1

$2,3$

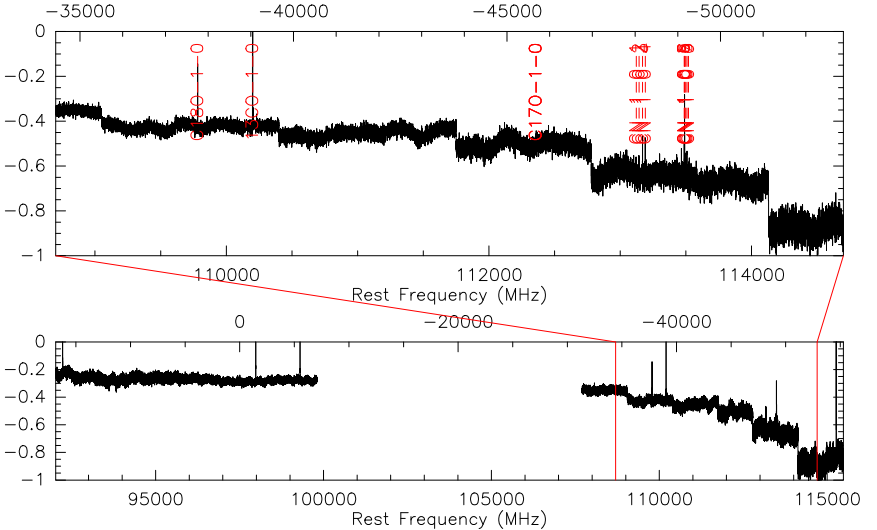
2

th

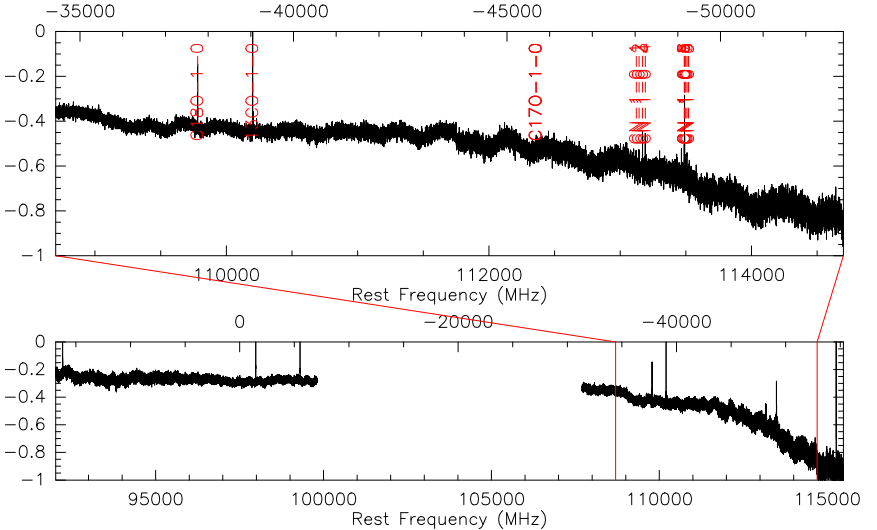

GILDAS
SOFTWARE

~ 7

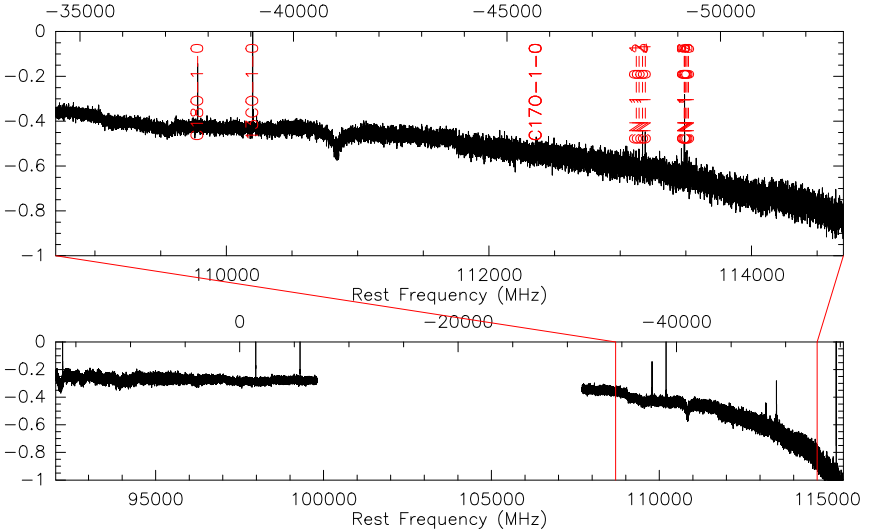
0;0 HORSEHEAD 110 30ME0H---F0- 0:08-AUG-2013 R:22-JUN-2017
RA: 05:40:54.27 DEC: -02:28:00.0 Eq 2000.0 Rad. 0.0° Offs: -123.3 +20.5
Unknown tau: 0.025 Tsys: 113. Time: 2.0hr El: 33.8
N: 120117 I0: 28058.6 V0: 10.50 Dv: -0.6006 LSR
F0: 97499.6827 Df: 0.1953 Fi: 110000.000



