HD49933

Teff = 6700 ± 100 K
Mbol = [3.25 ; 3.45]
[Fe/H] = -0.32 ±0.1
Vsin i = 10 ± 4 km/s

3.8325	≤	$\log T_{eff}$	≤ 3.8195	
0.52	≤	log L/L_	≤ 0.6	(with $M_{bol,\_}$ = 4.75)
0.009315	≤	(Z/X)	≤ 0.01476	(with (Z/X)_ = 0.0245)
0.00652	≤	Z	≤ 0.01033	(if X = 0.70)

$<\square\square_{n,0}>_{n>10}$ = 90.1765 (OM+TA)
$<\square\square_{n,0}>_{n>10}$ = 90.1799 (TT)

Models

M	X	Z	ov	□	diff
1.05 - 1.15	0.70	0.00652	0.0 / 0.2	1.8	N
1.05 - 1.3	0.70	0.0082	0.0 / 0.2	1.8	N
1.1 - 1.25	0.70	0.01033	0.0 / 0.2	1.8	N
1.15 – 1.3	0.736	0.00857	0.0 / 0.2	1.8	N
1.35, 1.38	0.70	0.019	0.0 / 0.2	1.8	Y
1.5	0.70	0.03	0.0 / 0.2	1.8	Y

1. $\square\square_{n,\ell} = \square_{n,\ell} - \square_{n-1,\ell}$
2. $\square\square_{0,2} = \square_{n,0} - \square_{n-1,2}$
3. $\square\square_{0,1} = 2\,\square_{n,0} - (\square_{n,1} + \square_{n-1,1})$
4. $\square\square_{1,3} = \square_{n,1} - \square_{n-1,3}$

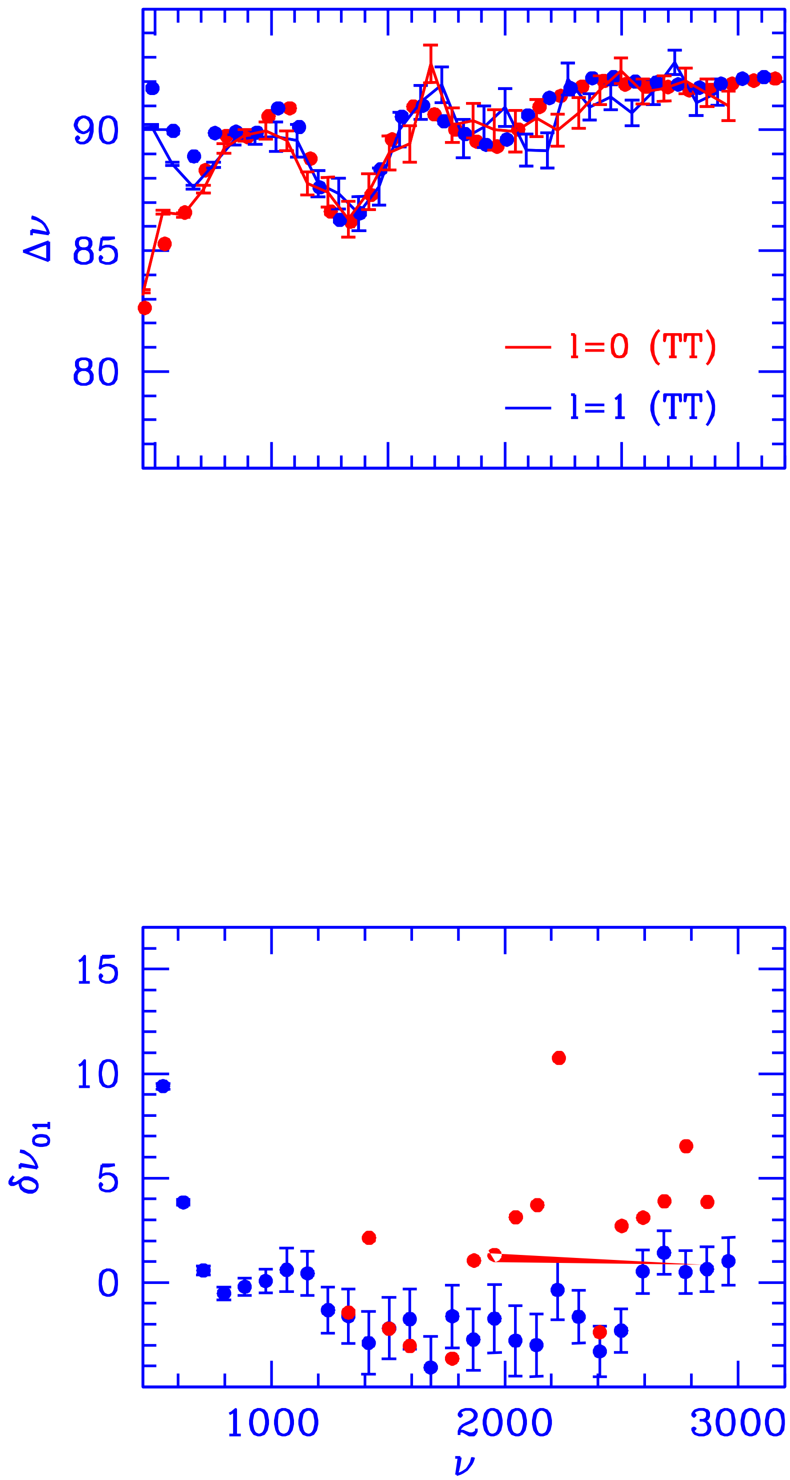
The best models fitting $\square\square_{n,\ell}$ are
but they do not satisfy 2, 3, 4

