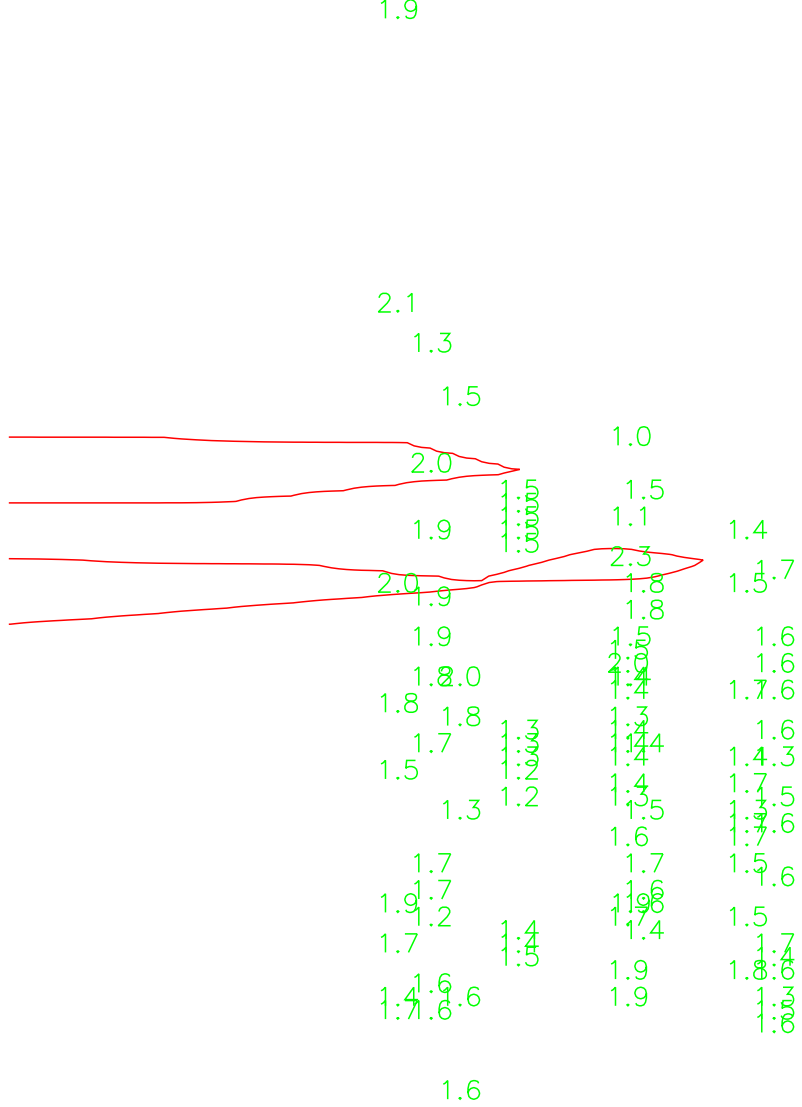
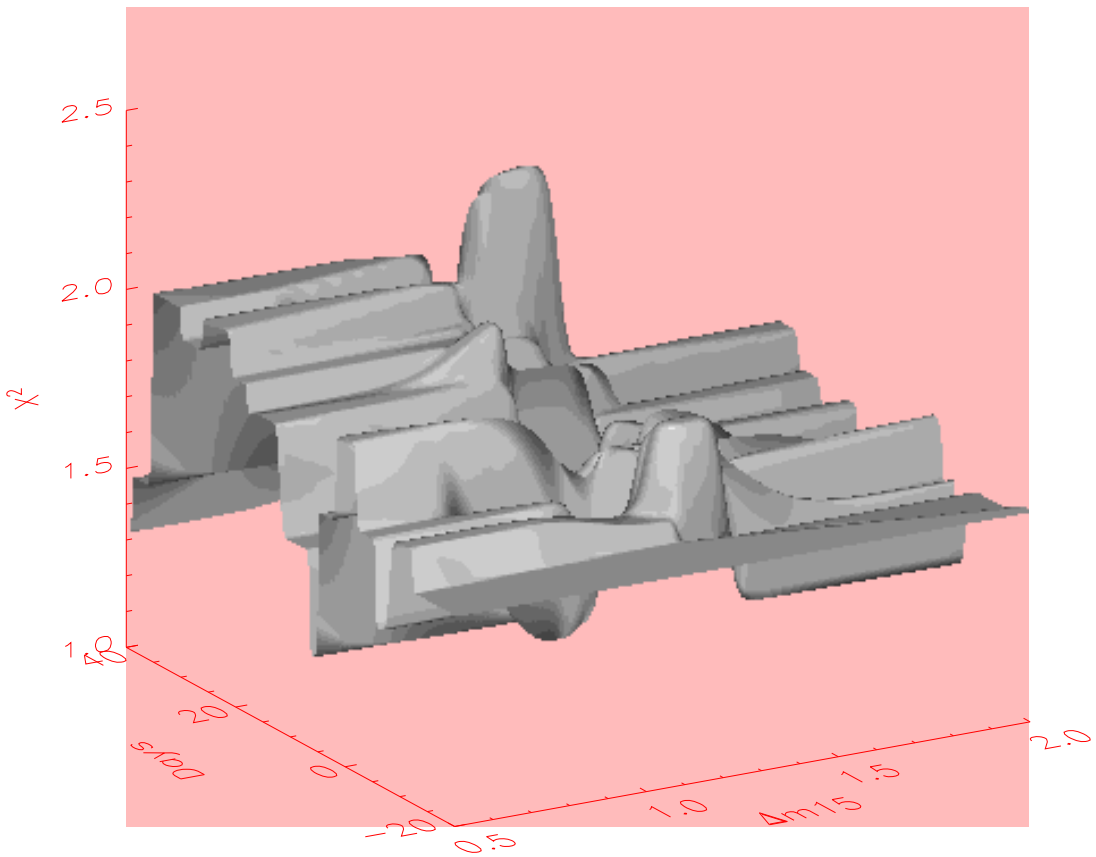
