V883_Ori

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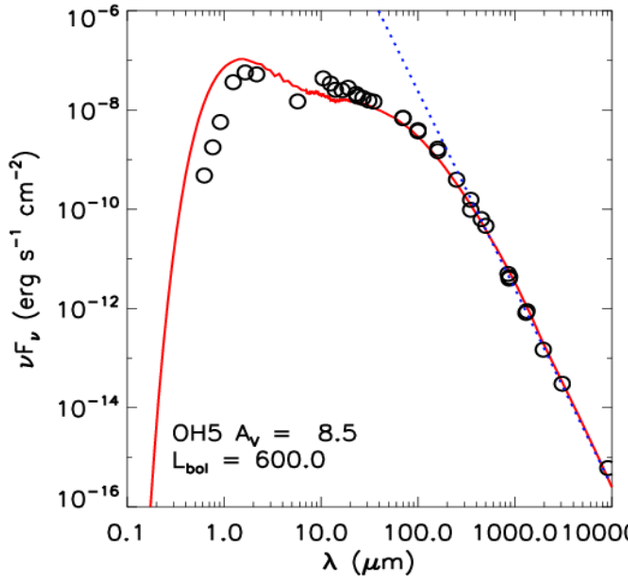
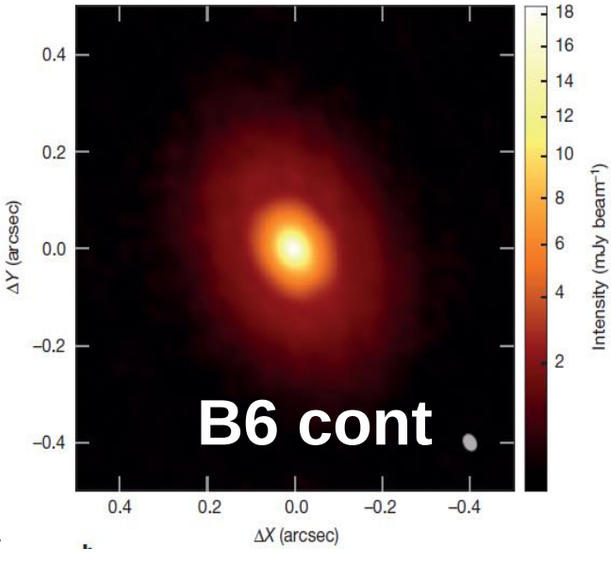
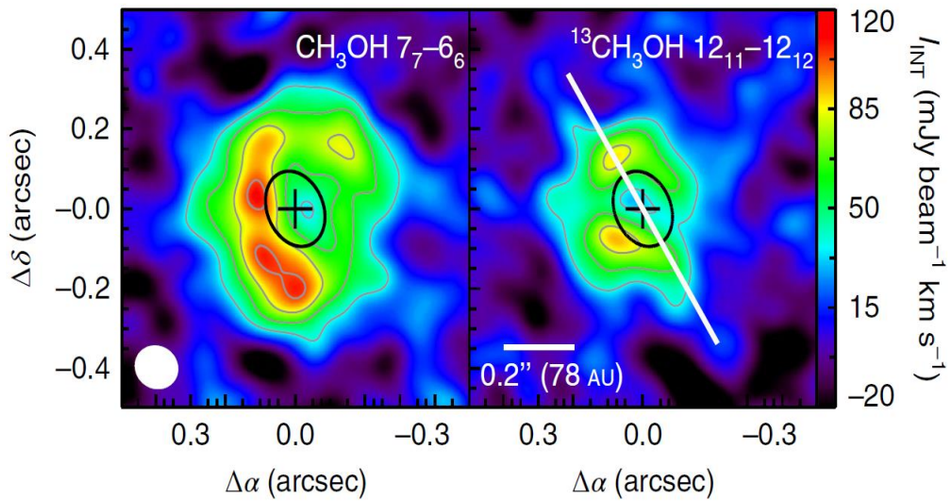
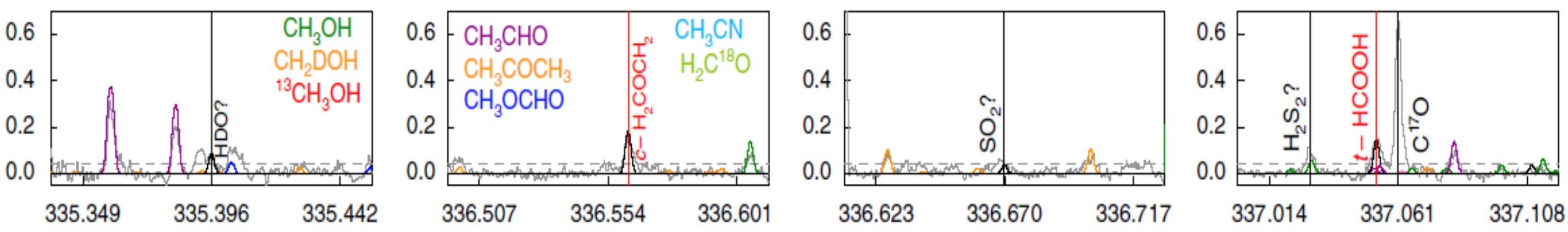
V883 Ori

- FU Ori
  - L_{bol} = 187.2 (A_V=0) /600 (A_V=8.5) $L_\odot$
  - M_{acc} = 7x10^{-5} $M_\odot$ yr^{-1} (Cieza +2016)
- Distance = 388 pc (Lee, J.E.+2019)
- Water snowline :
  - 38 au (0.1”) ← dust opacity (Cieza+2016)
  - ~100 au ← CH_3OH vs. HCO^+ (Leemker+2021)
- Complex Organic Molecules (Lee, J.E.+2019)





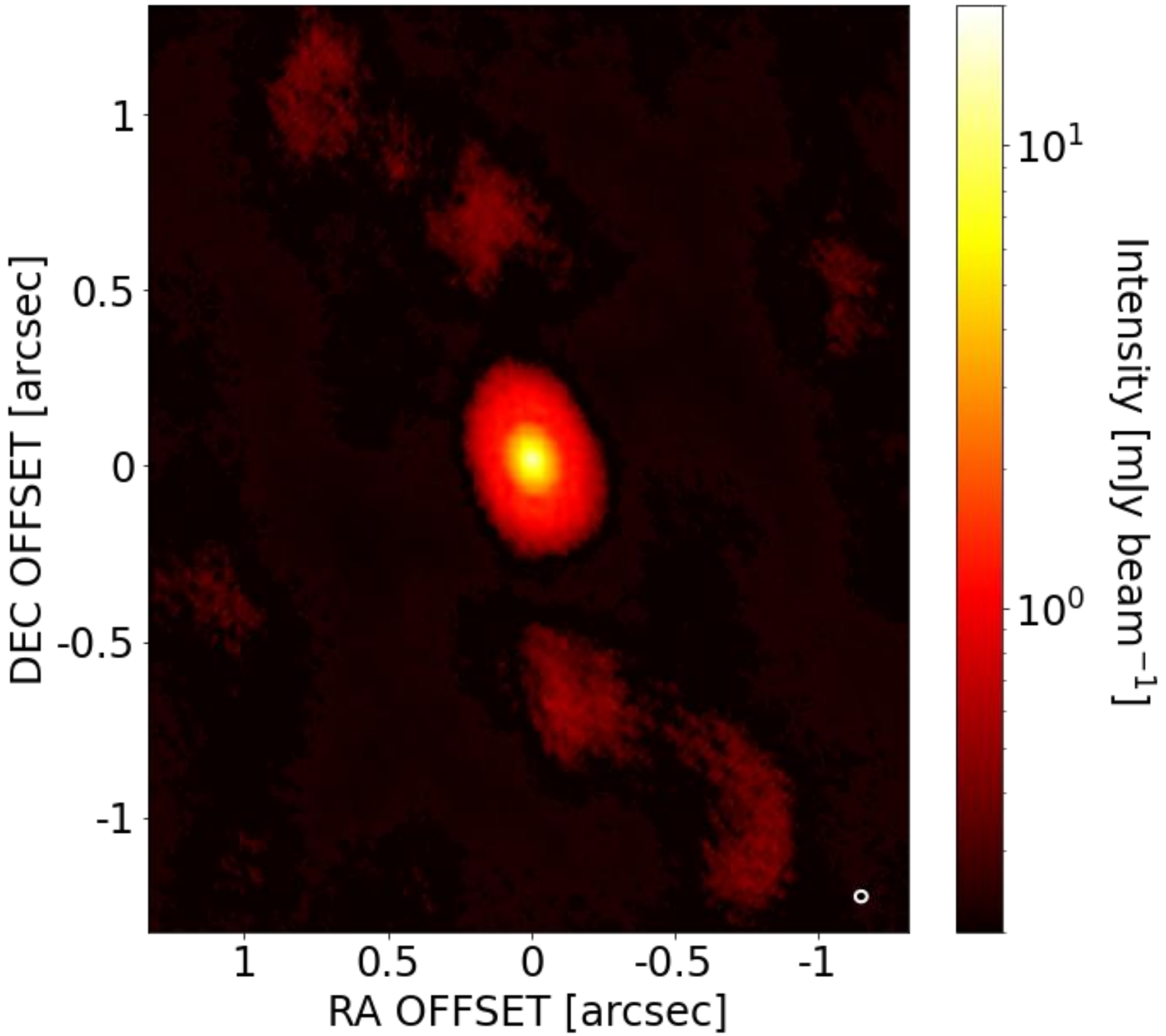




Self-Calibration

- Signal to noise ratio before self-calibration = 100
- # of Antenna (N_A) = 45, Solint. = 600 s , # of solutions (N_S) = 5
- $\frac{S/N}{\sqrt{N_A - 3}}$ ~15.4 , $\frac{S/N}{\sqrt{N_A - 3}} \frac{1}{\sqrt{N_S}}$ ~ 6.9
- S/N ~3 > error ~ 15 degrees
- S/N > 3 : Phase cal possible, S/N >10 Amp cal possible

Before Self-Cal.