M : 1.12 – 1.25 M_
Z : 0.00652 – 0.01033
X : 0.70 – 0.736
Age: 2 – 3 Gyr.
$\square_{ov}$: 0.0 – 0.2
No Diff

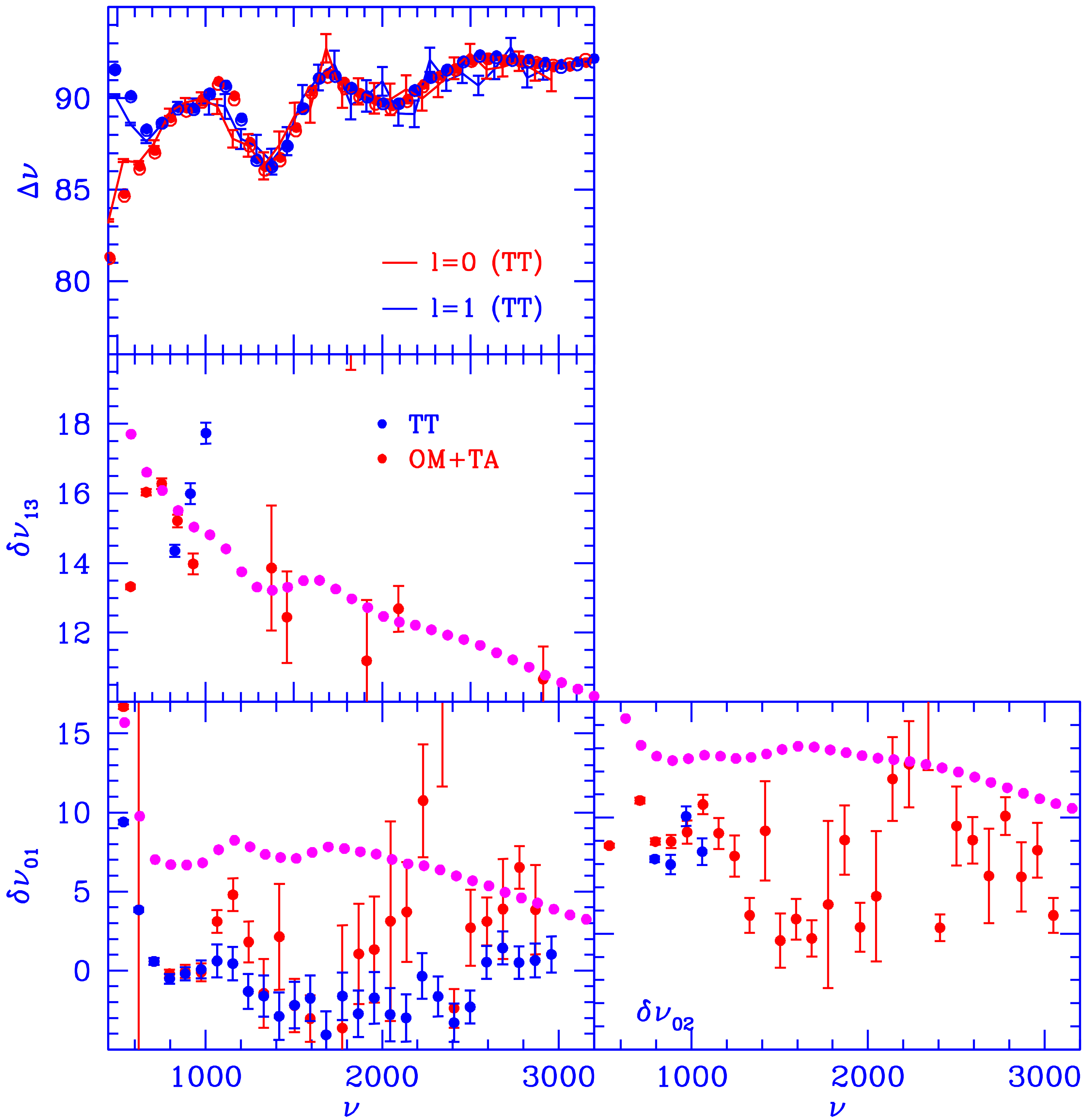
Introducing diffusion, the constraints on the model parameter would be

M > 1.35 M_
$0.03 > Z_i > 0.019$
X : 0.70
Age < 1. Gyr.
$\square_{ov}$: 0.0 – 0.2
Diff

