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

This receiver is a two horn system for continuum, spectroscopy and VLBI observations.

Overview

RX Name	Band	Frequency range [GHz]	Polarisation	Nr. of Horns	Horn position relativ to center of focus cabin
S20mm	K	12.0-18.0	dual-circular	2	Horn 1: Az: -525 arcsec, Elv: 63 arcsec, Horn 2: Az: -762 arcsec, Elv: 63 arcsec

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
14.25	1	LCP	2.1	34	1.36	25	48	2.18	62	52.5	Jun 2024
14.25	1	RCP	2.1	34	1.36	25	48	2.18	62	52.5	Jun 2024
16.75	1	LCP	2.8	45	1.30	35	46	2.22	59	44.3	Jun 2024
16.75	1	RCP	2.8	45	1.30	35	46	2.22	59	44.3	Jun 2024

normalized Gain curve (G = A0 + A1·Elv + A2·Elv2)			Observed in	confirmed
A0 = 0.9818	A1 = 1.179E-3	A2 = -1.906E-5	Dec 2022	—

Comments:

- Note that the system temperature at this frequency depends on weather conditions!
- For technical reasons, no spectroscopic frequency-switch observations are possible!
- Below 13 GHz, there is strong interference due to communication with satellites.

Available receiver versions (for OBSINP)

Version	Description	Details
continuum_5ghz	standard continuum backend with 2 basebands	13.0-15.5 GHz & 15.5-18.0 GHz
cont_spec_5ghz	includes the WFFTS with 2x2x64k channels	13.0-15.5 GHz & 15.5-18.0 GHz

Below here: Information is currently updated.

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*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
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*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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