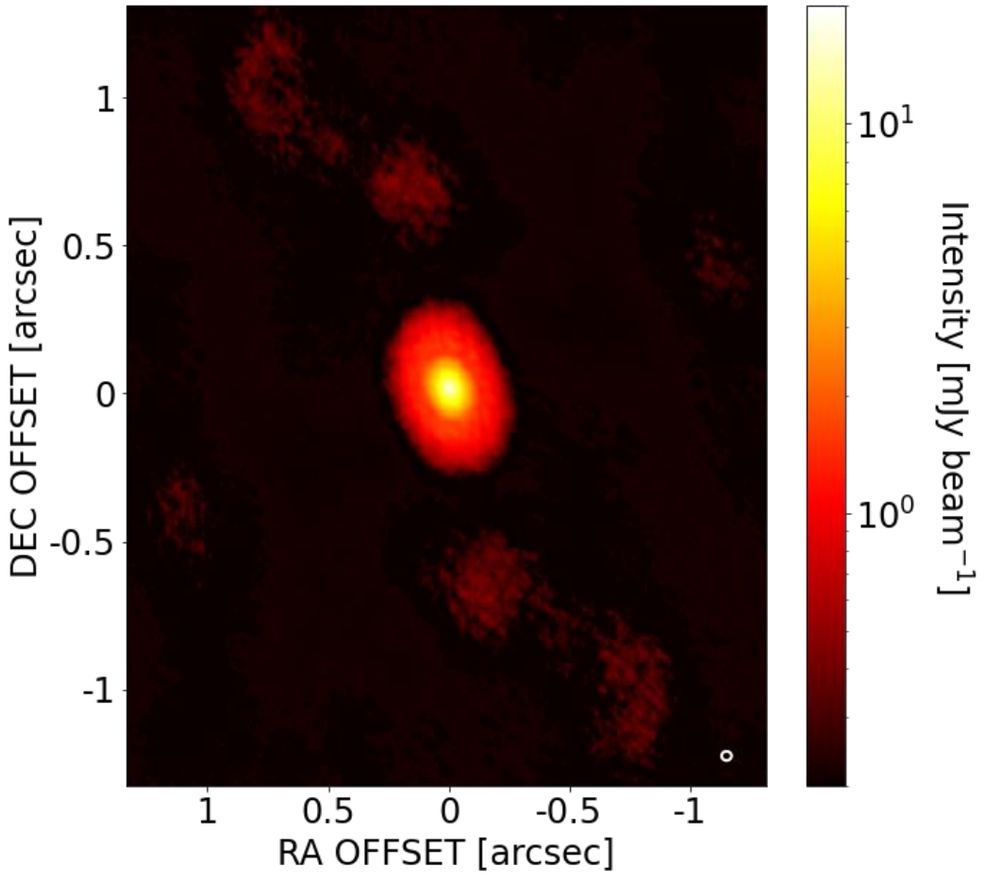


MAX : 1.38E-02

RMS : 1.16E-04

S/N : 119

- After Phase Cal

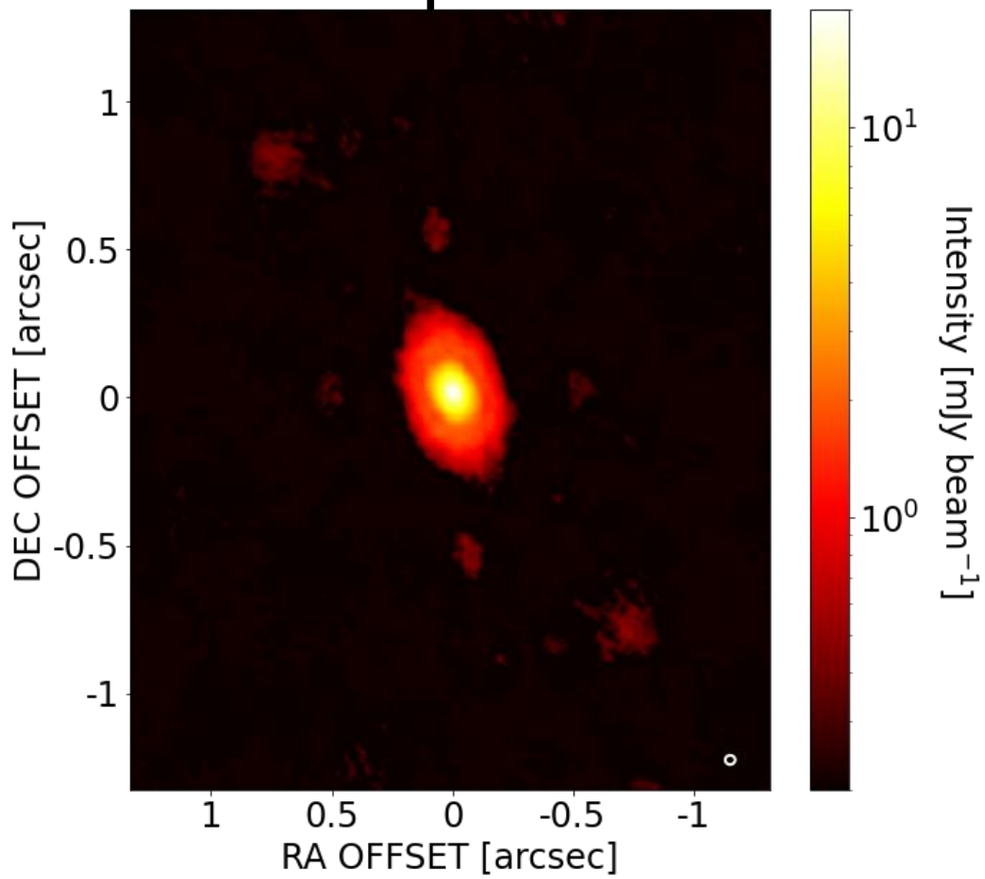


Peak : 1.59E-02

RMS : 1.51E-04

S/N : 105

- After Apcal



Peak : 2.00E-02

RMS : 1.20E-04

S/N : **166**

	solint	threshold
1st	600	10sig
2nd	600	3sig
Apcal	1500	3sig

- S/N increases about 40%

Two Cases

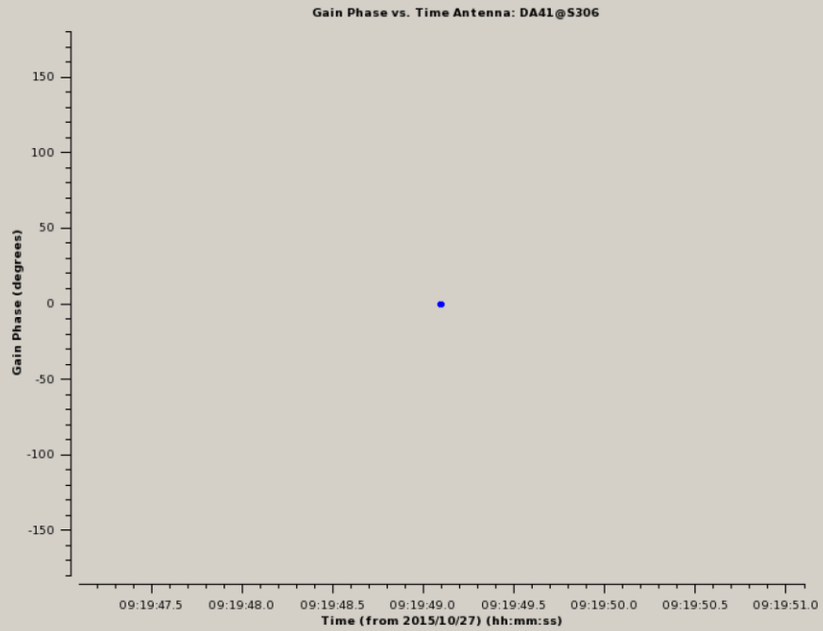
- Case 1 : Shallow > Deep

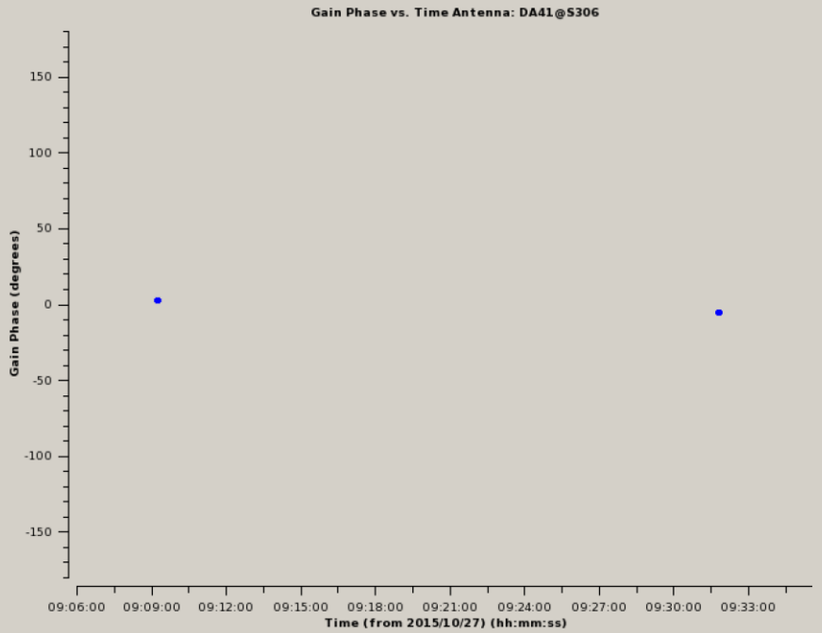
	solint	threshold
1st	inf	20sig
2nd	1500	10sig
3rd	900	10sig
4th	600	5sig
5th	300	2sig
Apcal	1500	2sig