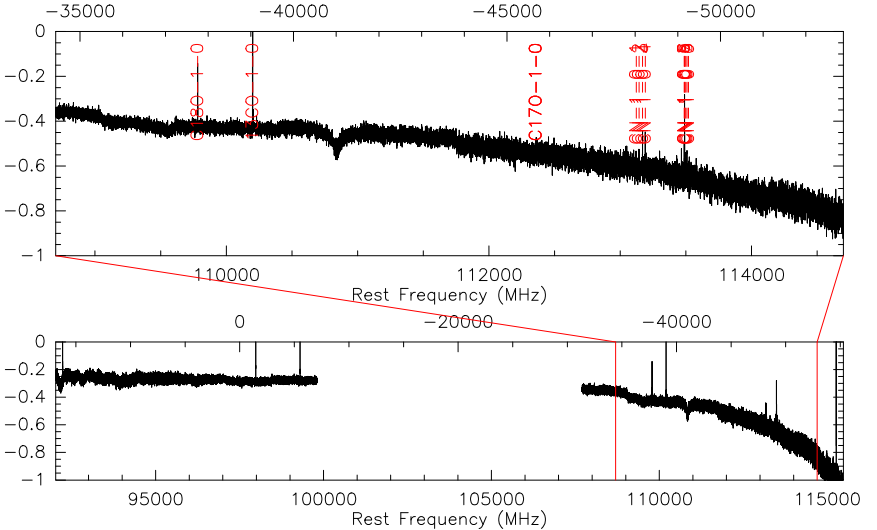
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RA: 05:40:54.27 DEC: -02:28:00.0 Eq 2000.0 Rad. 0.0° Offs: -123.3 +20.5
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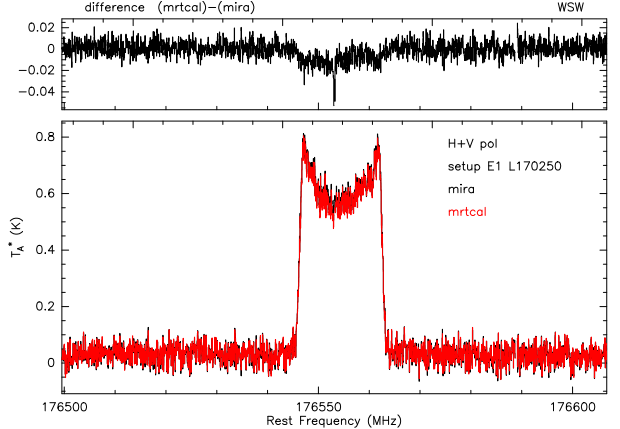


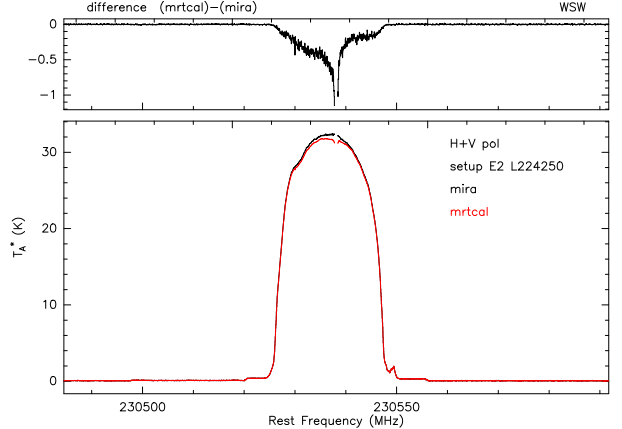
0;0 HORSEHEAD 110 30ME0H---F0- 0:08-AUG-2013 R:22-JUN-2017
RA: 05:40:54.27 DEC: -02:28:00.0 Eq 2000.0 Rad. 0.0° Offs: -123.3 +20.5
Unknown tau: 0.025 Tsys: 113. Time: 2.0hr El: 33.8
N: 120117 I0: 28058.6 V0: 10.50 Dv: -0.6006 LSR
F0: 97499.6827 Df: 0.1953 Fi: 110000.000

