

atlast_9band_cameras

May 28, 2026

Below are 2 example multiband cameras spanning the 9 bands defined in Table 1 of the SZ science case (Di Mascolo, Perrott, et al. 2025; <https://ui.adsabs.harvard.edu/abs/2025ORE.....4..113D/abstract>).

The first one (atlast-sz_mini) is a more modest 6 arcminute FoV camera for which maria simulations should be feasible on a laptop or workstation, depending on integration time, map sizes, and other memory limitations. The second one (atlast-sz) fills the telescope's available FoV using the corrections in Gallardo et al. 2024 (<https://ui.adsabs.harvard.edu/abs/2024SPIE13094E..28G/abstract>).

The 42 GHz band is configured as monochromatic, while each band after that is in a dichroic pair (similar to existing detectors made for ACTpol, SPTpol, SPT3G, and Simons Observatory). In principle, the 42 GHz band could be made dichroic as well should the spectral leverage be required. They also both allow for measurements of the polarization.

Both instrument examples use detector spacings of 1.7 f-lambda for most of the bands (i.e. not Nyquist-sampled, but close to optimal for point source sensitivity). The exception is that the upper two bands in atlast-sz_mini are at 3.4 f-lambda to keep the detector counts manageable (19k detectors rather than 1.39 million). Moving to 0.5 f-lambda would increase the counts by a factor of ~11.5 times.

```
[1]: import maria
instrument = maria.get_instrument("atlast-sz_mini")
print(instrument)
instrument.plot()
```

Instrument(5 arrays)

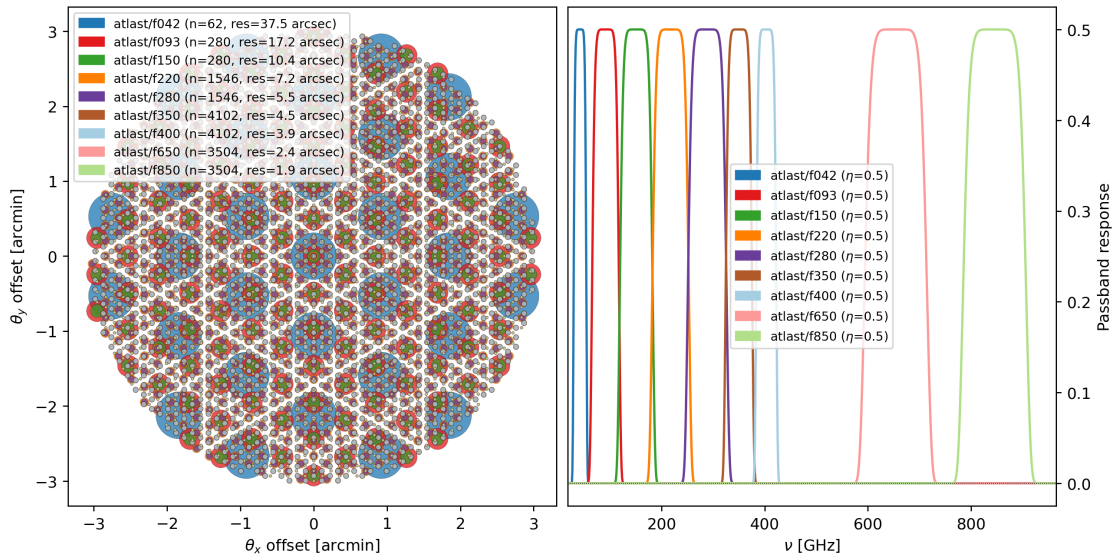
arrays:

	n	FoV	baseline	bands	polarized
array-0	62	5.621'	0 m	[atlast/f042]	True
array-1	560	5.992'	0 m	[atlast/f093,atlast/f150]	True
array-2	3092	5.991'	0 m	[atlast/f220,atlast/f280]	True
array-3	8204	6.056'	0 m	[atlast/f350,atlast/f400]	True
array-4	7008	6.008'	0 m	[atlast/f650,atlast/f850]	True

bands:

	name	center	width	NEP	NET_RJ
NET_CMB	FWHM				
0	atlast/f042	42 GHz	24 GHz	0.5 30 aW/s	183.7 uK_RJ/s 192.4
uK_CMB/s	37.49"				
1	atlast/f093	91.5 GHz	51 GHz	0.5 30 aW/s	86.43 uK_RJ/s 107.1

uK_CMB√s	17.21"								
2	atlast/f150	151 GHz	62 GHz	0.5	30 aW√s	71.1	uK_RJ√s	124	
uK_CMB√s	10.43"								
3	atlast/f220	217.5 GHz	69 GHz	0.5	30 aW√s	63.88	uK_RJ√s	189.8	
uK_CMB√s	7.24"								
4	atlast/f280	288.5 GHz	73 GHz	0.5	30 aW√s	60.38	uK_RJ√s	363.3	
uK_CMB√s	5.458"								
5	atlast/f350	350 GHz	50 GHz	0.5	30 aW√s	88.16	uK_RJ√s	1.083	
mK_CMB√s	4.499"								
6	atlast/f400	403 GHz	38 GHz	0.5	30 aW√s	116	uK_RJ√s	2.751	
mK_CMB√s	3.907"								
7	atlast/f650	654 GHz	118 GHz	0.5	30 aW√s	37.36	uK_RJ√s	25.03	
mK_CMB√s	2.408"								
8	atlast/f850	845.5 GHz	119 GHz	0.5	30 aW√s	37.04	uK_RJ√s	426.2	
mK_CMB√s	1.862"								



```
[2]: print('this results in '+str(instrument.dets.n)+' detectors')
```

this results in 18926 detectors

```
[3]: import maria
instrument = maria.get_instrument("atlast-sz")
print(instrument)
instrument.plot()
```