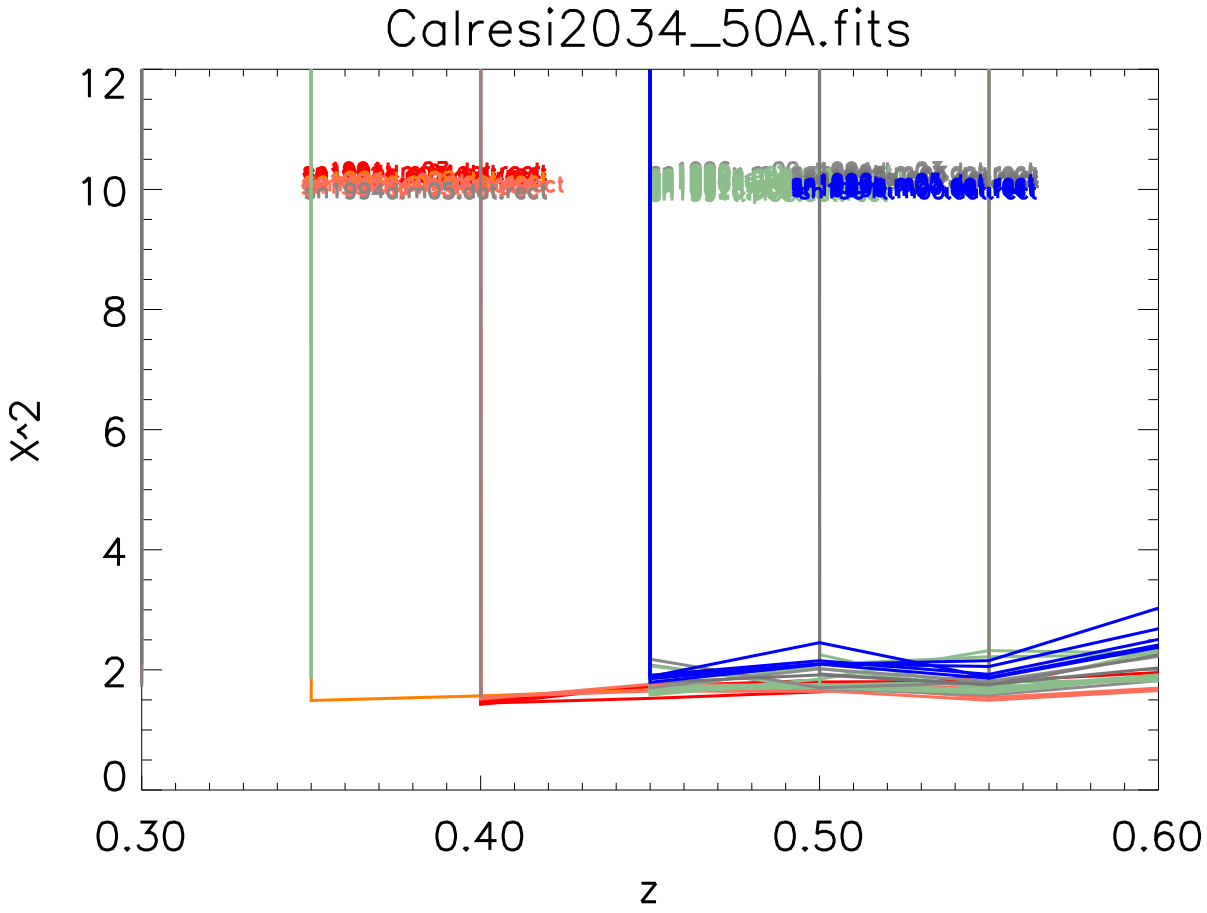
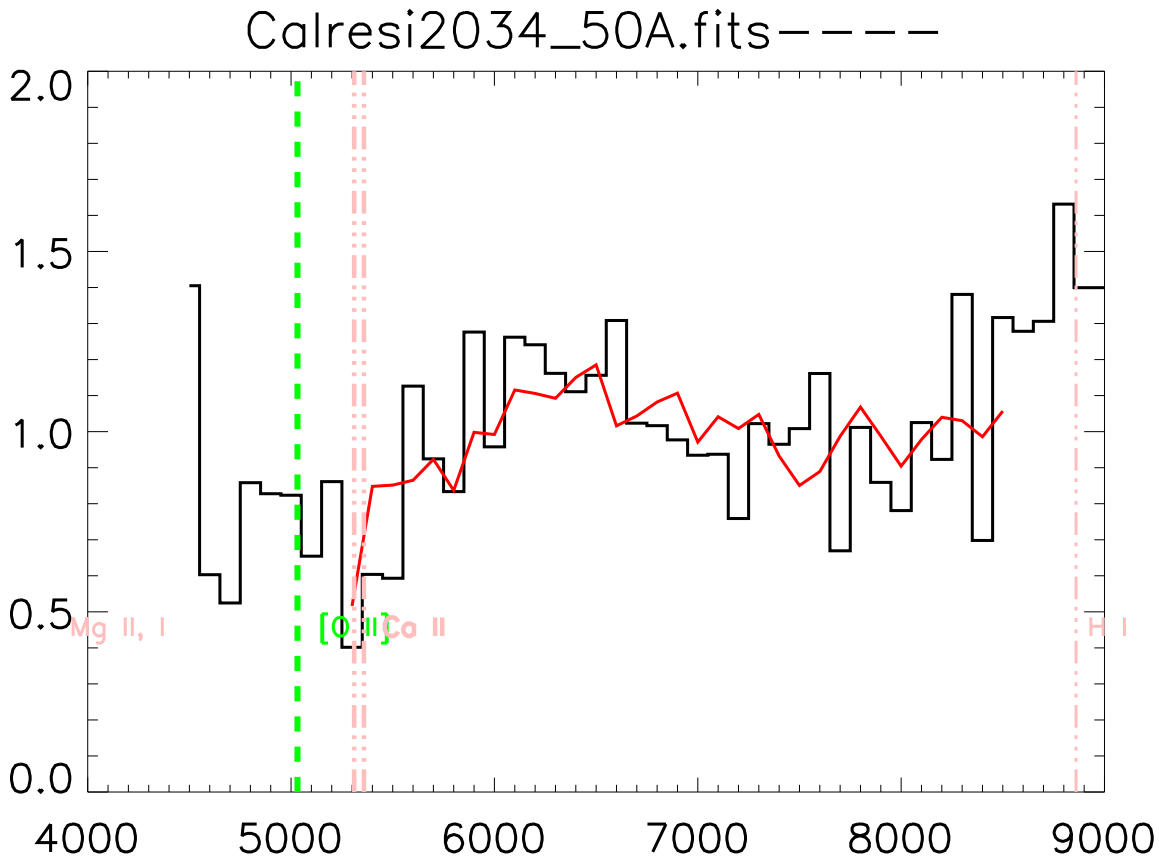