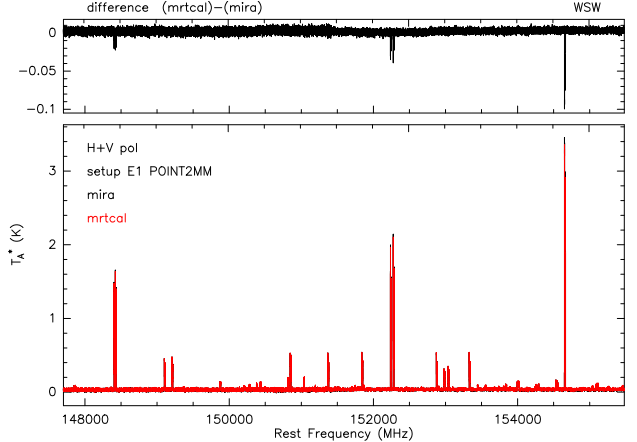


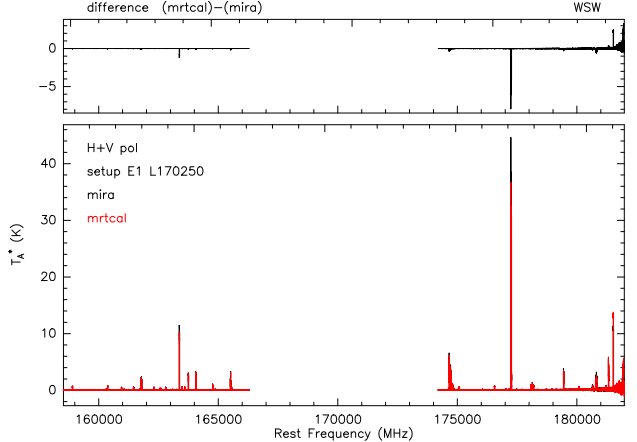


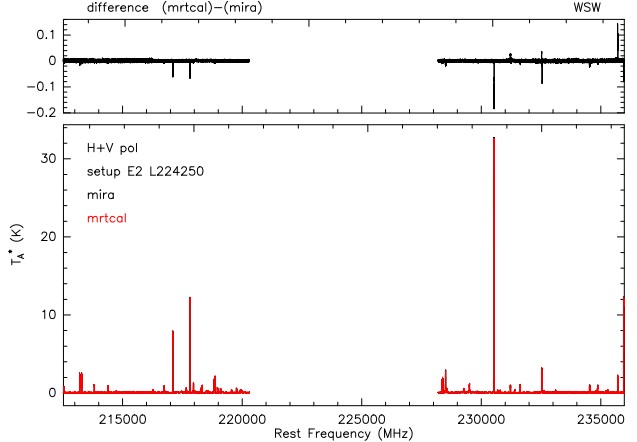
"

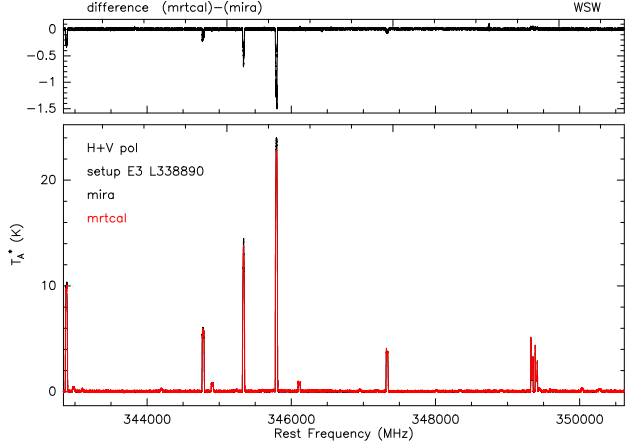

difference (mrtcal)−(mira)
WSW
0.02
0
−0.02
−0.04
0.8
0.6
0.4
0.2
0
T_A^* (K)
H+V pol
setup E1 L170250
mira
mrtcal
176500
176550
176600
Rest Frequency (MHz)


difference (mrtcal)−(mira)
WSW
0
−0.5
−1
H+V pol
setup E2 L224250
mira
mrtcal
T_A^* (K)
30
20
10
0
230500
230550
Rest Frequency (MHz)