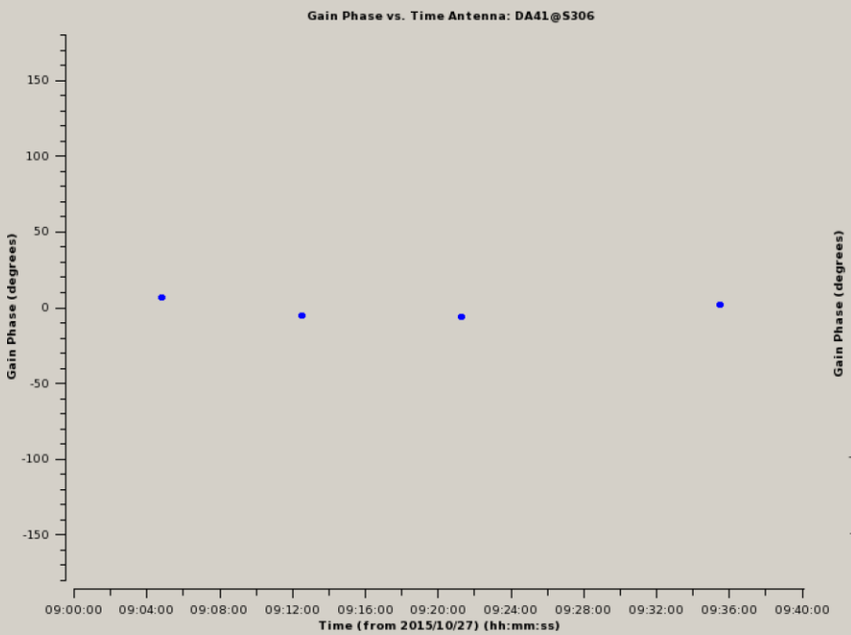
- Case 2 : Uniform depth

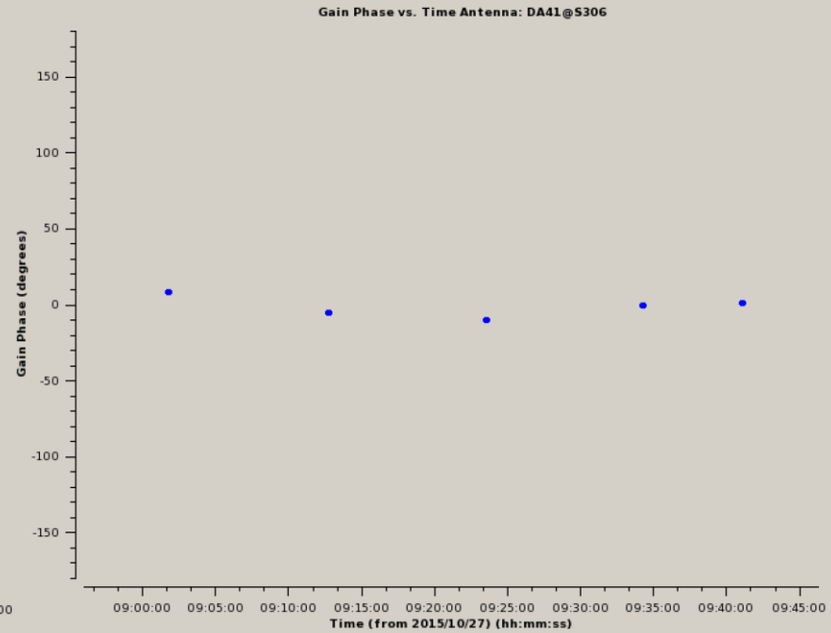
	solint	threshold
1st	inf	5sig
2nd	1500	5sig
3rd	900	5sig
4th	600	5sig
5th	300	5sig
Apcal	1500	5sig