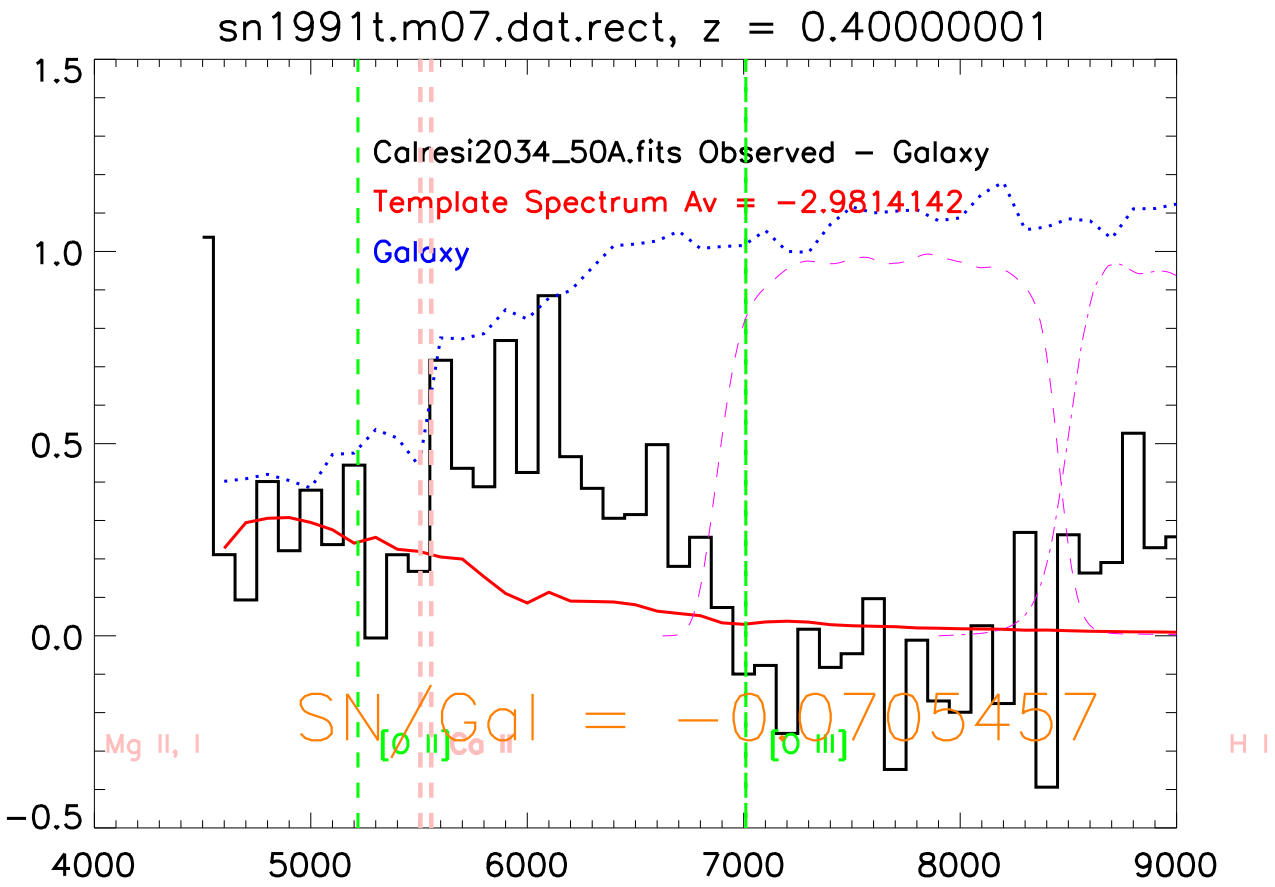
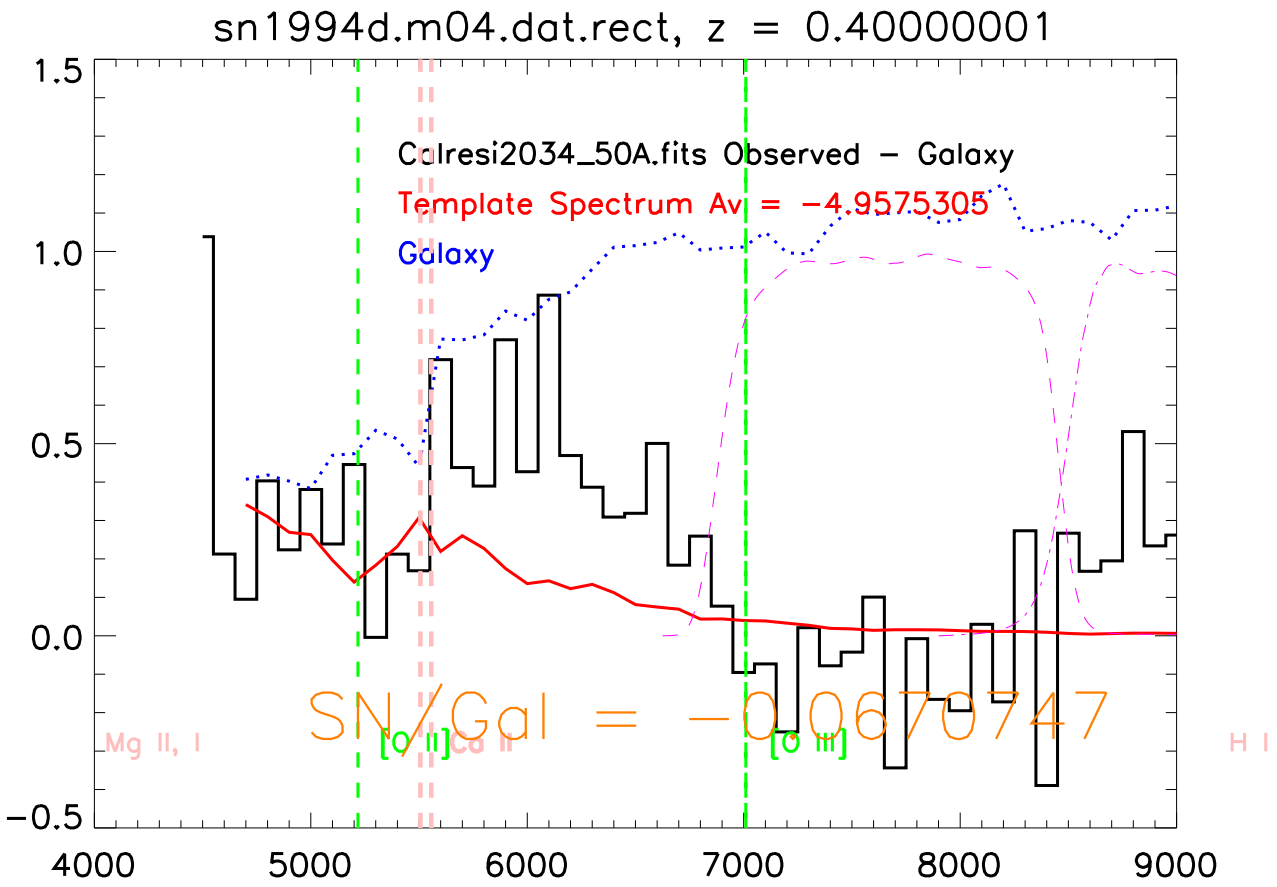