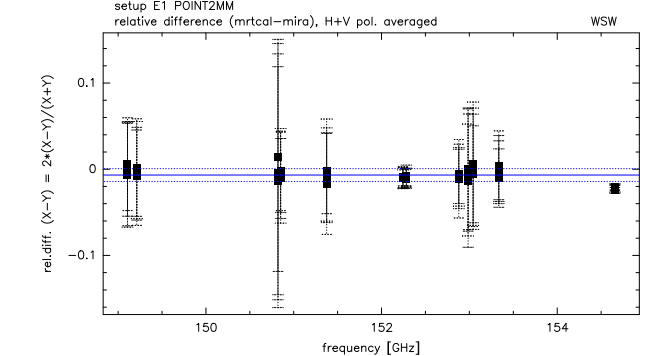

difference (mrtcal)−(mira)
WSW
0
−0.05
−0.1
H+V pol
setup E1 POINT2MM
mira
mrtcal
T_A^* (K)
3
2
1
0
148000
150000
152000
154000
Rest Frequency (MHz)

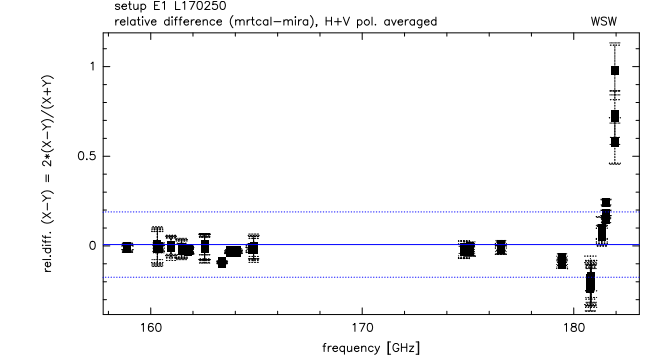

difference (mrtcal)−(mira)
WSW
0
−5
H+V pol
setup E1 L170250
mira
mrtcal
T_A^* (K)
40
30
20
10
0
160000
165000
170000
175000
180000
Rest Frequency (MHz)

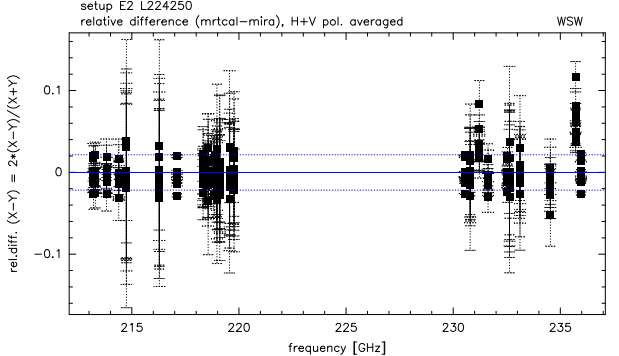

difference (mrtcal)−(mira)
WSW
0.1
0
−0.1
−0.2
H+V pol
setup E2 L224250
mira
mrtcal
T_A^* (K)
30
20
10
0
215000
220000
225000
230000
235000
Rest Frequency (MHz)

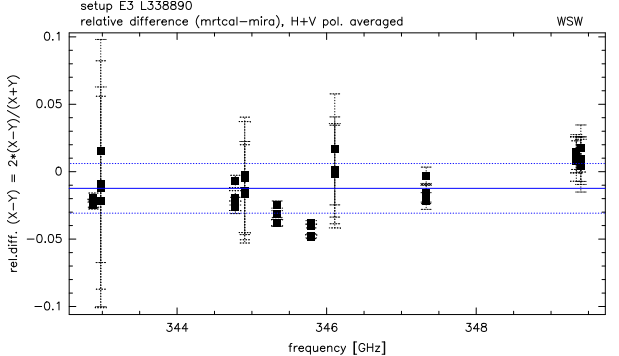

difference (mrtcal)−(mira)
WSW
0
−0.5
−1
−1.5
H+V pol
setup E3 L338890
mira
mrtcal
20
10
0
T_A^* (K)
344000
346000
348000
350000
Rest Frequency (MHz)