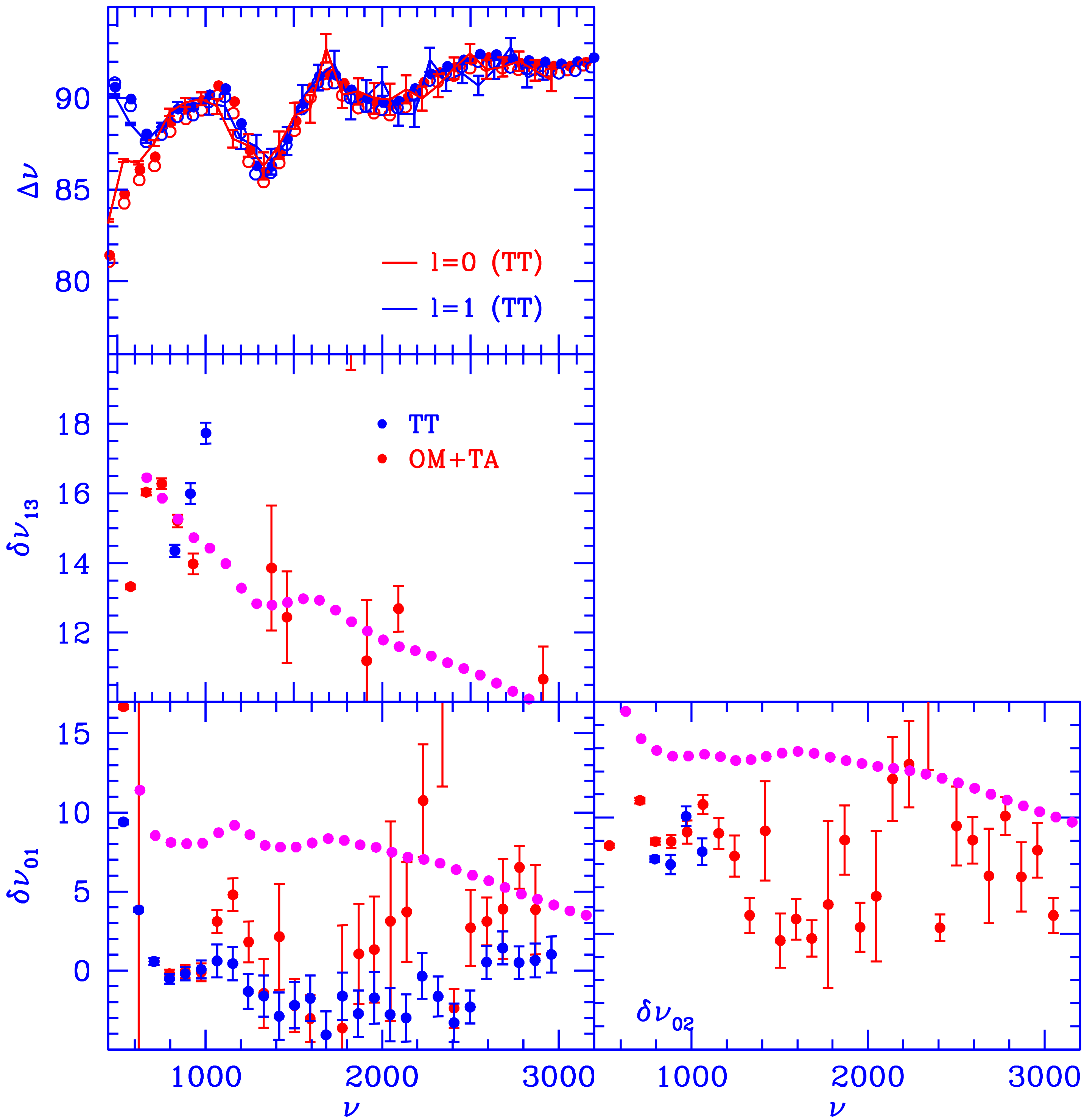
It appears that $\square\square_{0,1}$ decreases at high frequencies if overshooting is included, and $\square\square_{0,1}$ decreases at low frequencies if microscopic diffusion is