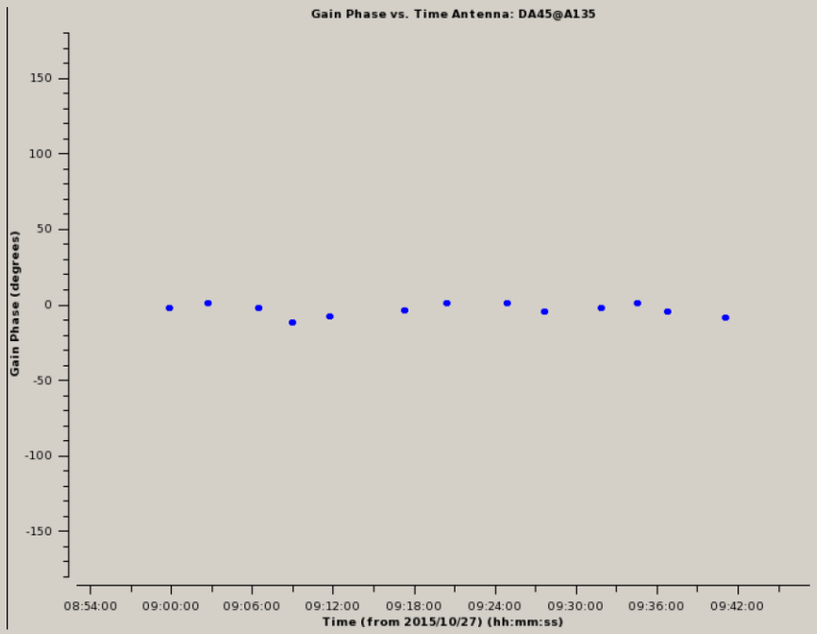
Time vs. Phase





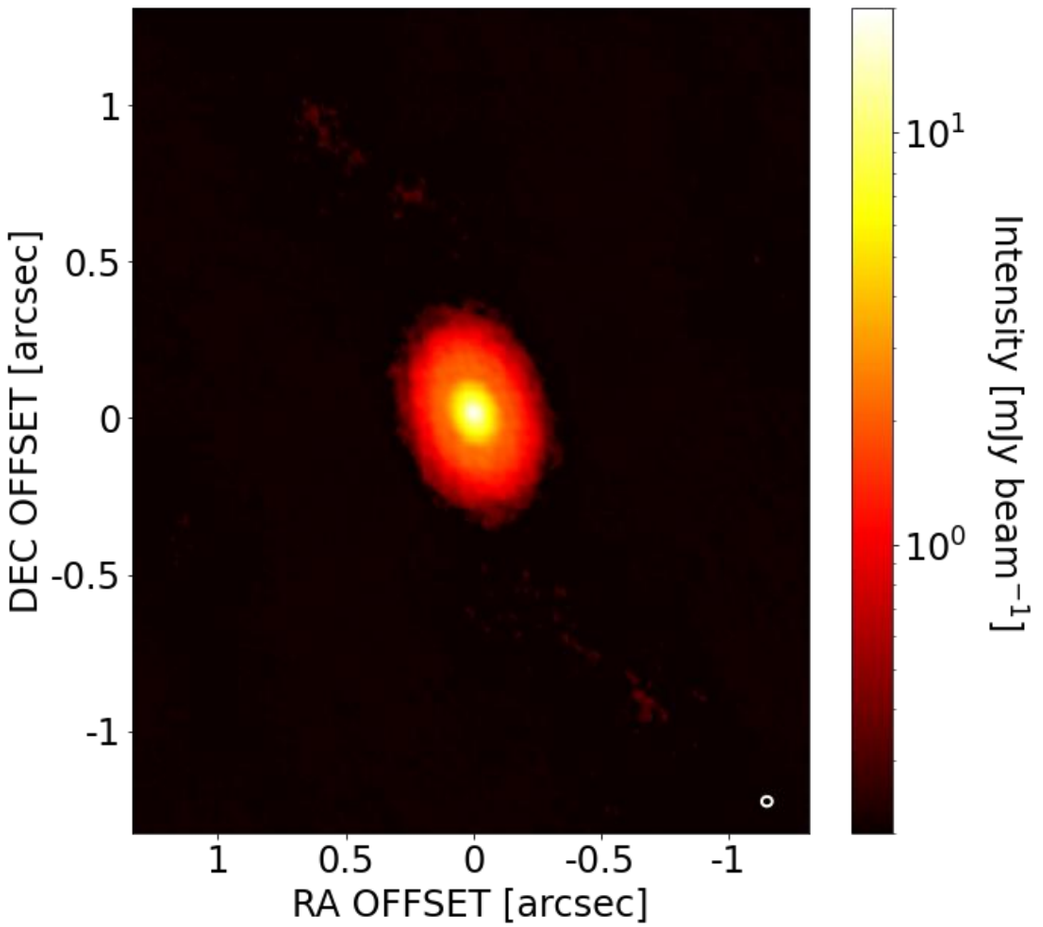






After Phase Cal

- Case 1 : Shallow > Deep

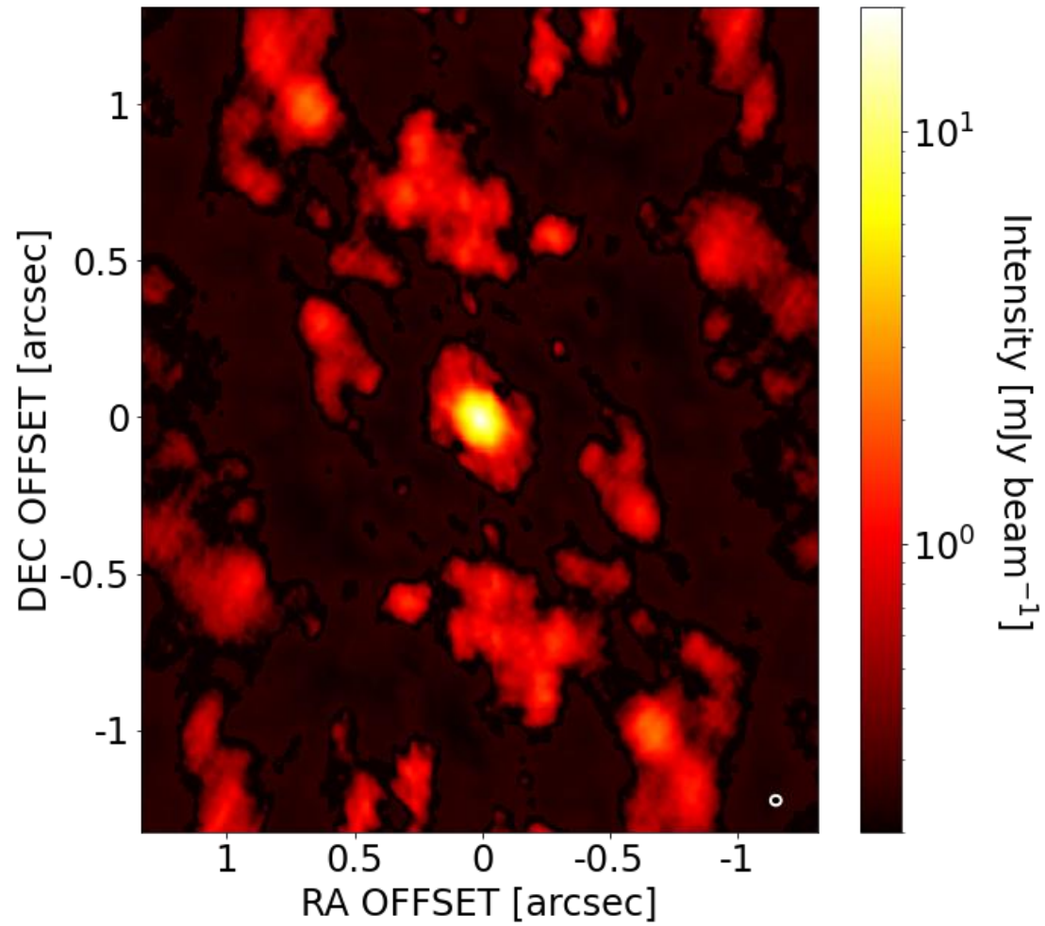


MAX : 1.89E-02

RMS : 1.05E-04

S/N : 180

- Case 2 : Uniform depth



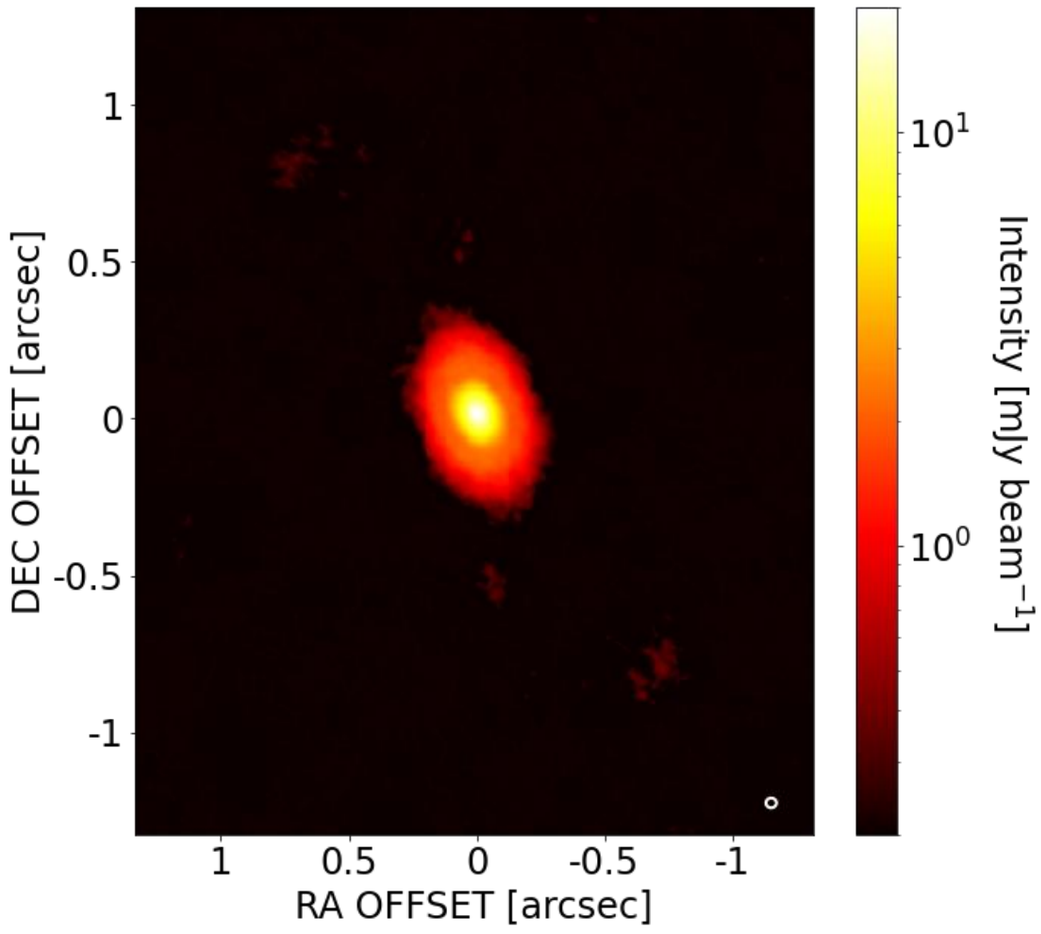
MAX : 1.83E-02

RMS : 4.36E-04

S/N : 42

After Apcal

- Case 1 : Shallow > Deep

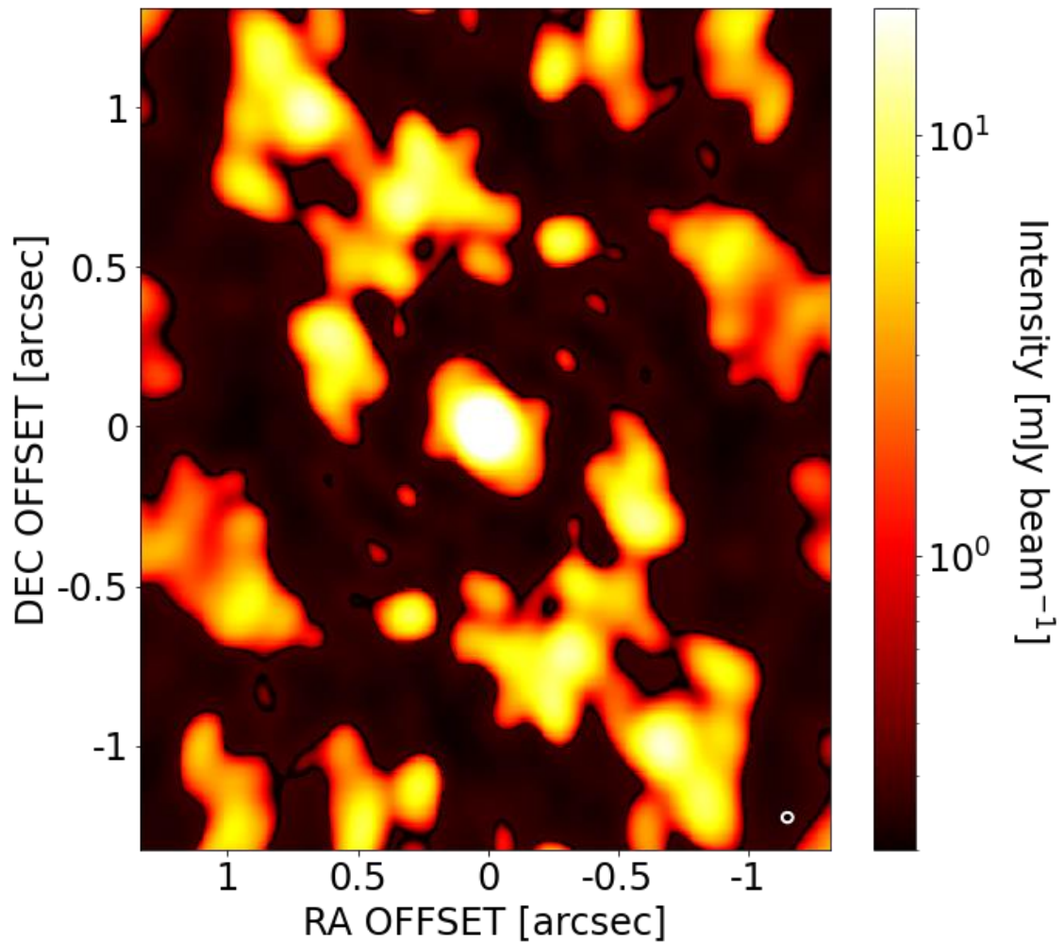


MAX : 2.04E-02

RMS : 9.27E-05

S/N : **220**

- Case 2 : Uniform depth

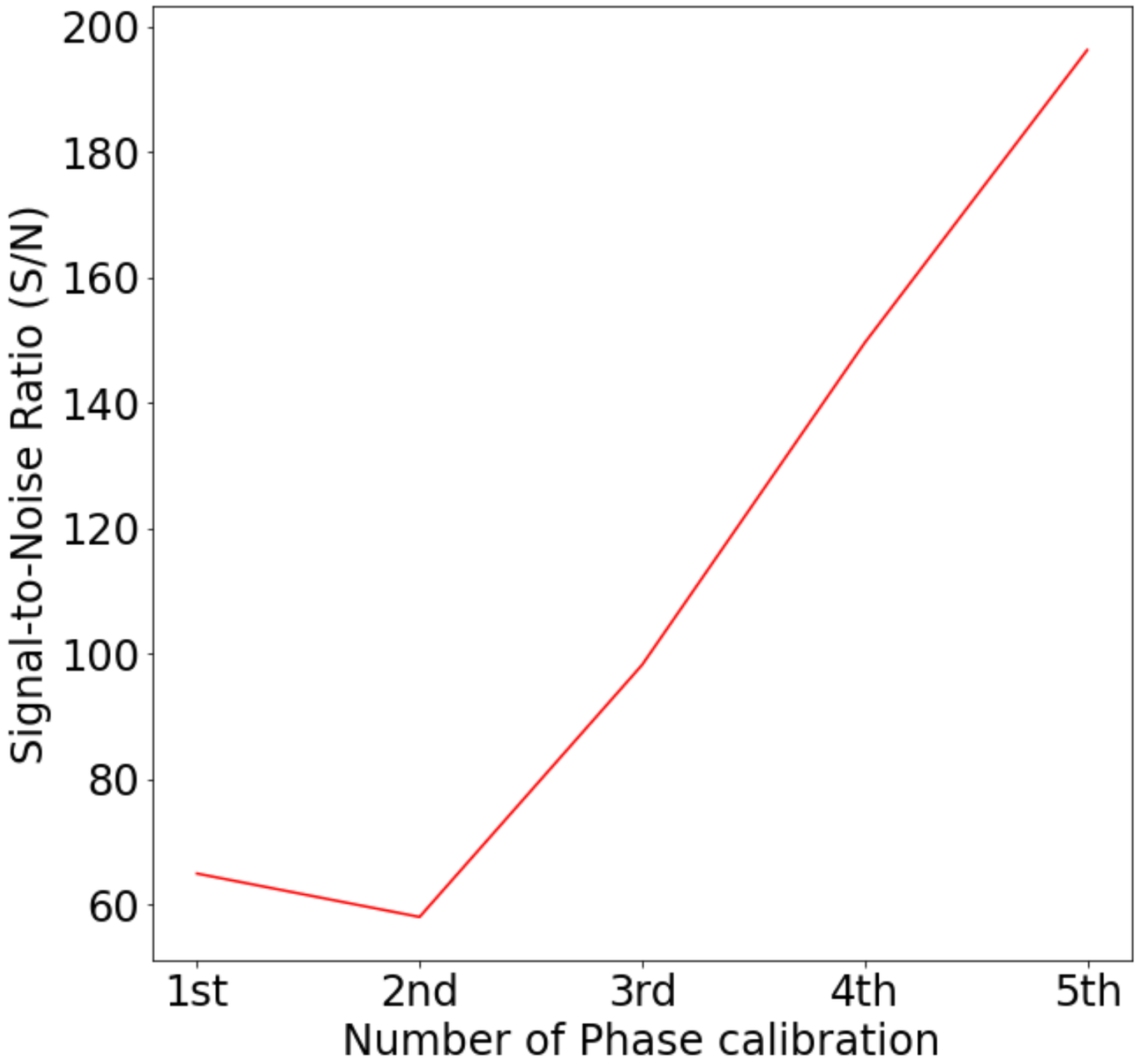


MAX : 6.80E-02

RMS : 3.33E-03

S/N : 20

Change of S/N


200
180
160
140
120
100
80
60
Signal-to-Noise Ratio (S/N)
1st
2nd
3rd
4th
5th
Number of Phase calibration

Conclusions

- Case 1 : Shallow > Deep

	solint	threshold
1st	inf	20sig
2nd	1500	10sig
3rd	900	10sig
4th	600	5sig
5th	300	2sig
Apcal	1500	2sig

