

2cm double beam secondary focus receiver (12000-18000 MHz)

This receiver replaced the old 2cm secondary focus system. It is a two horn system for continuum, spectroscopy and VLBI observations. The system is currently tested and all values are preliminary.

Note, that for technical reasons, no spectroscopic frequency-switch observations are possible!

Calibration Information

Frequency [GHz]	Feed	Polarisation	Tcal [K]	Tsys [K]	Sensitivity [K/Jy]	SEFD [Jy]	Aperture Eff. [%]	TMB/S [K/Jy]	Main Beam Eff. [%]	FWHM [arcsec]	Last update
13.0	1	LCP	4.2	55	1.42	77	50	2.13	66	58.3	Nov 2019
13.0	1	RCP	4.5	55	1.42	78	50	2.14	66	58.3	Nov 2019
15.0	1	LCP	2.5	59	1.31	77	46	1.97	66	52.7	Nov 2019
15.0	1	RCP	2.4	61	1.30	80	46	1.96	66	52.5	Nov 2019
17.0	1	LCP	4.1	64	1.19	76	42	1.80	66	48.4	Nov 2019
17.0	1	RCP	4.5	65	1.17	76	41	1.79	66	48.6	Nov 2019

normalized Gain curve ($G = A0 + A1 \cdot Elv + A2 \cdot Elv^2$)						Observed in	confirmed
A0 = 0.97099	A1 = 1.8327E-3	A2 = -2.8674E-5	(from old S20mm)		—		

Comments:

- Note that the system temperature at this frequency depends strongly on weather conditions!
- Zenith tau values can range from ??? to ???.

Version description for OBSINP

RX Name	Wavelength [cm]	Frequency (center) [GHz]	Nr. of Horns
S20mm Double Beam RX	2.0	12.0-18.0 (15.0)	2
Version:	Comment		
1. Continuum (BW: 2 GHz)	Broad Band Continuum		
Horn offsets (Azi, Elv, from center of SFK)	Horn 1: -525" ; 63" – Horn 2: -762" ; 63"		
relative offset of horn 2 from 1 (Azi, Elv)	-237" ; 0"		

Receiver Bands

The receiver delivers the data in two 2.5GHz-wide IF-subbands, which can be shifted in to cover the 12-18 GHz range.

Spectroscopy modes and resolution

Low-res mode (2 basebands for each of 2 feeds and 2 polarizations)

Note, that due to technical reasons the LSR correction has to be applied via software (regridding). This will decrease the effective spectral resolution to some degree.

TODO: update numbers!

BW	nchan	nu	Df	Dv	dv
MHz		MHz	kHz	km/s	km/s
2500	16384	18000	152.6	2.541	2.948
2500	16384	20000	152.6	2.287	2.653
2500	16384	22000	152.6	2.079	2.412
2500	16384	24000	152.6	1.906	2.211
2500	16384	26000	152.6	1.759	2.041
2500	32768	18000	76.3	1.271	1.474
2500	32768	20000	76.3	1.144	1.327
2500	32768	22000	76.3	1.040	1.206
2500	32768	24000	76.3	0.953	1.105
2500	32768	26000	76.3	0.880	1.020
2500	65536	18000	38.1	0.635	0.737
2500	65536	20000	38.1	0.572	0.663
2500	65536	22000	38.1	0.520	0.603
2500	65536	24000	38.1	0.477	0.553
2500	65536	26000	38.1	0.440	0.510

BW ... band width

nchan ... number of spectral channels

nu ... center frequency

Df ... Channel separation (in frequency)

Dv ... Channel separation (in velocity)

dv ... Velocity resolution ($dv=1.16 \cdot Dv$)

Hi-res mode (?? basebands)

TODO: update numbers!

BW	nchan	nu	Df	Dv	dv
MHz		MHz	kHz	km/s	km/s
300	16384	18000	18.3	0.305	0.354
300	16384	20000	18.3	0.274	0.318

BW	nchan	nu	Df	Dv	dv
MHz		MHz	kHz	km/s	km/s
300	16384	22000	18.3	0.250	0.289
300	16384	24000	18.3	0.229	0.265
300	16384	26000	18.3	0.211	0.245
300	32768	18000	9.2	0.152	0.177
300	32768	20000	9.2	0.137	0.159
300	32768	22000	9.2	0.125	0.145
300	32768	24000	9.2	0.114	0.133
300	32768	26000	9.2	0.106	0.122
300	65536	18000	4.6	0.076	0.088
300	65536	20000	4.6	0.069	0.080
300	65536	22000	4.6	0.062	0.072
300	65536	24000	4.6	0.057	0.066
300	65536	26000	4.6	0.053	0.061

BW ... band width

nchan ... number of spectral channels

nu ... center frequency

Df ... Channel separation (in frequency)

Dv ... Channel separation (in velocity)

dv ... Velocity resolution ($dv=1.16 \cdot Dv$)

Tcal measurements

Mar 2020

Tcal and Tsys



Opacity and Tebb (WVR+AATM)



T0



Antenna model





Nov 2019

Tcal and Tsys



Opacity and Tebb (WVR+AATM)



T0



Antenna model



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