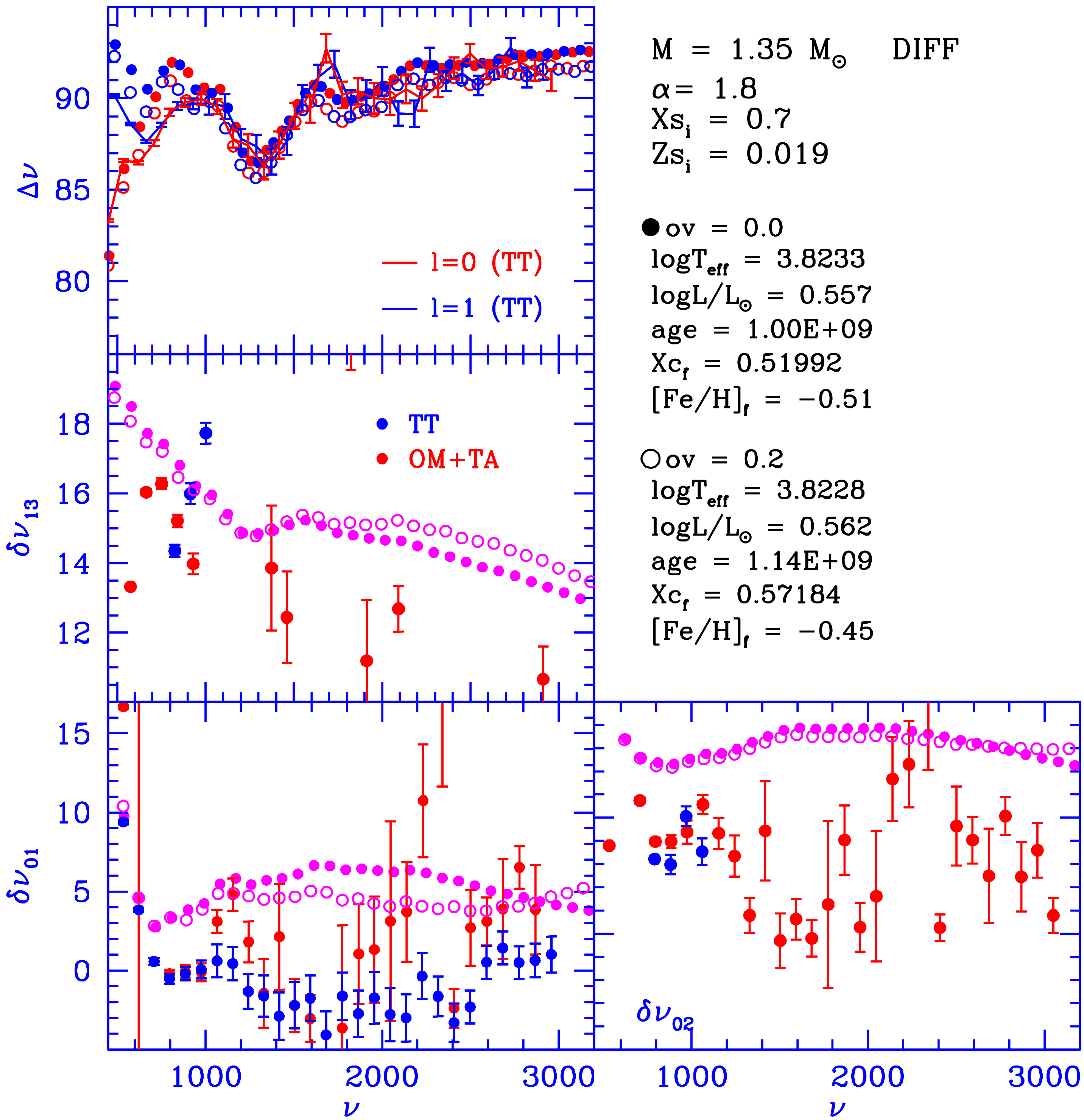
90
85
80
Δν
l=0 (TT)
l=1 (TT)
15
10
5
0
δν01
1000
2000
3000
ν