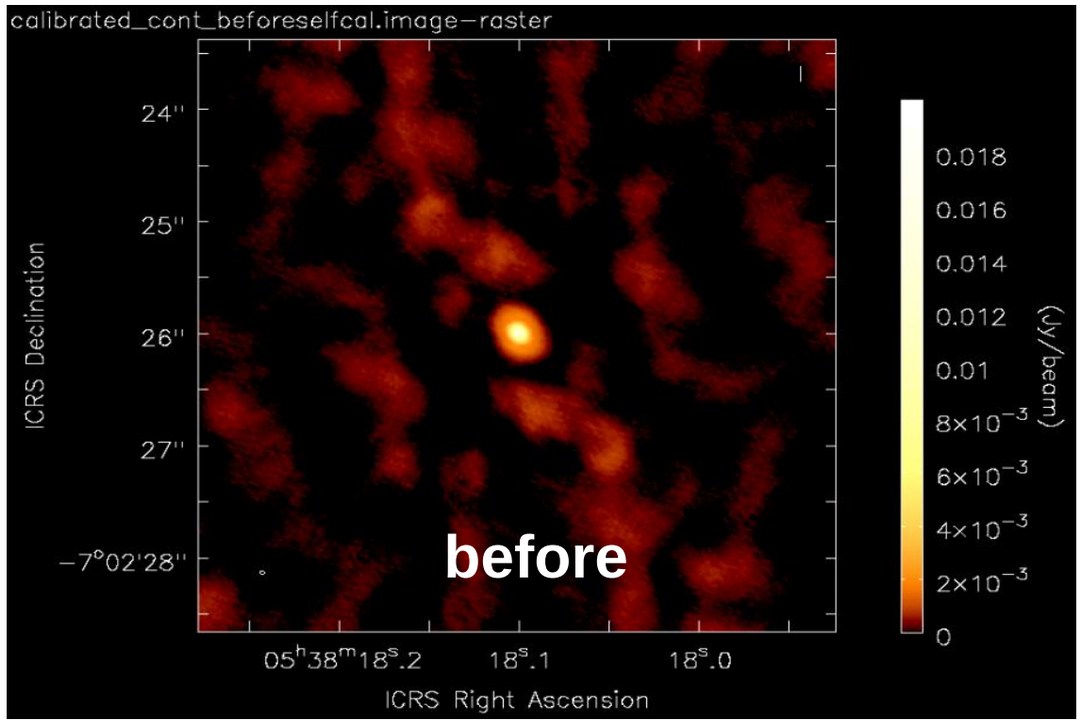
- S/N increases about twice

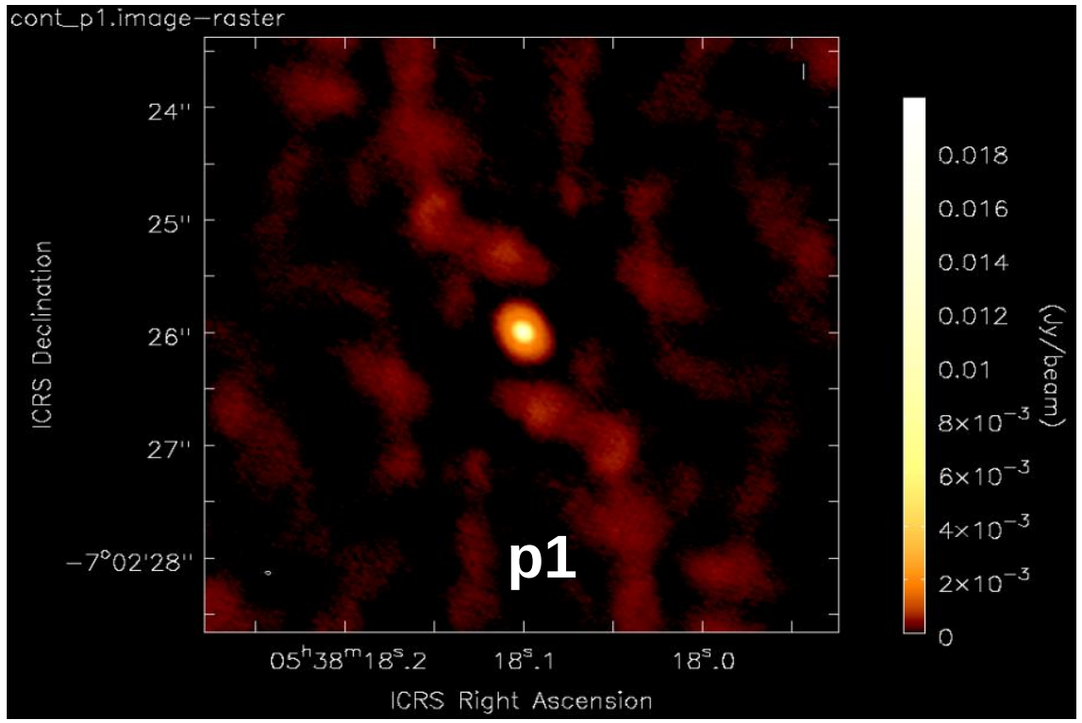
- Case 2 : Uniform depth

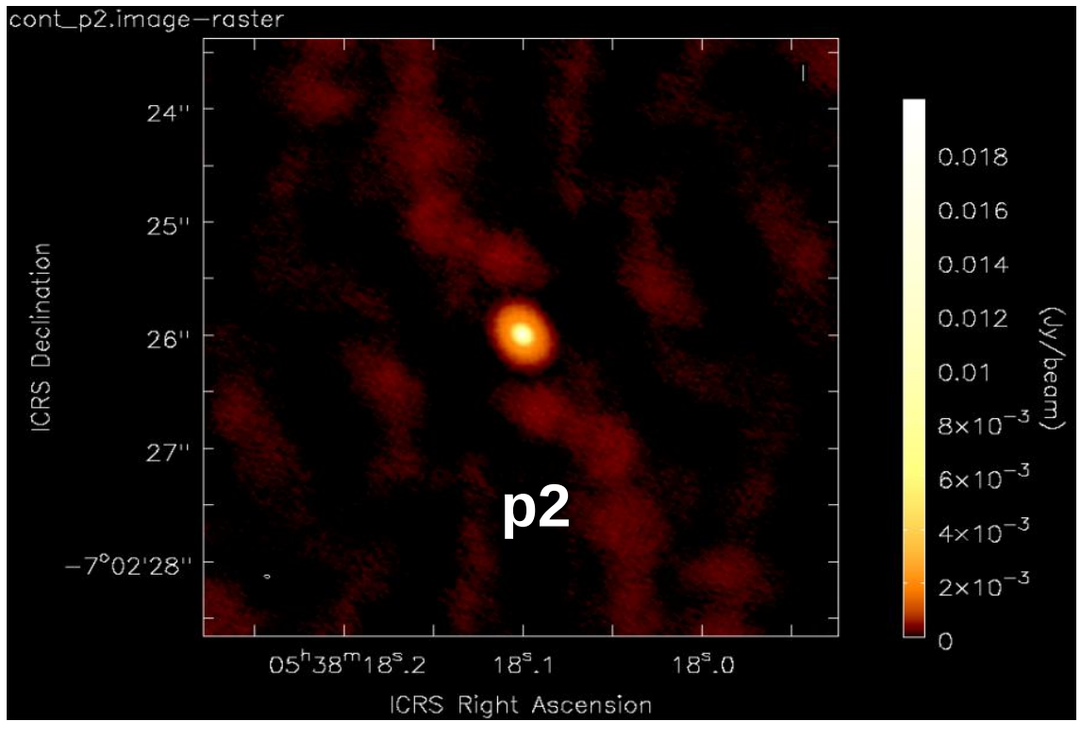
	solint	threshold
1st	inf	5sig
2nd	1500	5sig
3rd	900	5sig
4th	600	5sig
5th	300	5sig
Apcal	1500	5sig