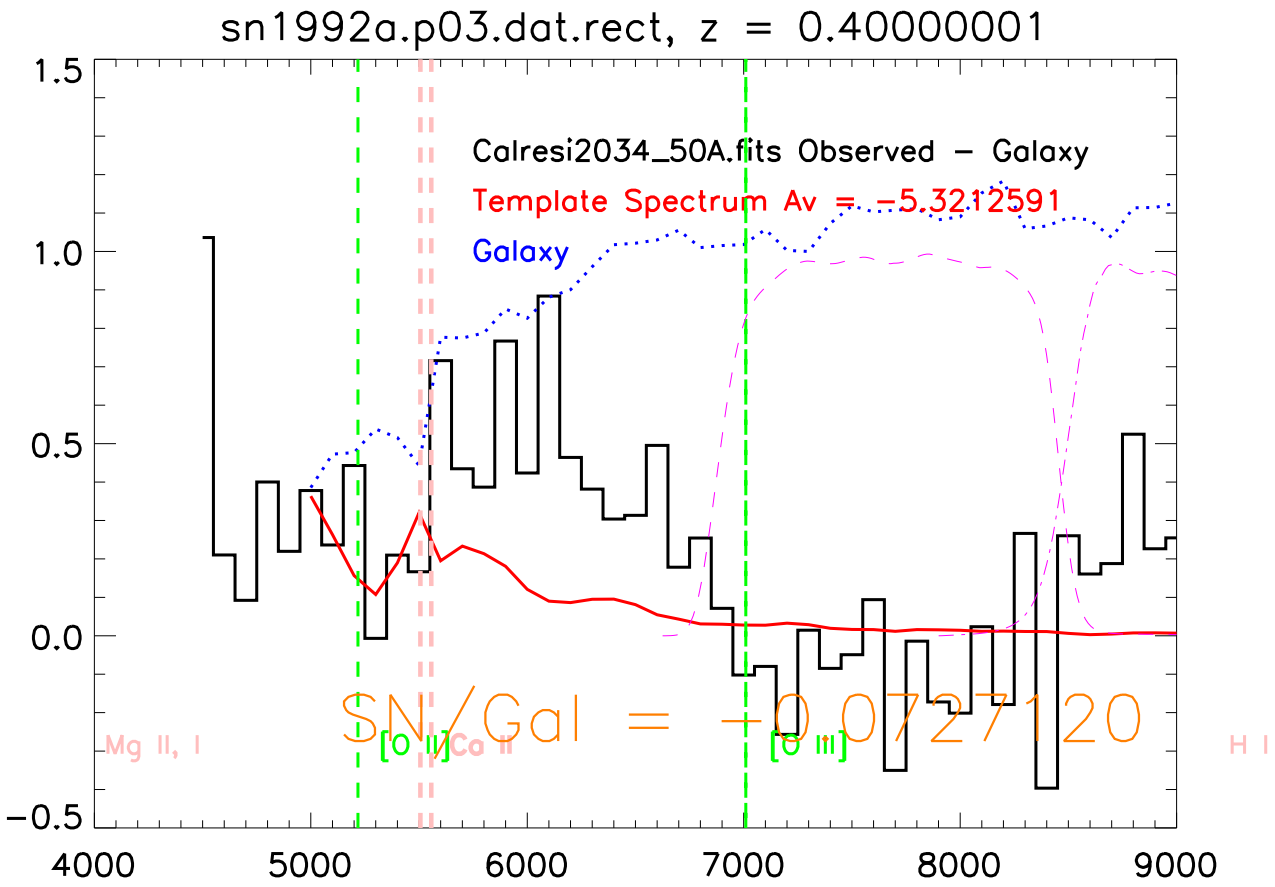

2.5
2.0
1.5
1.0
χ^2
40
20
0
−20
dφ/s
0.5
1.0
1.5
2.0
Δm15

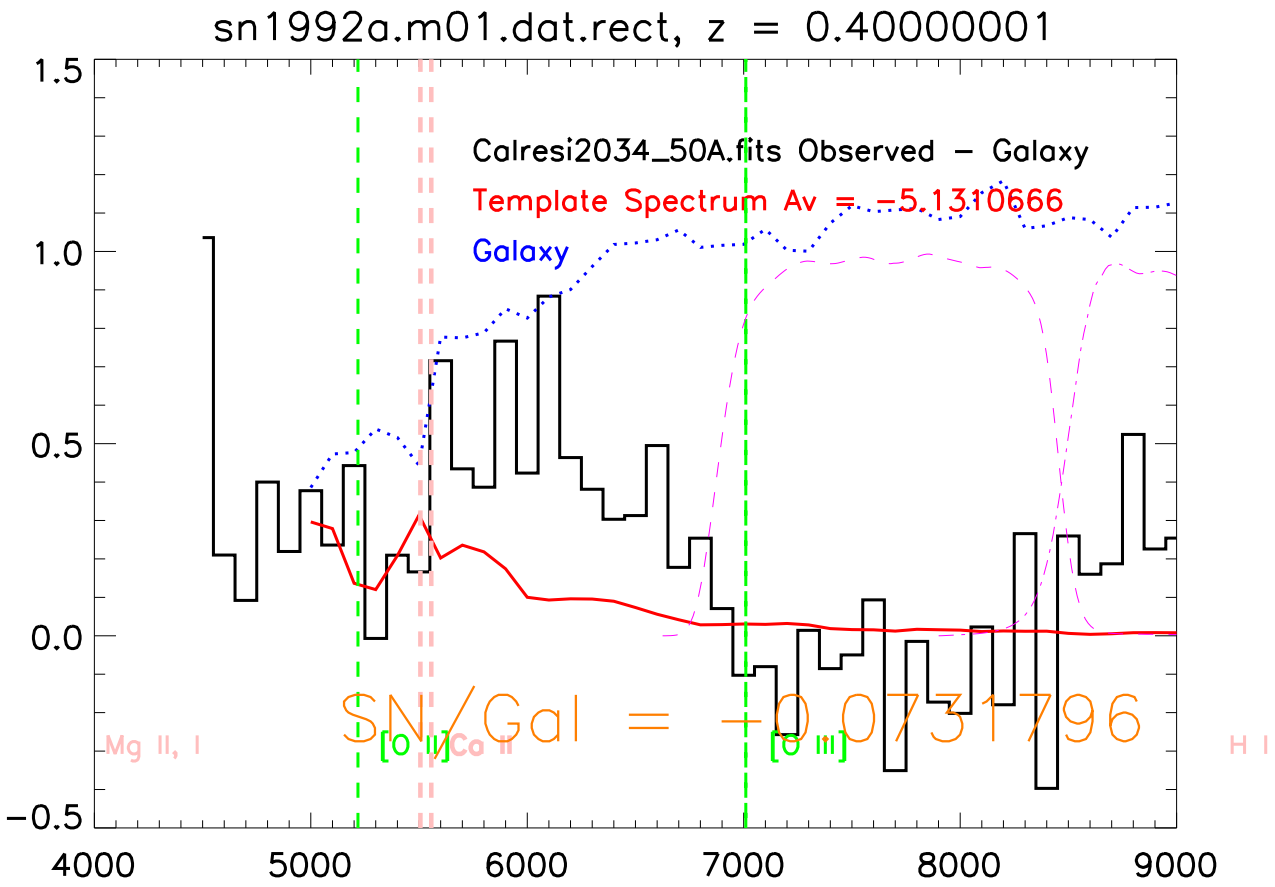

Calresi2034_50A.fits
12
10
8
6
4
2
0
X^2
0.30
0.40
0.50
0.60
z

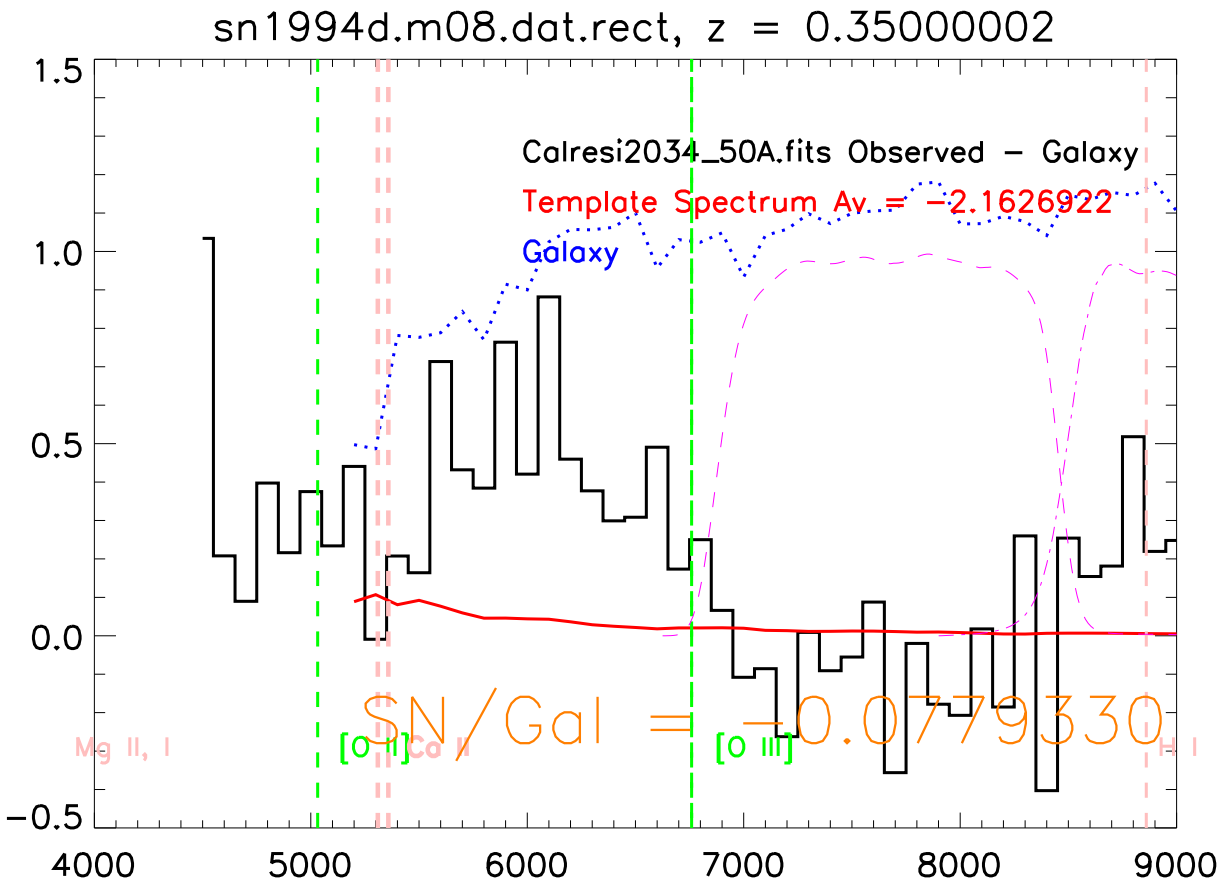

Calresi2034_50A.fits----
2.0
1.5
1.0
0.5
0.0
4000
5000
6000
7000
8000
9000
Mg II, I
[O II]
Ca II
H I