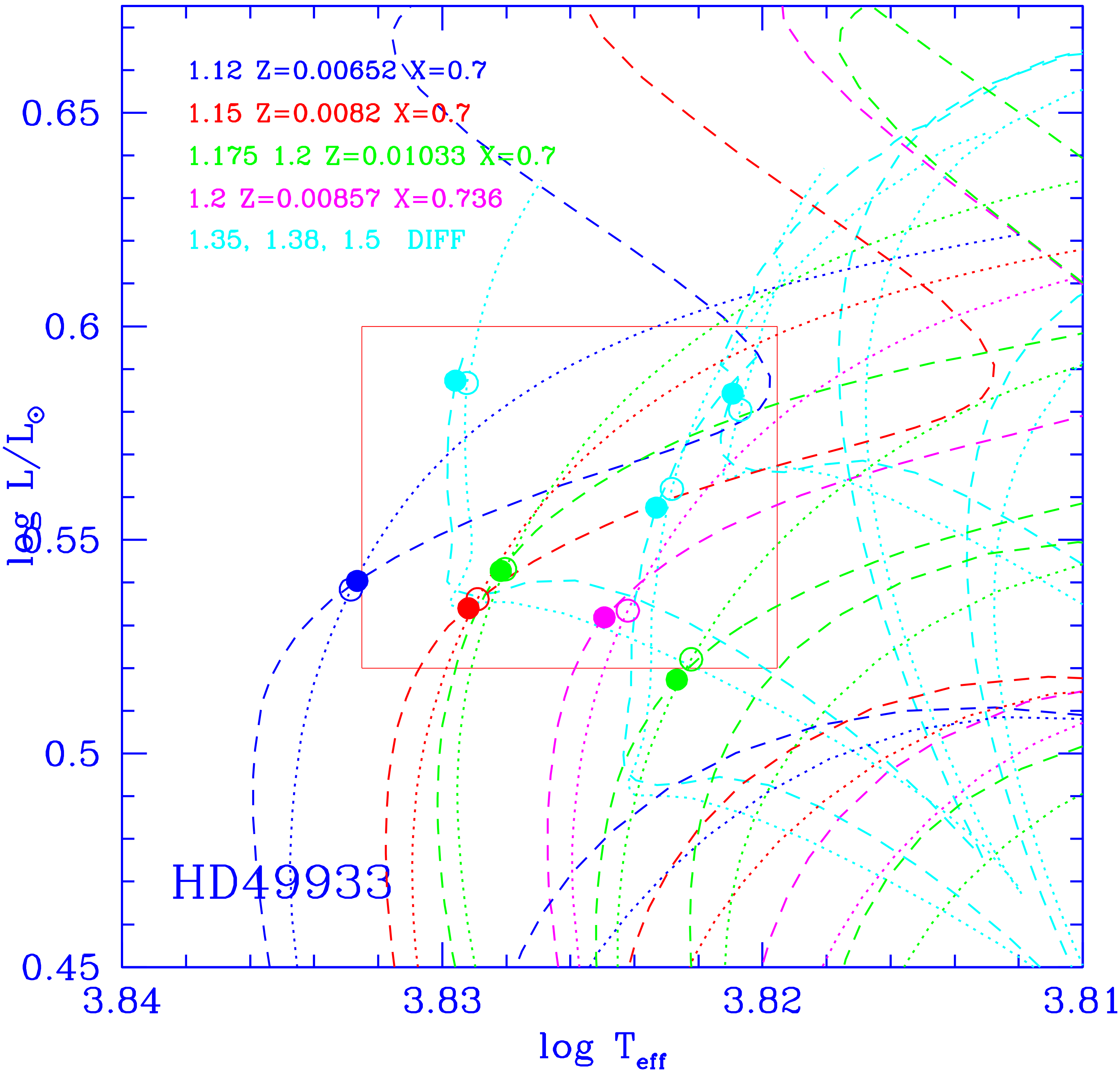
Δν
l=0 (TT)
l=1 (TT)
δν13
TT
OM+TA
δν01
δν02
ν
ν



90
85
80
Δν
l=0 (TT)
l=1 (TT)
18
16
14
12
δν13
TT
OM+TA
15
10
5
0
δν01
1000
2000
3000
ν
5
0
δν02
1000
2000
3000
ν



M = 1.35 M⊙ DIFF
α = 1.8
Xsi = 0.7
Zsi = 0.019
● ov = 0.0
logTeff = 3.8233
logL/L⊙ = 0.557
age = 1.00E+09
Xcf = 0.51992
[Fe/H]f = −0.51
○ ov = 0.2
logTeff = 3.8228
logL/L⊙ = 0.562
age = 1.14E+09
Xcf = 0.57184
[Fe/H]f = −0.45
l=0 (TT)
l=1 (TT)
TT
OM+TA
Δν
δν13
δν01
δν02
ν
ν



1.12 Z=0.00652 X=0.7
1.15 Z=0.0082 X=0.7
1.175 1.2 Z=0.01033 X=0.7
1.2 Z=0.00857 X=0.736
1.35, 1.38, 1.5 DIFF
HD49933
log L/L⊙
log Teff
0.45
0.5
0.55
0.6
0.65
3.84
3.83
3.82
3.81