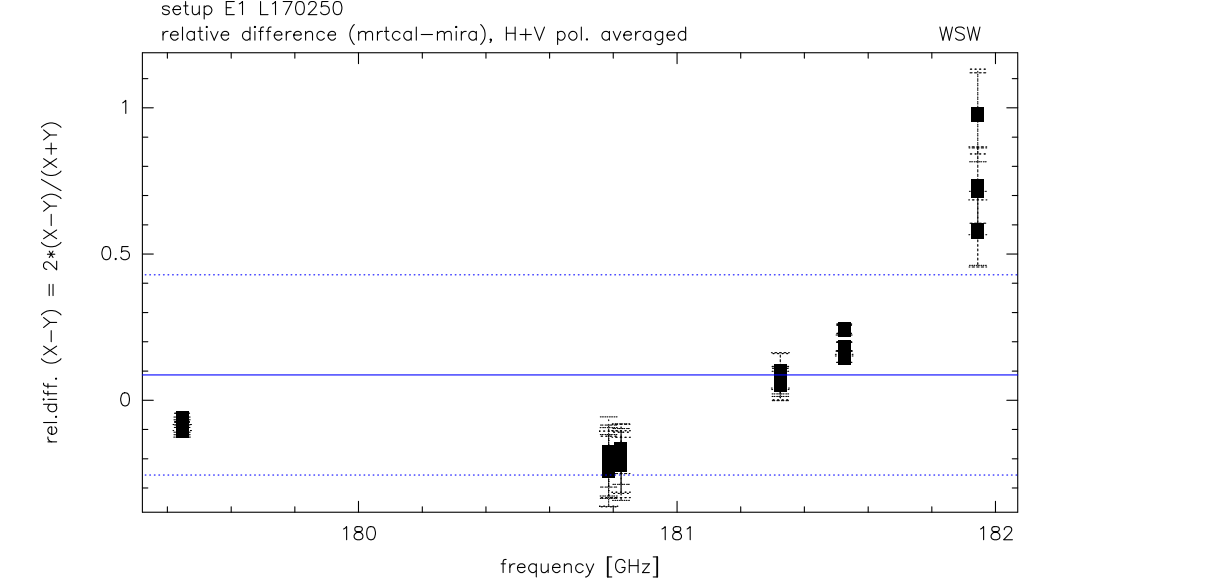
σ

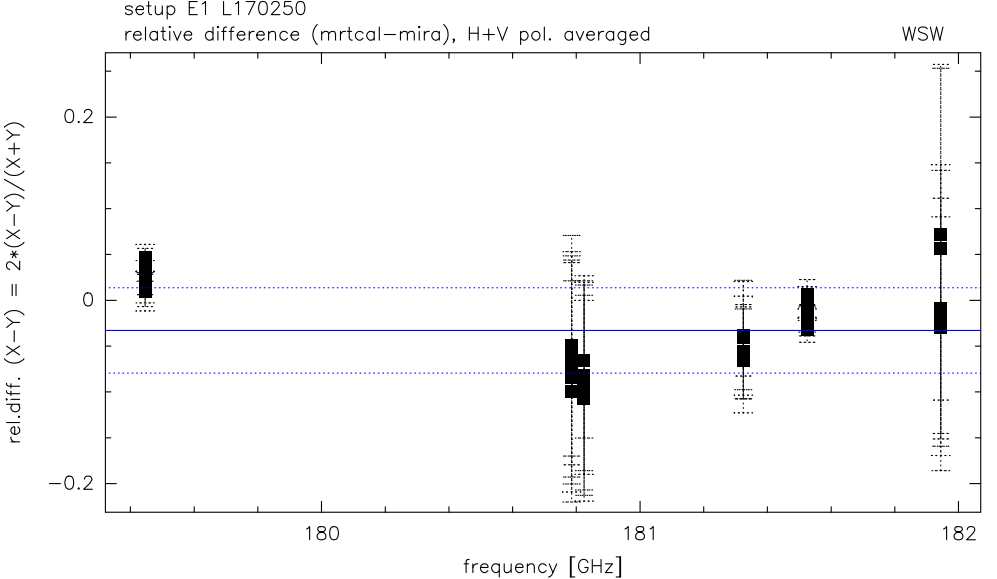

setup E1 POINT2MM
relative difference (mrtcal−mira), H+V pol. averaged
WSW
rel.diff. (X−Y) = 2*(X−Y)/(X+Y)
0.1
0
−0.1
150
152
154
frequency [GHz]