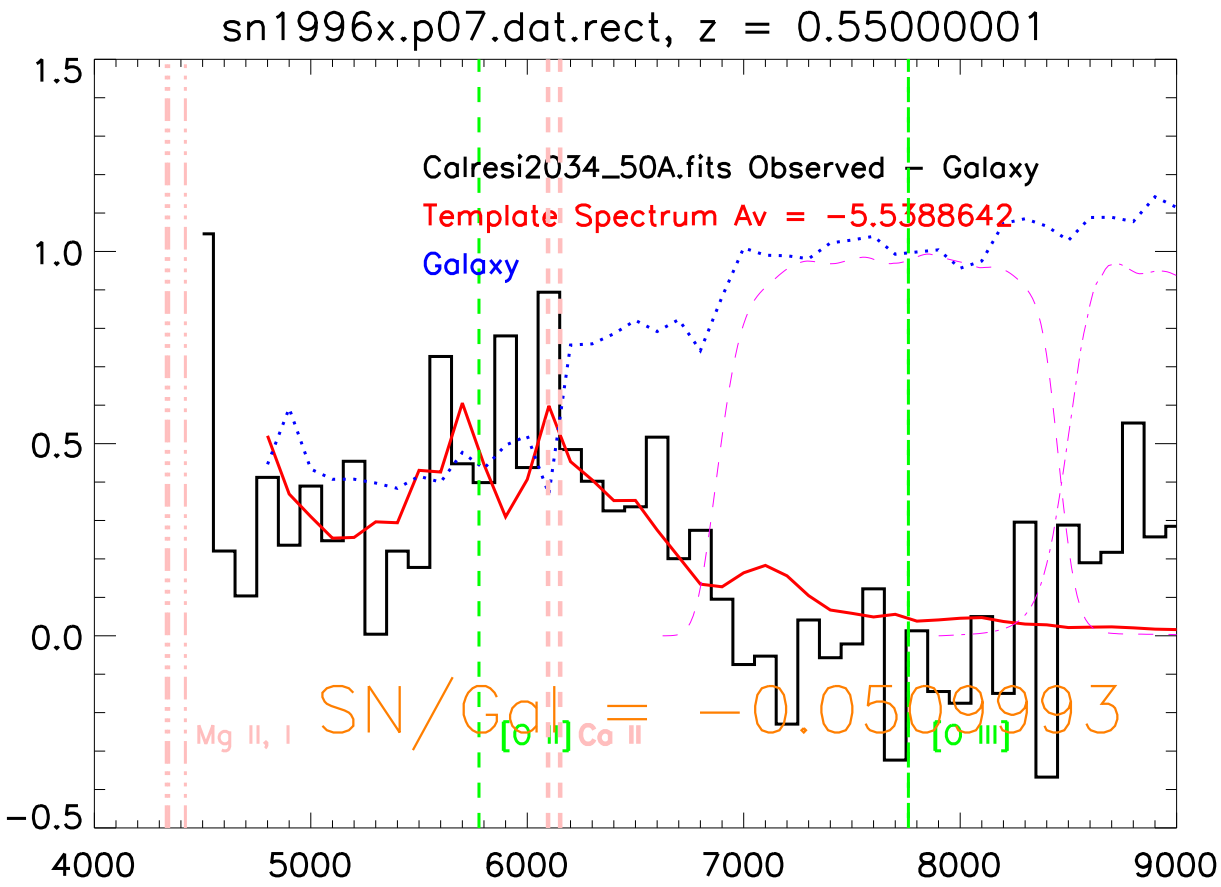

sn1991t.m07.dat.rect, z = 0.40000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −2.9814142
Galaxy
SN/Gal = −0.070705457
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

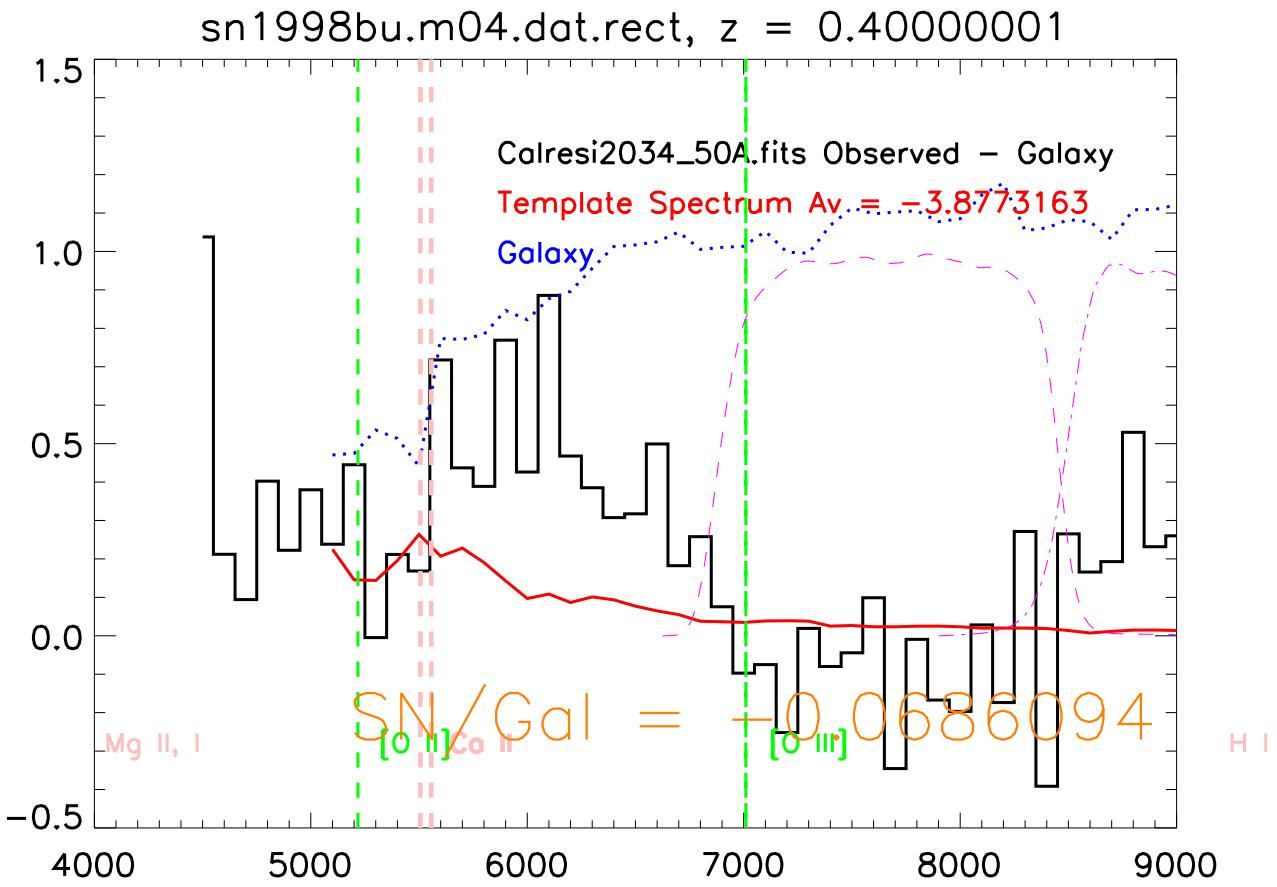

sn1994d.m04.dat.rect, z = 0.40000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −4.9575305
Galaxy
SN/Gal = −0.06770747
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