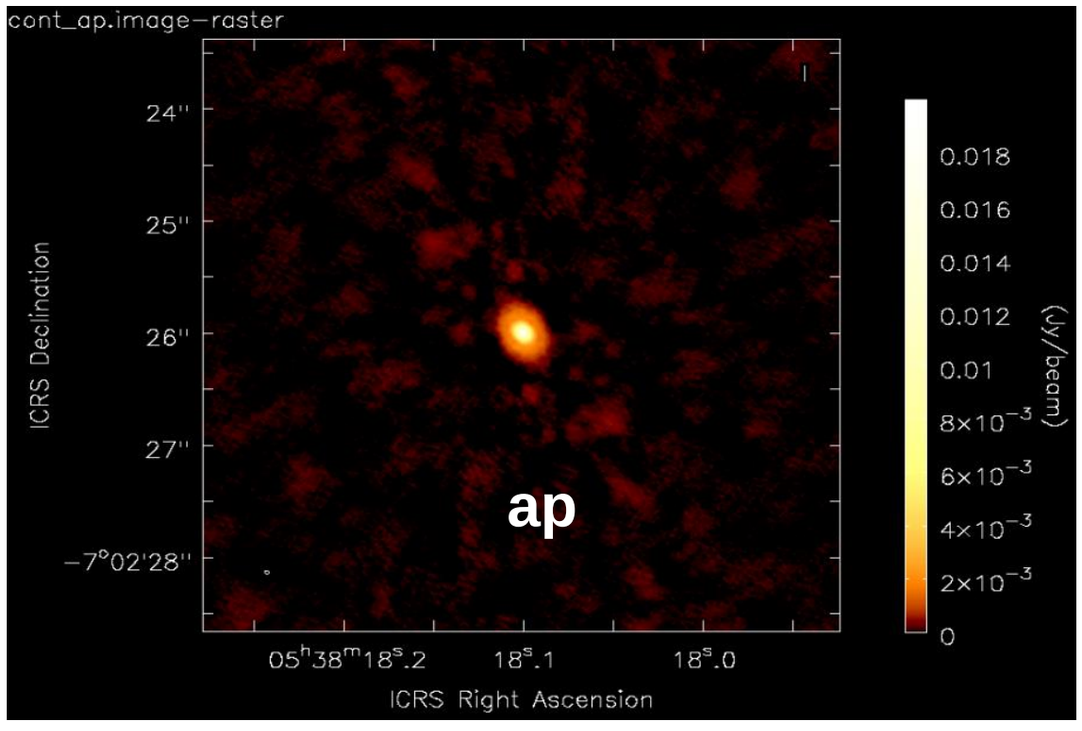
- S/N decreases six times

Self Calibration







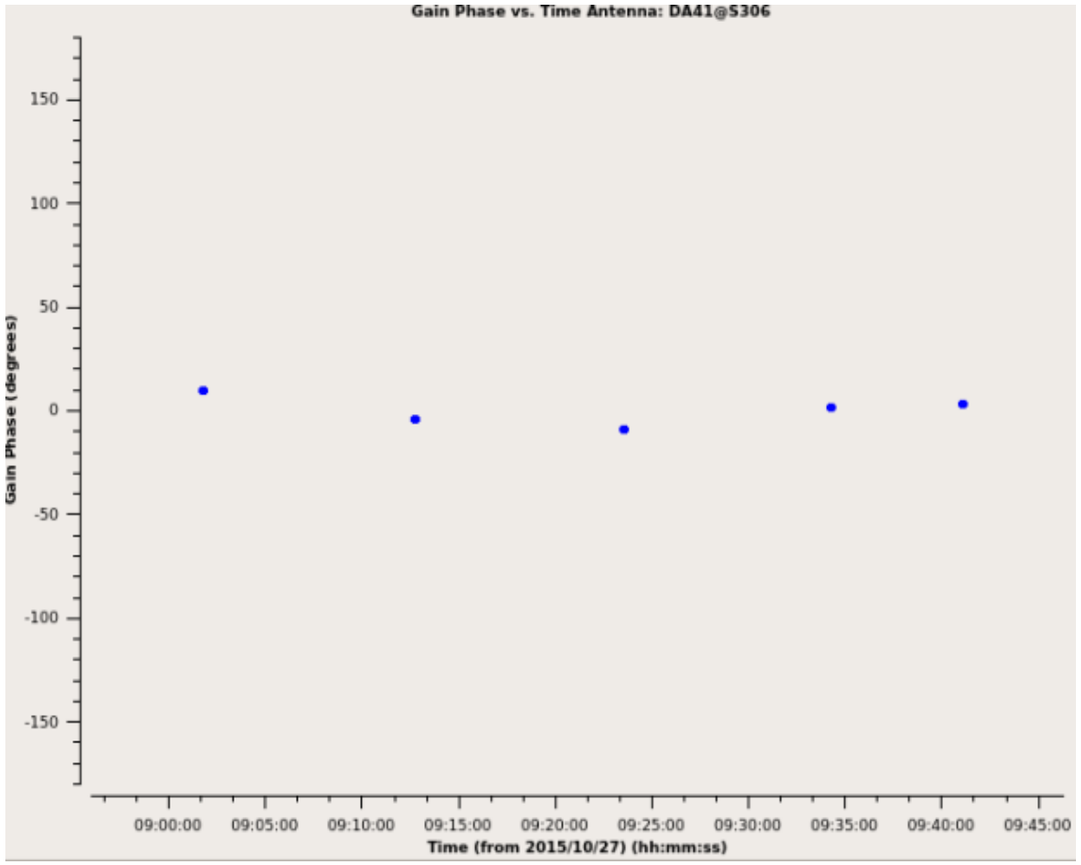


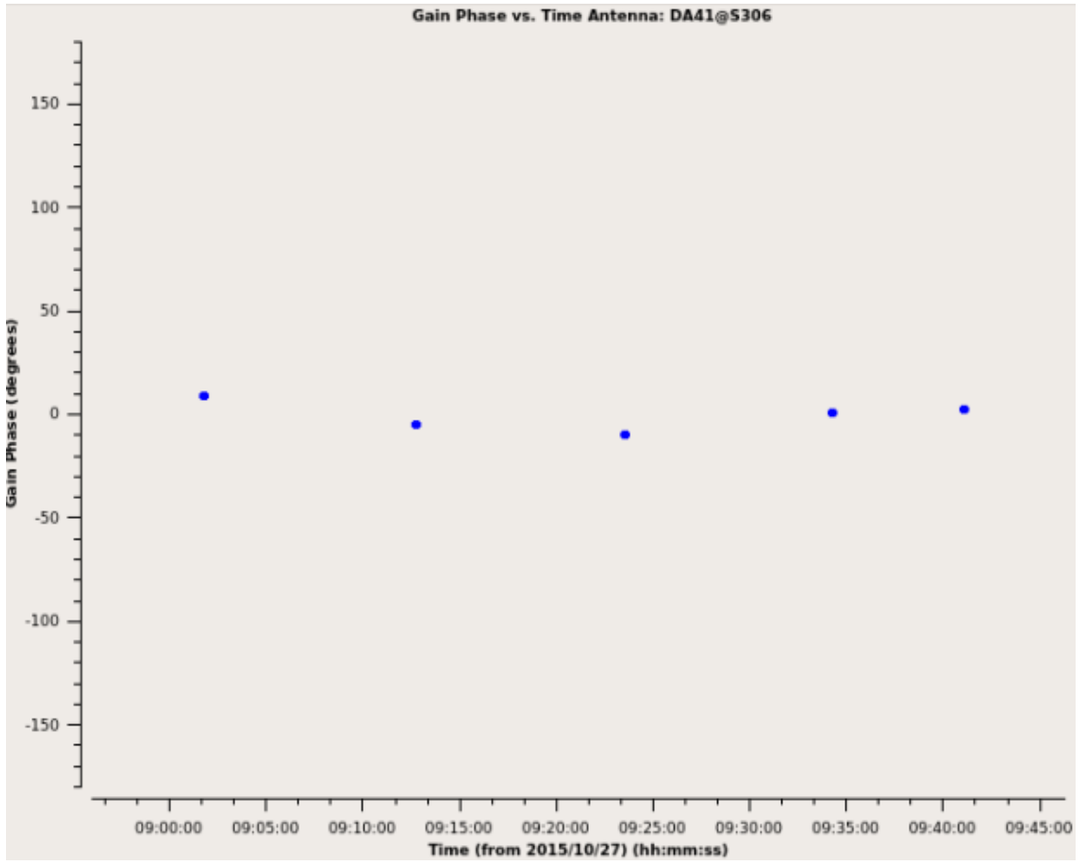
Change of S/N

	solint	Iteration	Max	RMS	S/N
Before		200	1.89E-2	2.38E-4	79
1st	600	400	1.89E-2	1.76E-4	107
2nd	600	1100	1.93E-2	1.25E-4	154
Apcal	1500	600	2.01E-2	8.62E-5	233

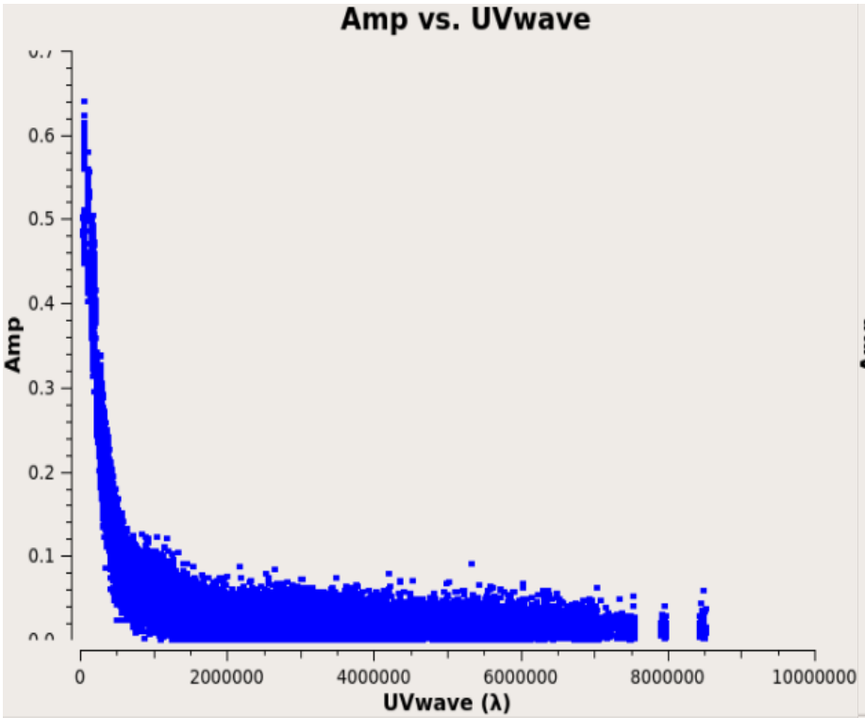
Only one deep tclean (1000 Iteration)
Max = 1.93E-2 RMS = 1.36E-4 → S/R = 142