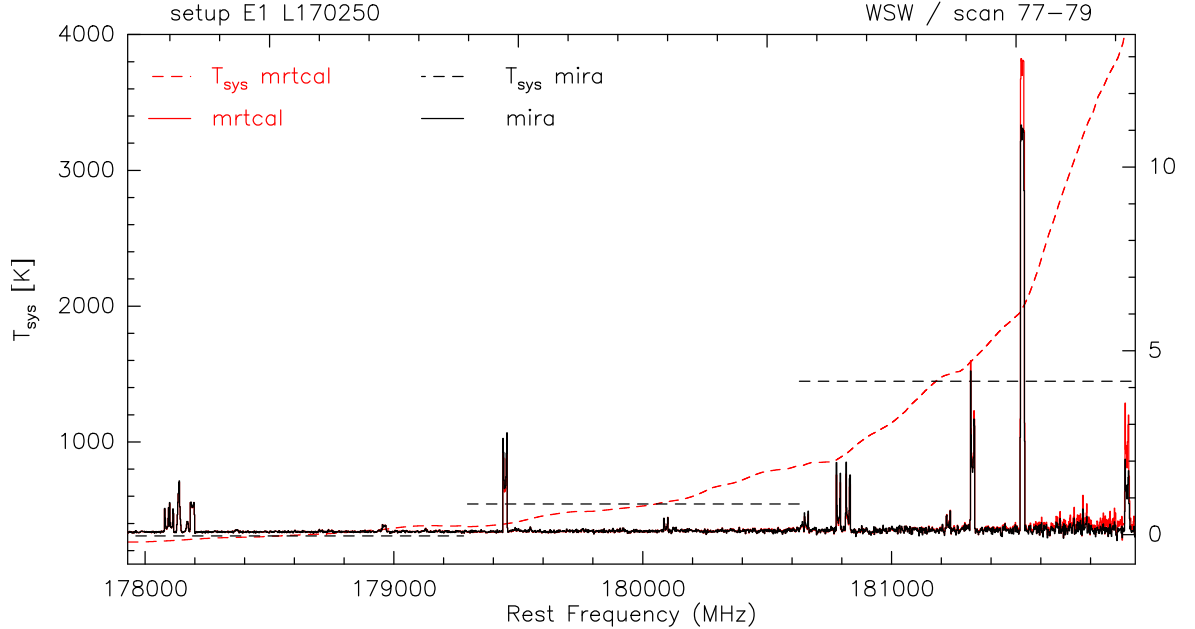

setup E1 L170250
relative difference (mrtcal−mira), H+V pol. averaged
WSW
rel.diff. (X−Y) = 2*(X−Y)/(X+Y)
1
0.5
0
160
170
180
frequency [GHz]

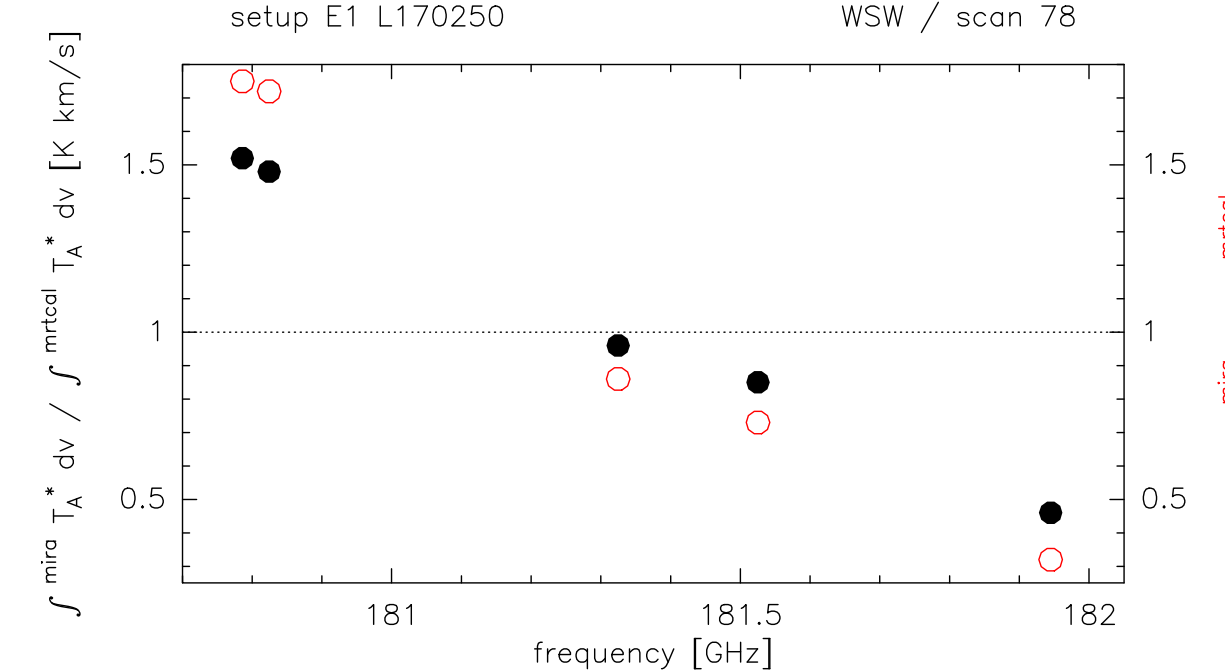

setup E2 L224250
relative difference (mrtcal−mira), H+V pol. averaged
WSW
rel.diff. (X−Y) = 2*(X−Y)/(X+Y)
0.1
0
−0.1
215
220
225
230
235
frequency [GHz]


setup E3 L338890
relative difference (mrtcal−mira), H+V pol. averaged
WSW
rel.diff. (X−Y) = 2*(X−Y)/(X+Y)
0.1
0.05
0
−0.05
−0.1
344
346
348
frequency [GHz]


setup E1 L170250
relative difference (mrtcal−mira), H+V pol. averaged
WSW
rel.diff. (X−Y) = 2*(X−Y)/(X+Y)
1
0.5
0
180
181
182
frequency [GHz]