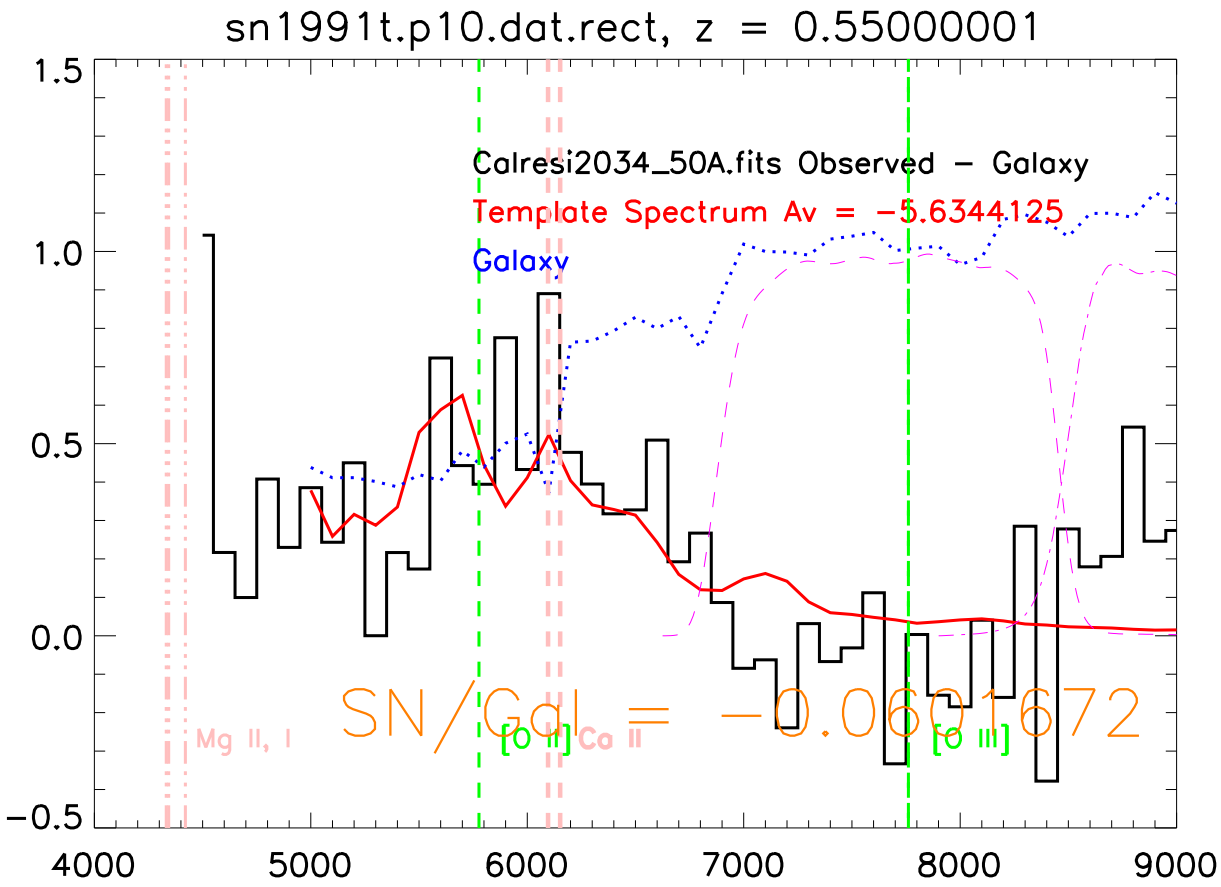

sn1992a.p03.dat.rect, z = 0.40000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −5.3212591
Galaxy
SN/Gal = +0.072712
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

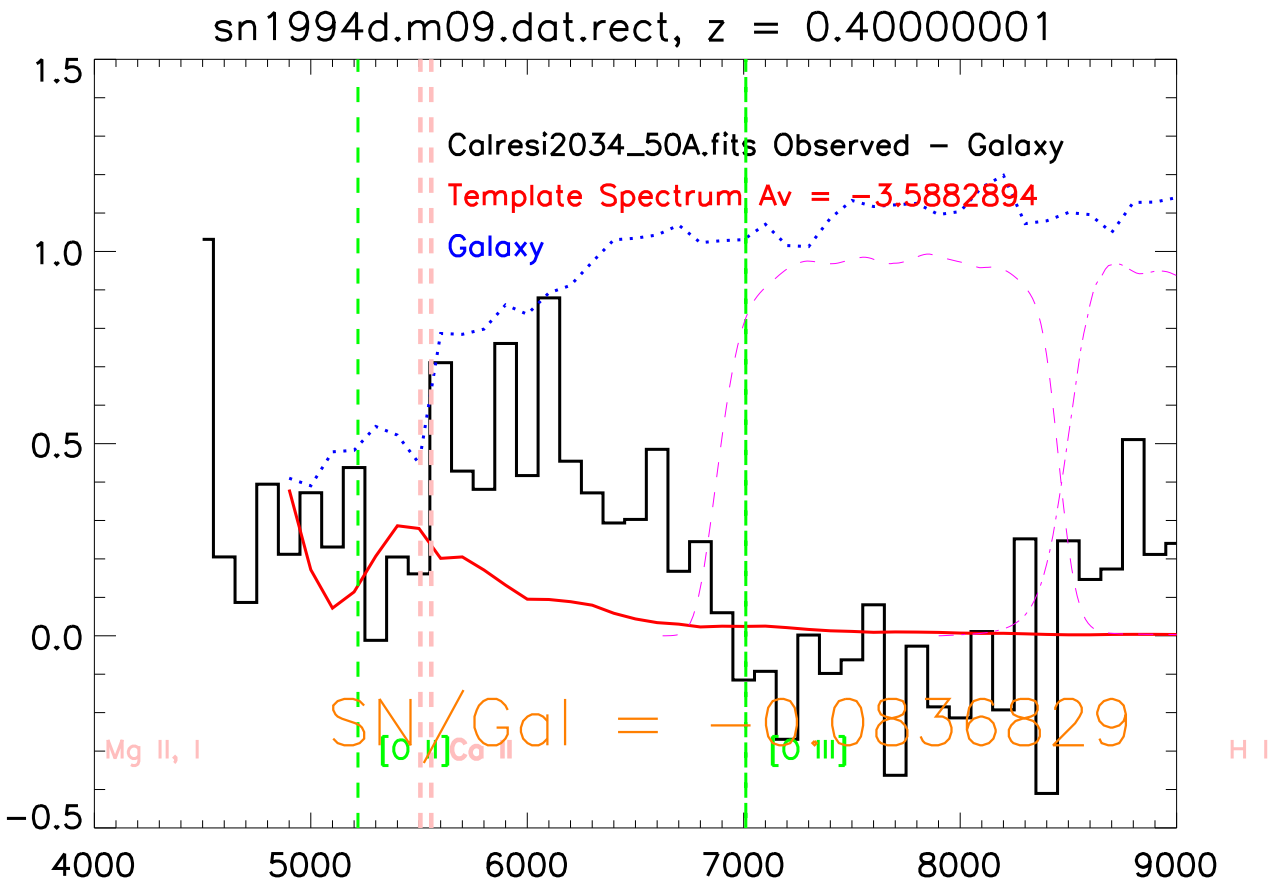

sn1992a.m01.dat.rect, z = 0.40000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −5.1310666
Galaxy
SN/Gal = +0.073171796
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

