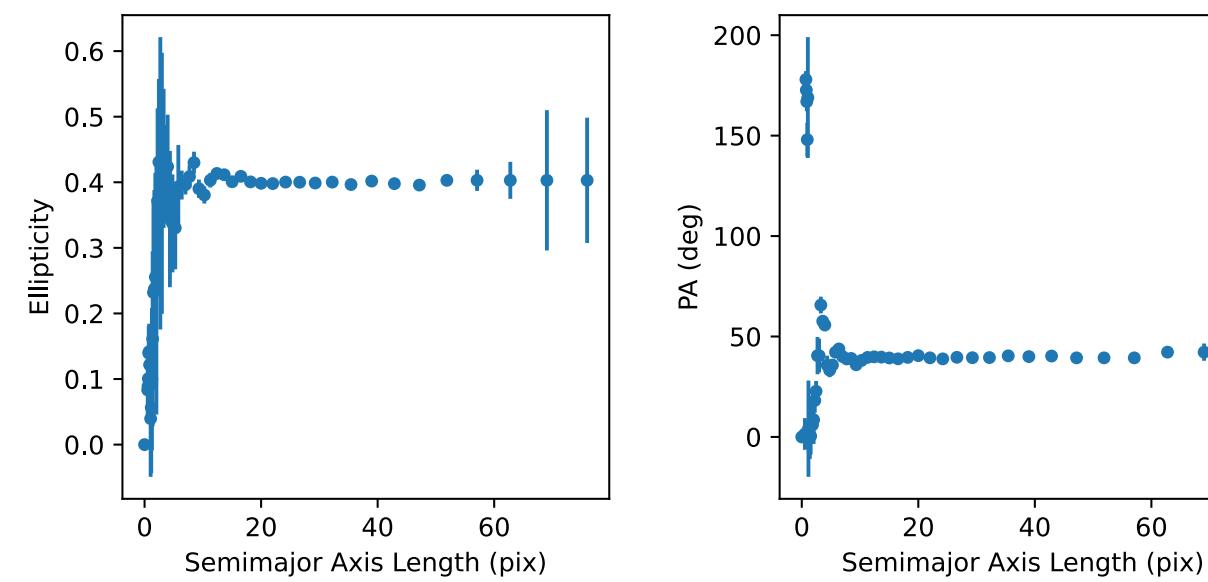
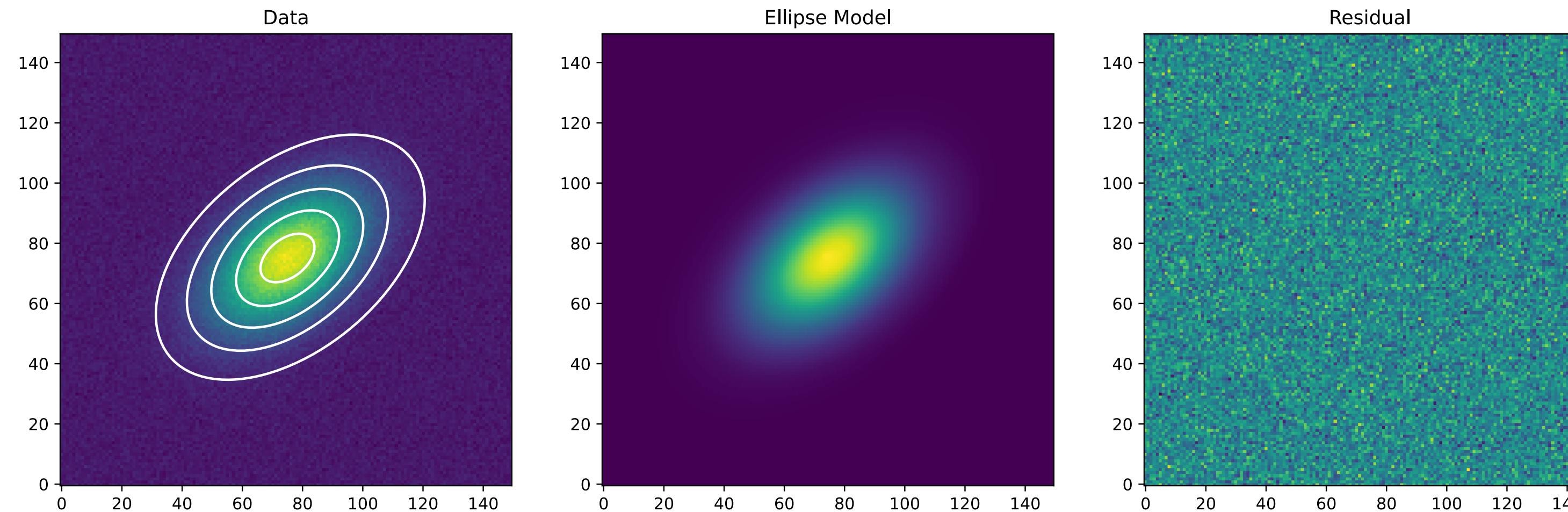


ePSF
(4x oversampled)



Elliptical Isophote Fitting/Analysis

photutils.isophote





Code: <https://github.com/astropy/photutils>



Read the Docs

Docs: <https://photutils.readthedocs.io>

photutils 1.1.0 »

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Important

If you use Photutils for a project that leads to a publication, whether directly or as a dependency of another package, please include an [acknowledgment and/or citation](#).

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