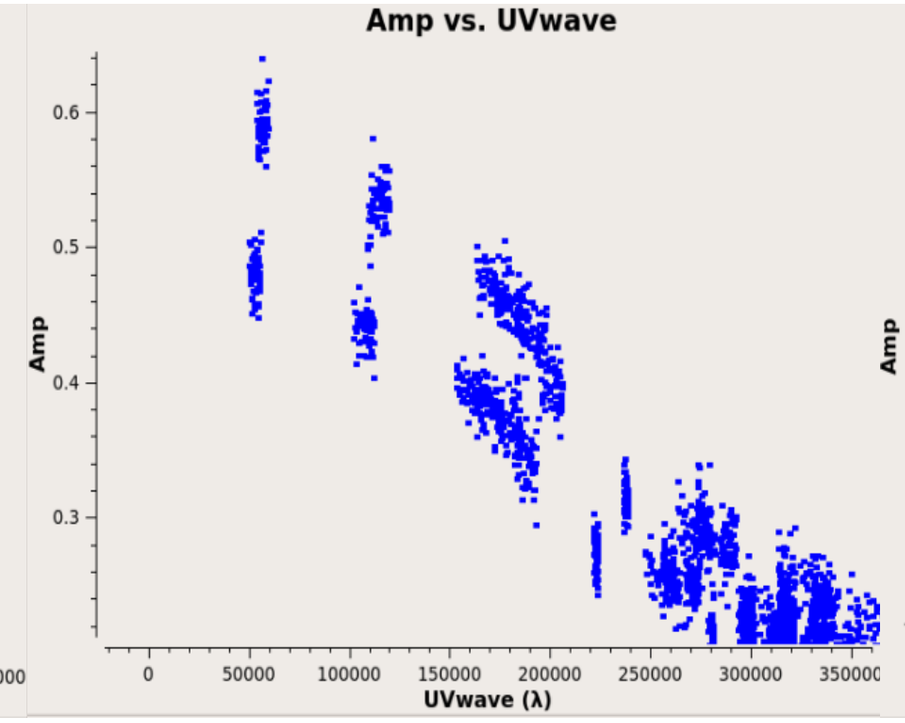
Time vs. Phase

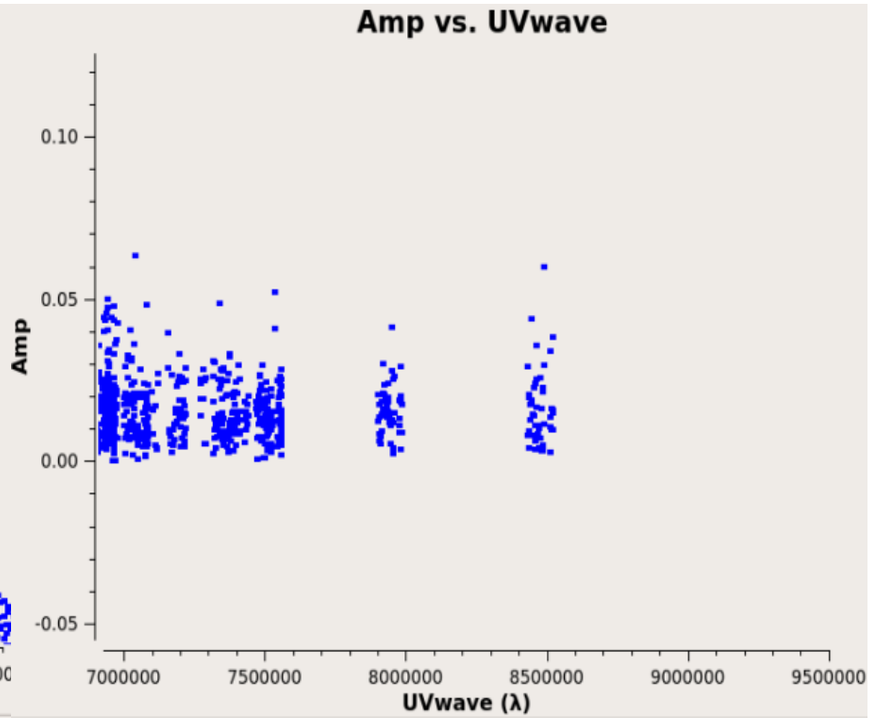




Amp vs. UVwave



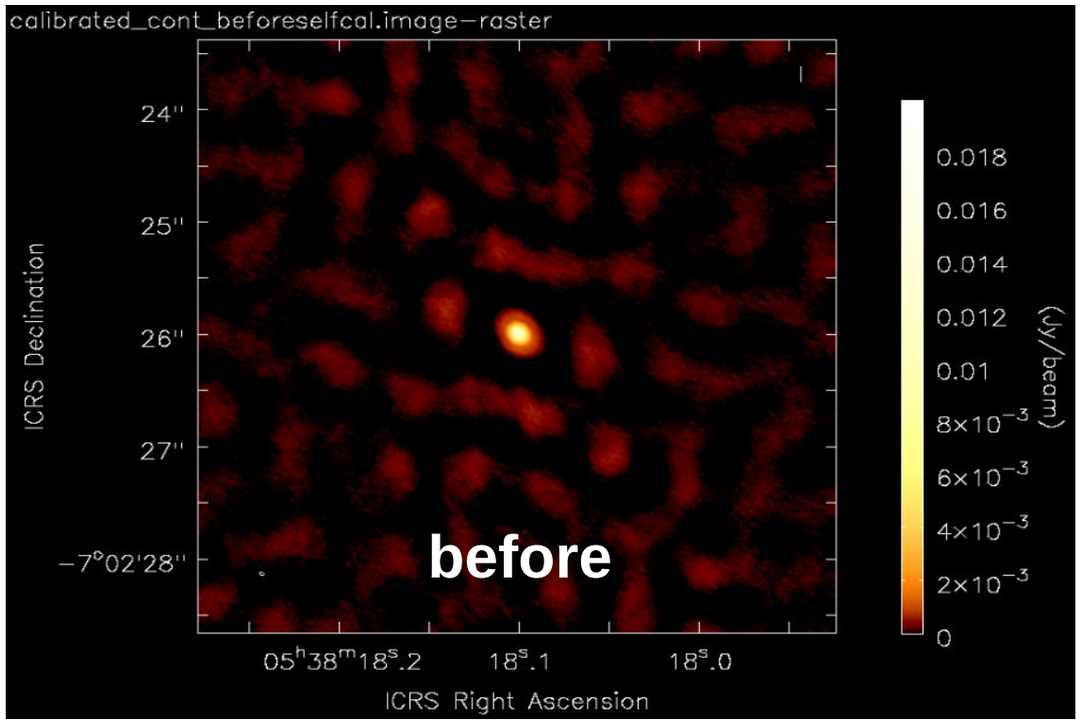


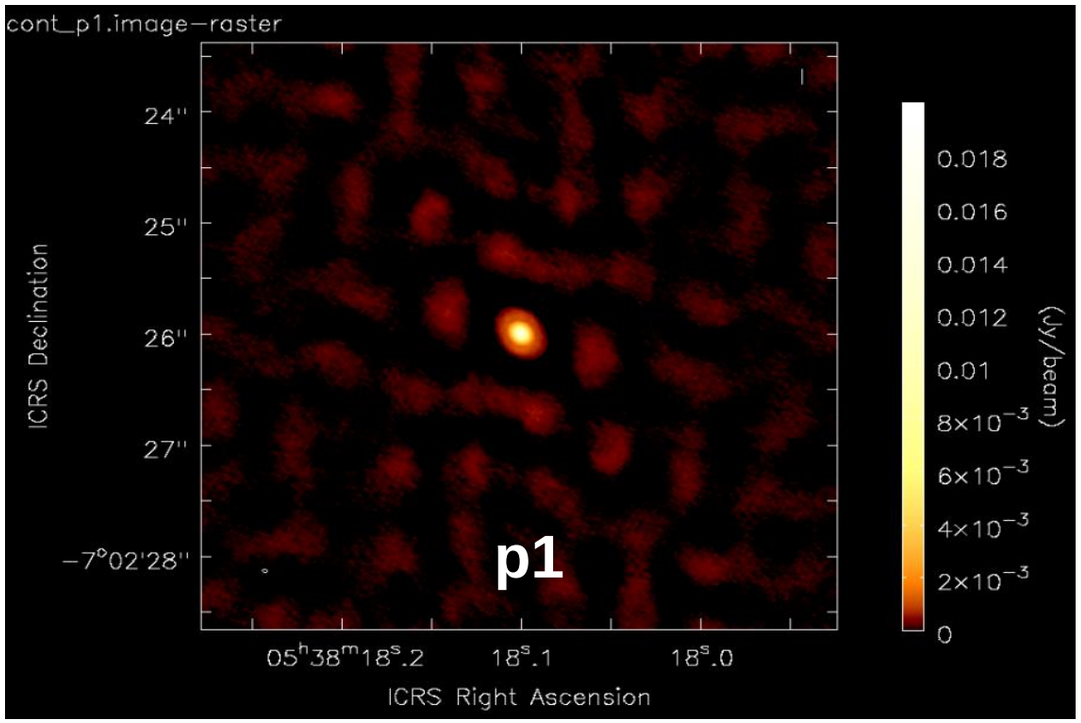


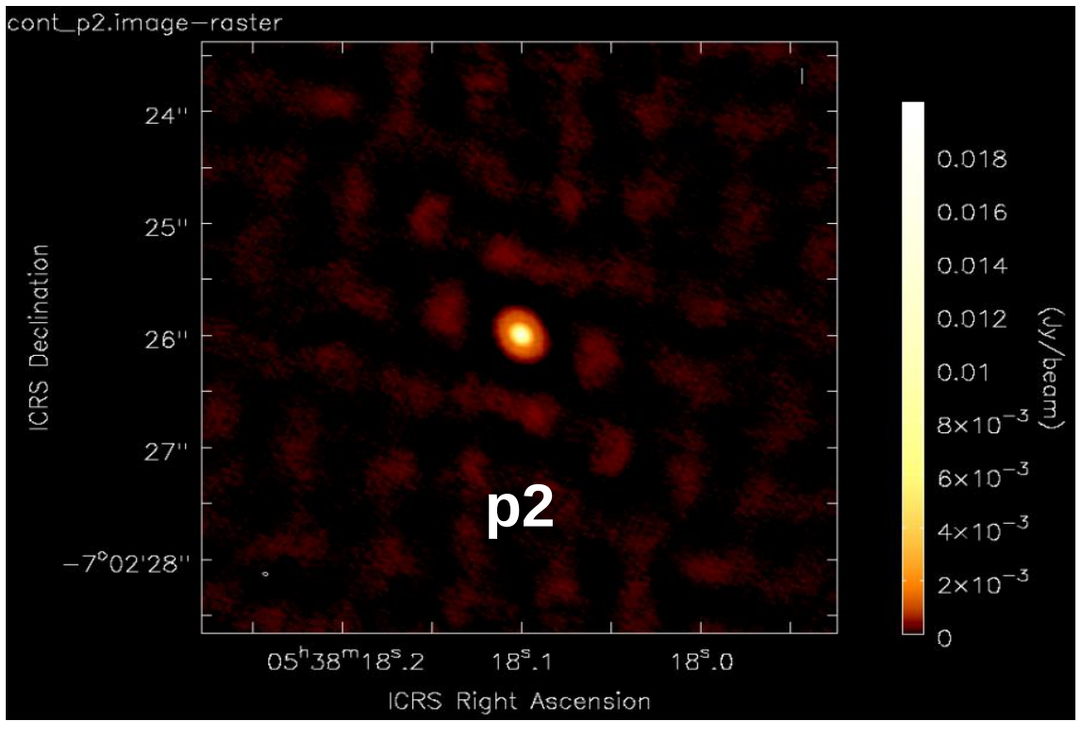
Cutting the uvrange less than 250kλ and greater than 7700kλ