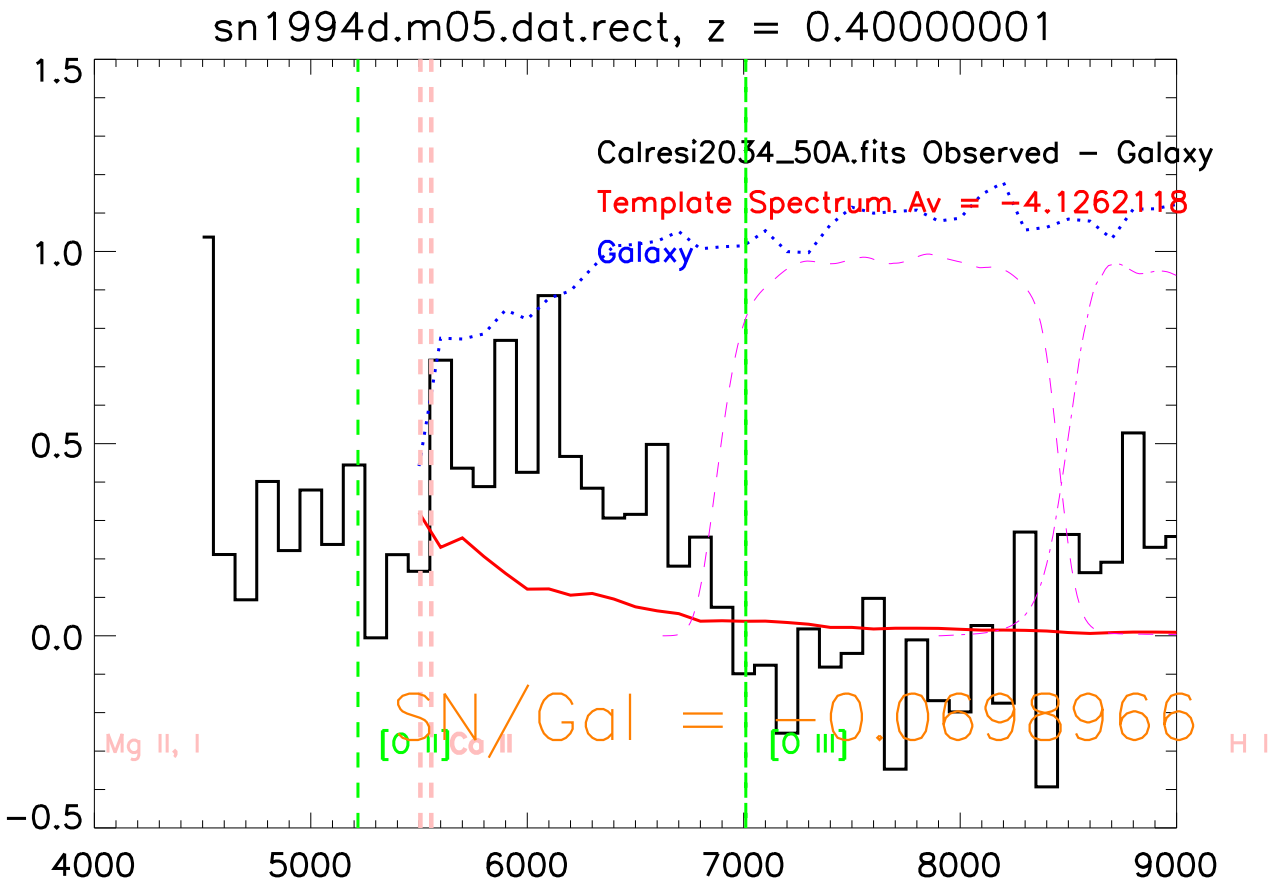

sn1994d.m08.dat.rect, z = 0.35000002
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av. = −2.1626922
Galaxy
SN/Gal = −0.0779330
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

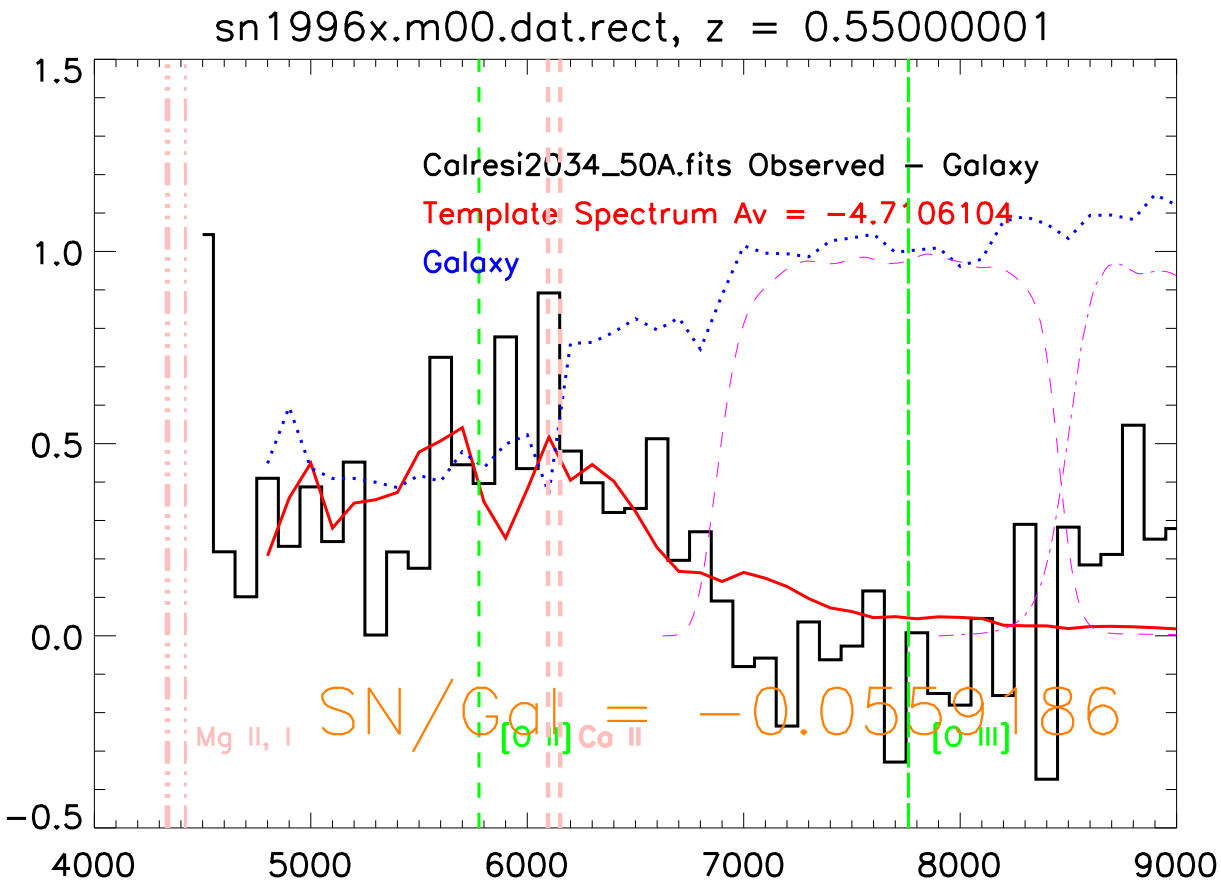

sn1996x.p07.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −5.5388642
Galaxy
SN/Gal = −0.0509993
Mg II, I
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