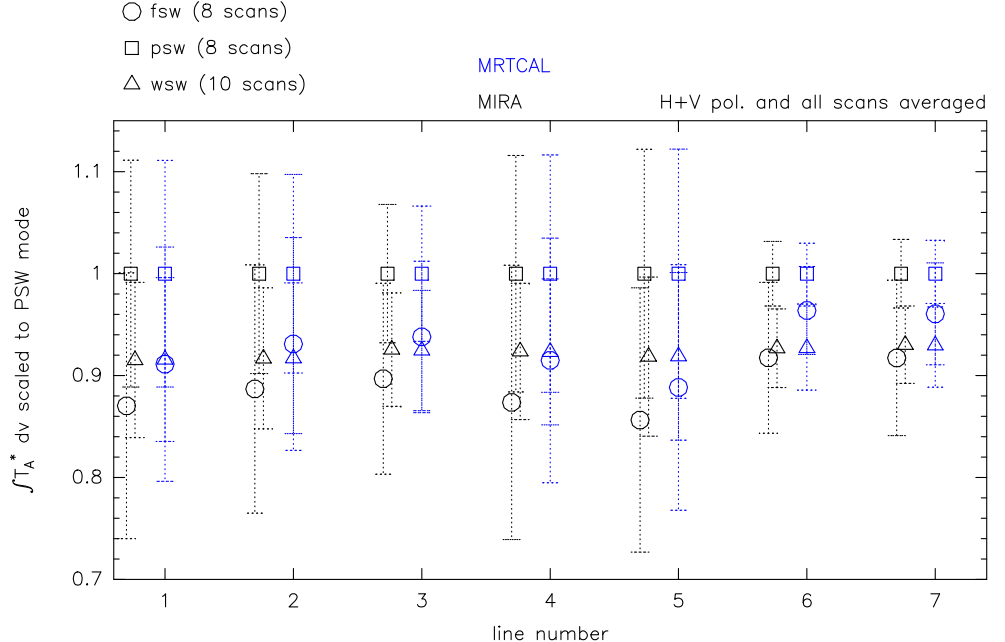

setup E1 L170250
relative difference (mrtcal−mira), H+V pol. averaged
WSW
rel.diff. (X−Y) = 2*(X−Y)/(X+Y)
0.2
0
−0.2
180
181
182
frequency [GHz]