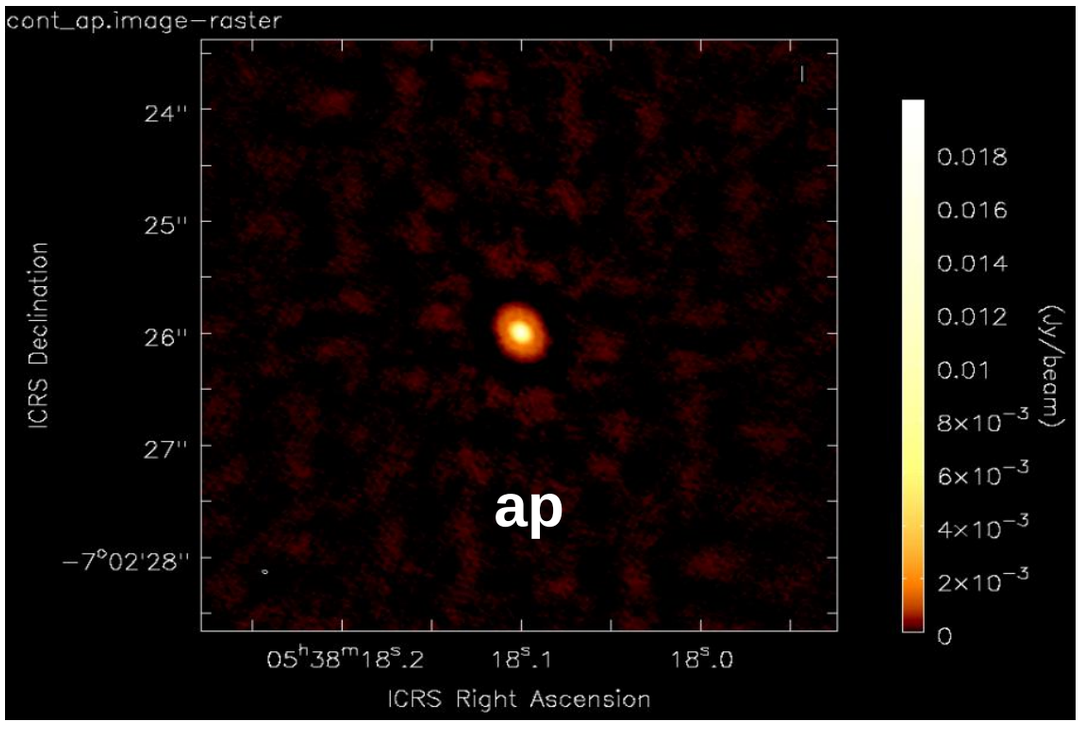
```
uvrange='250~7700klambda'
```

Cutting the short and long baseline





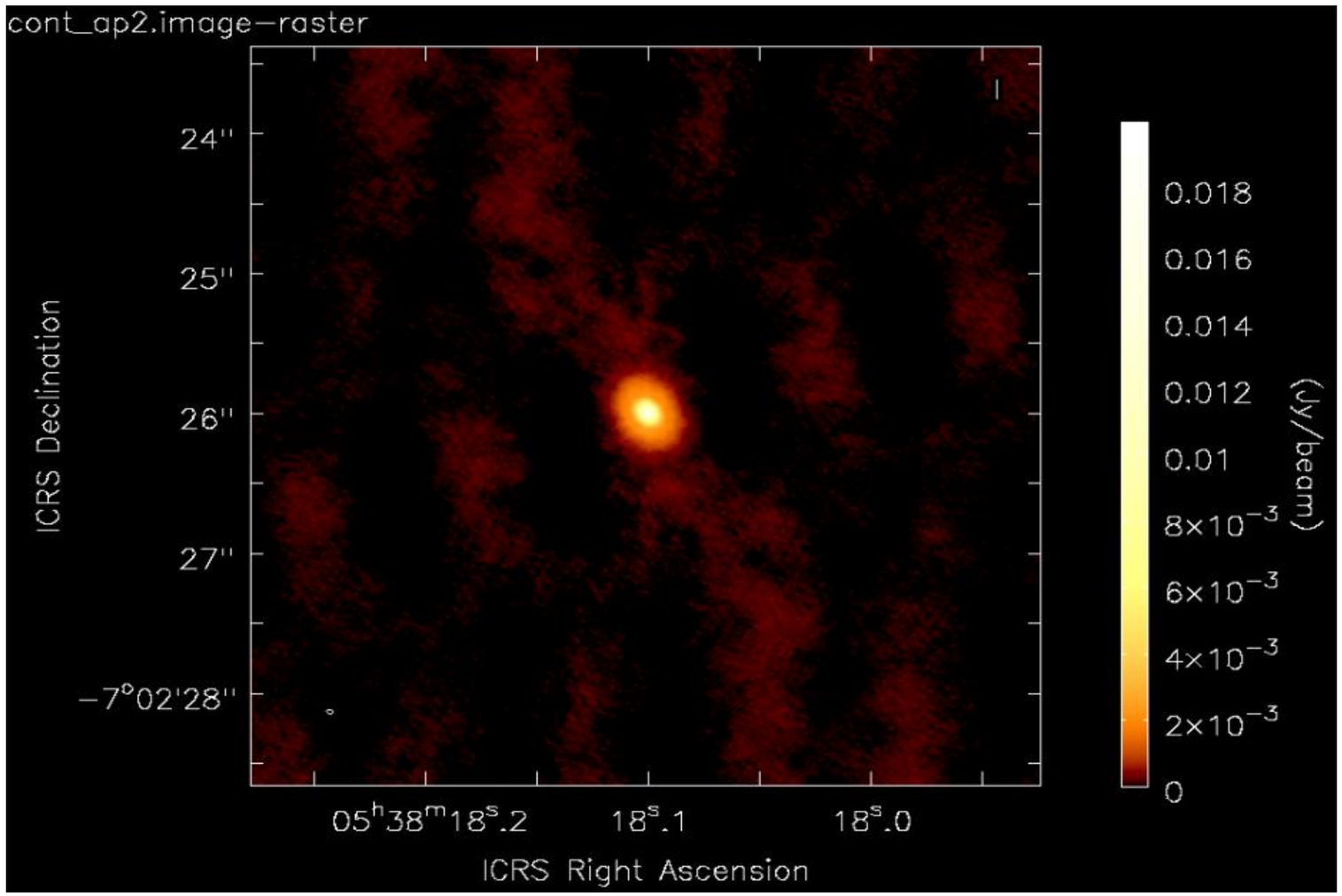




Change of S/N

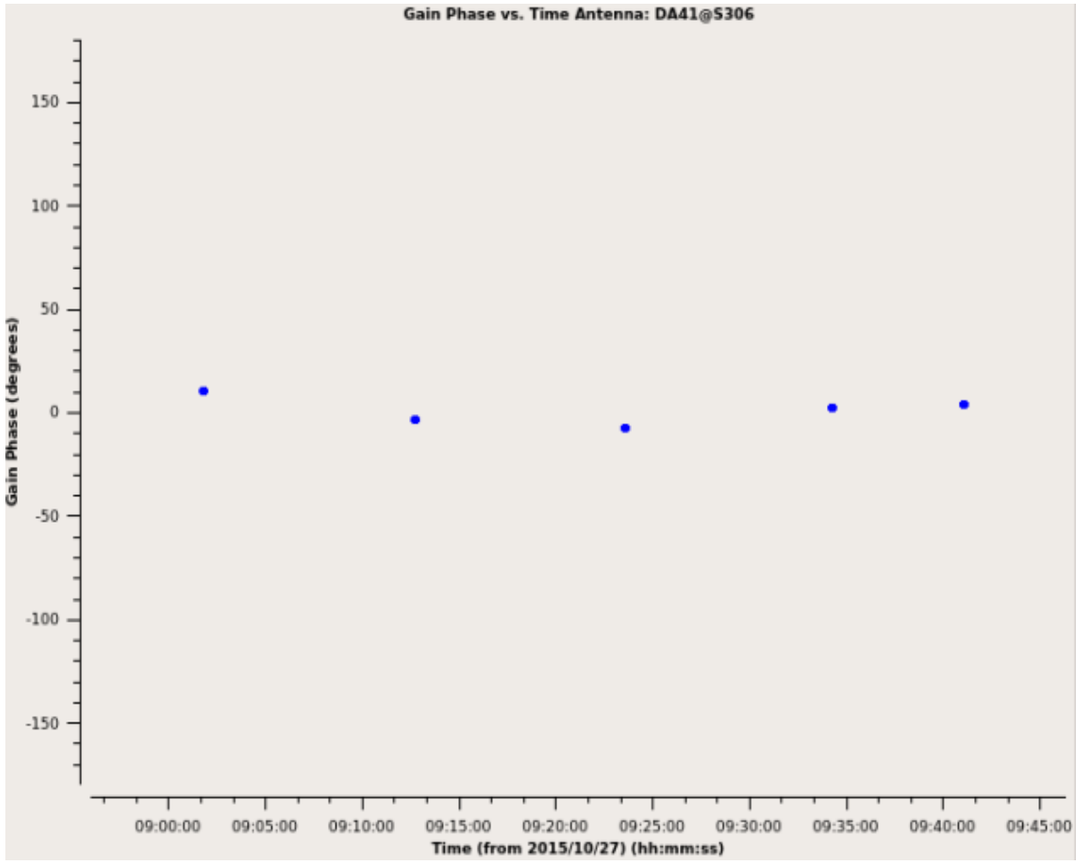
	solint	Iteration	Max	RMS	S/N
Before		200	1.86E-2	2.40E-4	78
1st	600	392	1.83E-2	1.17E-4	156
2nd	600	1100	1.85E-2	8.62E-5	214
Apcal	1500	566	1.91E-2	6.60E-5	289

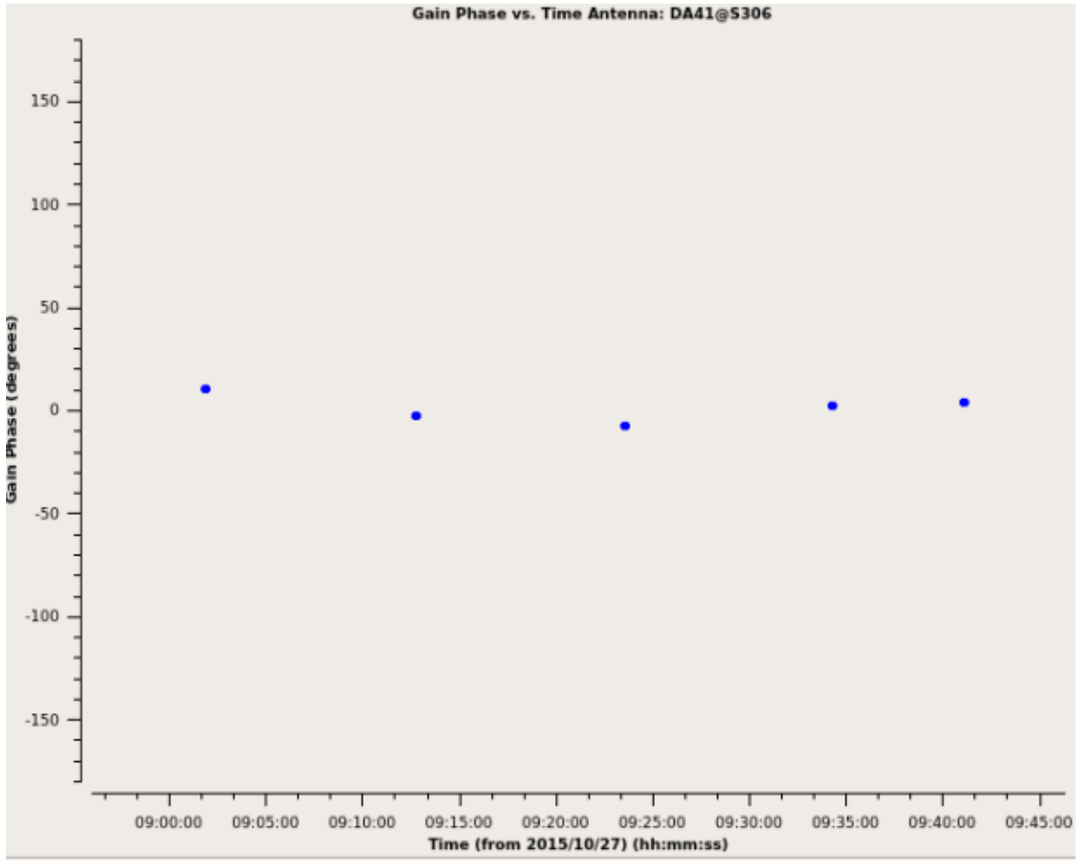
Only one deep tclean (1000 Iteration)
Max = 1.86E-2 RMS = 9.76E-5 → S/R = 190



	solint	Iteration	Max	RMS	S/N
Apcal	1500	590	1.99e-2	1.08e-4	184

Time vs. Phase





Conclusions

- Case 1 : No cut

S/N	
Before	79
1st	107
2nd	154
Apcal	233

- S/N increases about three times

- Case 2 : Cut

S/N	
Before	78
1st	156
2nd	214
Apcal	289

- S/N increases 3.7 times