Instrument(5 arrays)

arrays:

	n	FOV	baseline	bands	polarized
array-0	22998	1.999°	0 m	[atlast/f042]	True
array-1	217584	1.999°	0 m	[atlast/f093,atlast/f150]	True

array-2	371904	1.1°	0 m	[atlast/f220,atlast/f280]	True
array-3	509384	48'	0 m	[atlast/f350,atlast/f400]	True
array-4	250108	17.99'	0 m	[atlast/f650,atlast/f850]	True

bands:

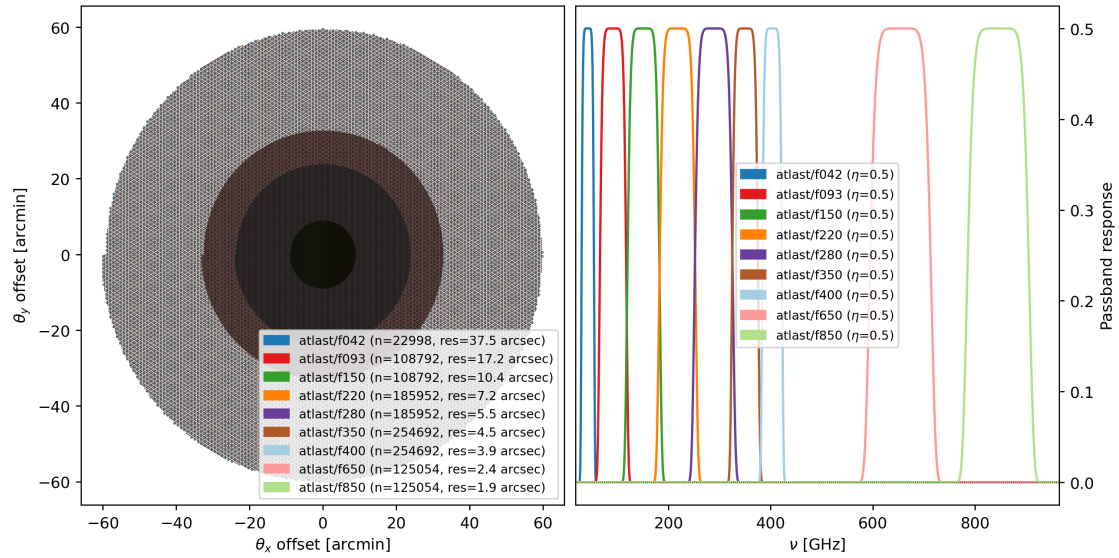
	name	center	width		NEP		NET_RJ	
NET_CMB	FWHM							
0	atlast/f042	42 GHz	24 GHz	0.5	30 aW/s	183.7	uK_RJ/s	192.4
uK_CMB/s	37.49"							
1	atlast/f093	91.5 GHz	51 GHz	0.5	30 aW/s	86.43	uK_RJ/s	107.1
uK_CMB/s	17.21"							
2	atlast/f150	151 GHz	62 GHz	0.5	30 aW/s	71.1	uK_RJ/s	124
uK_CMB/s	10.43"							
3	atlast/f220	217.5 GHz	69 GHz	0.5	30 aW/s	63.88	uK_RJ/s	189.8
uK_CMB/s	7.24"							
4	atlast/f280	288.5 GHz	73 GHz	0.5	30 aW/s	60.38	uK_RJ/s	363.3
uK_CMB/s	5.458"							
5	atlast/f350	350 GHz	50 GHz	0.5	30 aW/s	88.16	uK_RJ/s	1.083
mK_CMB/s	4.499"							
6	atlast/f400	403 GHz	38 GHz	0.5	30 aW/s	116	uK_RJ/s	2.751
mK_CMB/s	3.907"							
7	atlast/f650	654 GHz	118 GHz	0.5	30 aW/s	37.36	uK_RJ/s	25.03
mK_CMB/s	2.408"							
8	atlast/f850	845.5 GHz	119 GHz	0.5	30 aW/s	37.04	uK_RJ/s	426.2
mK_CMB/s	1.862"							

```
/Users/amroczko/opt/miniconda3/lib/python3.12/site-
packages/IPython/core/events.py:96: UserWarning: Creating legend with loc="best"
can be slow with large amounts of data.
```

```
func(*args, **kwargs)
```

```
/Users/amroczko/opt/miniconda3/lib/python3.12/site-
packages/IPython/core/pylabtools.py:170: UserWarning: Creating legend with
loc="best" can be slow with large amounts of data.
```

```
fig.canvas.print_figure(bytes_io, **kw)
```



```
[4]: print('this results in '+str(instrument.dets.n)+' detectors')
```

this results in 1371978 detectors