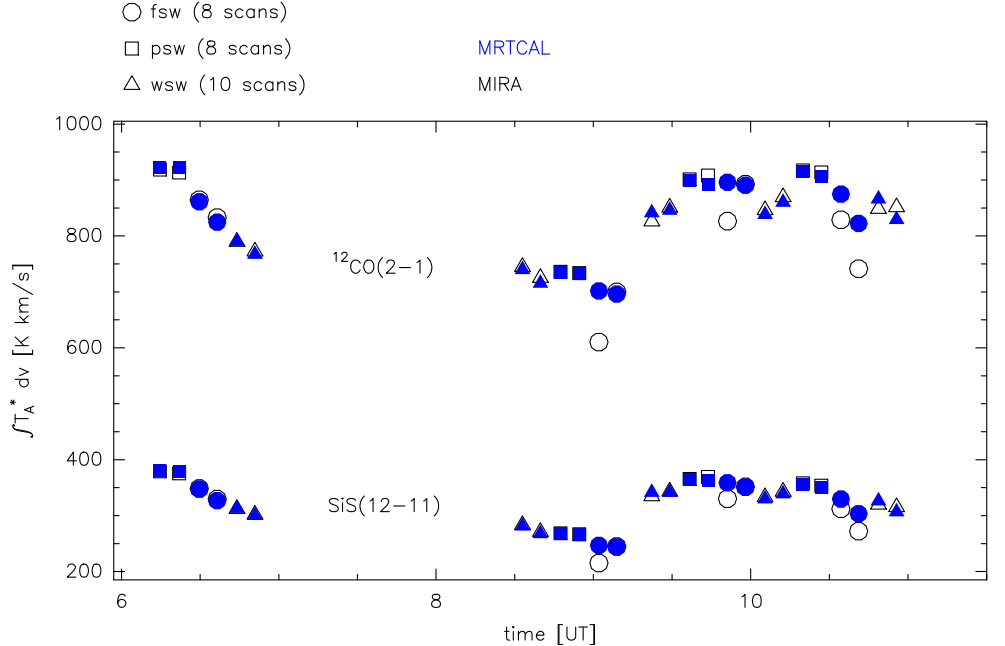

setup E1 L170250
WSW / scan 77−79
T_sys mrtcal
mrtcal
T_sys mira
mira
T_sys [K]
4000
3000
2000
1000
10
5
0
178000
179000
180000
181000
Rest Frequency (MHz)

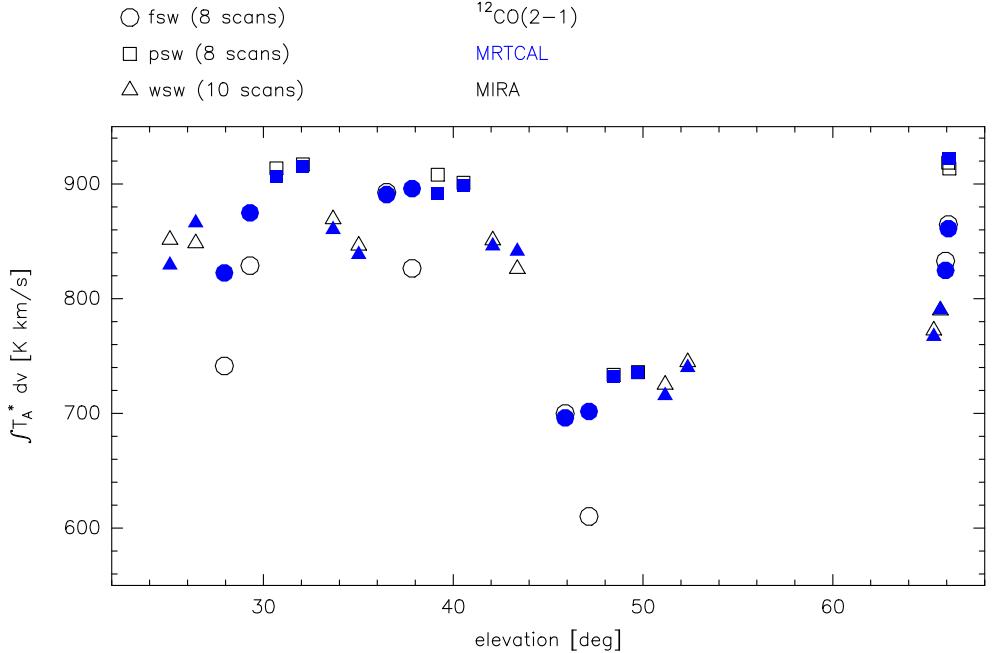

setup E1 L170250
WSW / scan 78
$\int$ mira T_A^* dv / $\int$ mrtcal T_A^* dv [K km/s]
1.5
1
0.5
181
181.5
182
frequency [GHz]


$\mathrm{T_{sys}}$




fsw (8 scans)
psw (8 scans)
wsw (10 scans)
MRTCAL
MIRA
H+V pol. and all scans averaged
∫T_A* dv scaled to PSW mode
line number
1.1
1
0.9
0.8
0.7
1
2
3
4
5
6
7


fsw (8 scans)
psw (8 scans)
wsw (10 scans)
MRTCAL
MIRA
1000
800
600
400
200
6
8
10
time [UT]
∫T_A* dv [K km/s]
12CO(2−1)
SiS(12−11)


fsw (8 scans)
psw (8 scans)
wsw (10 scans)
12CO(2−1)
MRTCAL
MIRA
900
800
700
600
30
40
50
60
elevation [deg]
∫T*A dv [K km/s]

3



2

$0{,}4$

$1,3$

$1,4$

$0{,}3$

4



$^2\Pi_{1/2}$



34

29

$2{,}6$

$2{,}5$

$6{,}2$

$6{,}0$

30

$0{,}8$

$0{,}7$

$4{,}6$

$4{,}5$

$4,4$

33

$\mathrm{K_a}$,$\mathrm{K_c}$

$3{,}0$

$2,1$

1

18

13

$2,9$

$2{,}8$

$8{,}2$

$8{,}1$

$8{,}3$

$6{,}5$

$6{,}4$

$6{,}3$

$0{,}16$

$0{,}15$

$2,12$

$2,11$