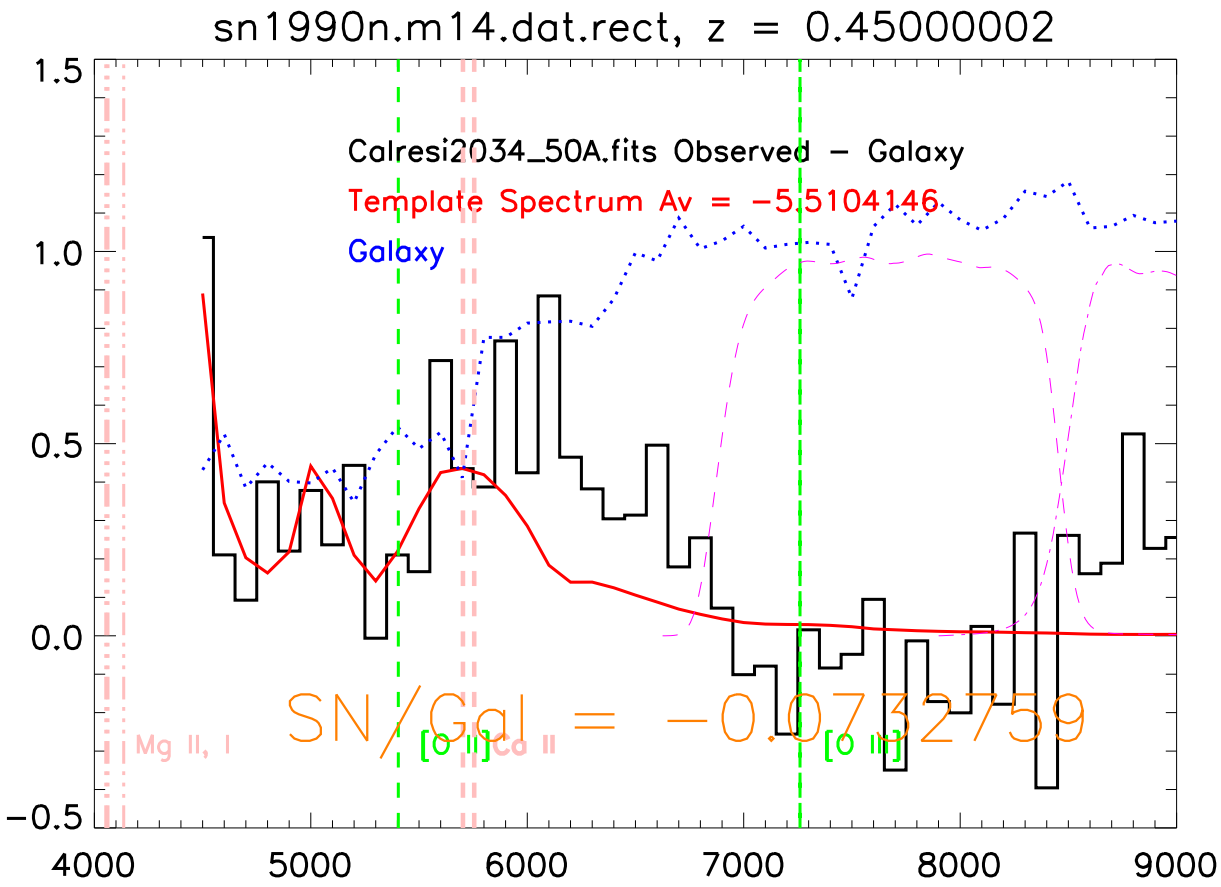

sn1998bu.m04.dat.rect, z = 0.40000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −3.8773163
Galaxy
SN/Gal = +0.0686094
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

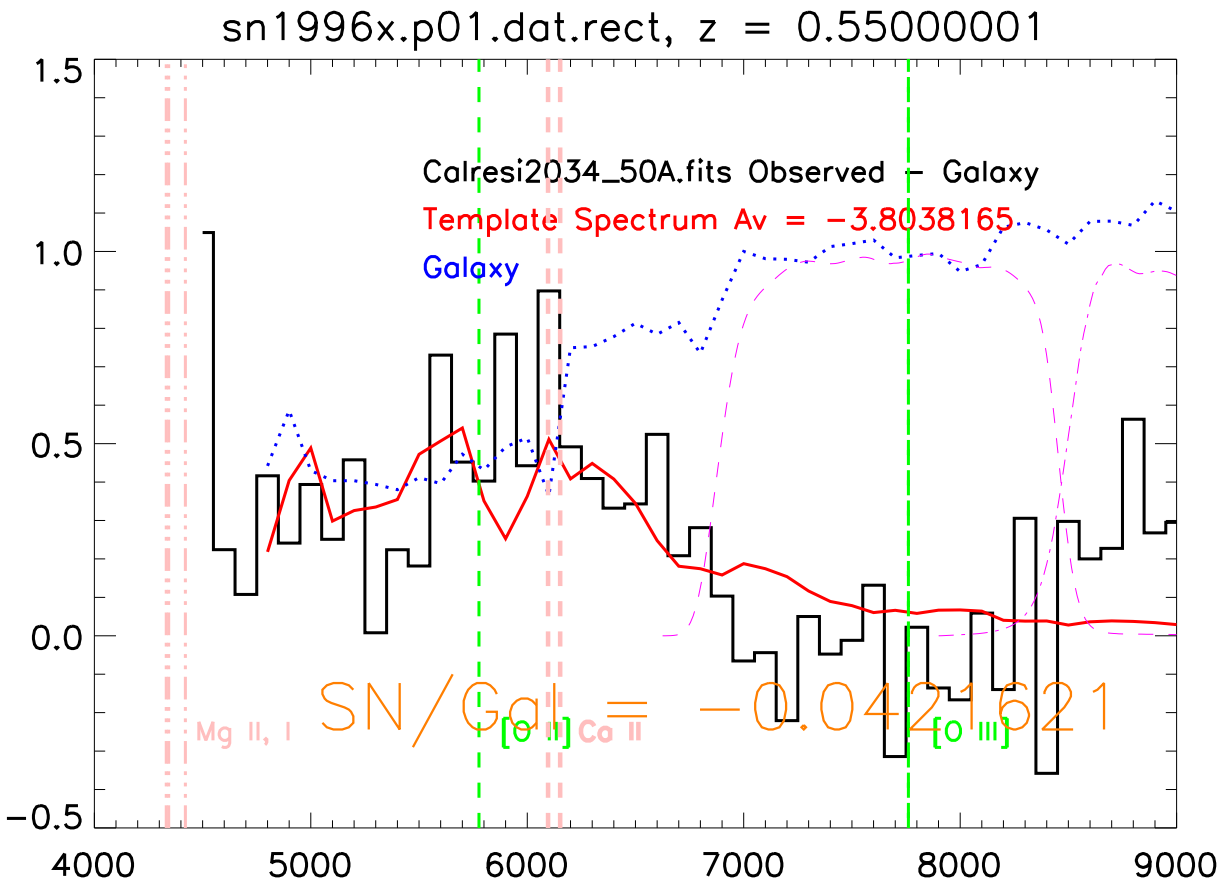

sn1991t.p10.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −5.6344125
Galaxy
SN/Gal = −0.0601672
Mg II, I
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

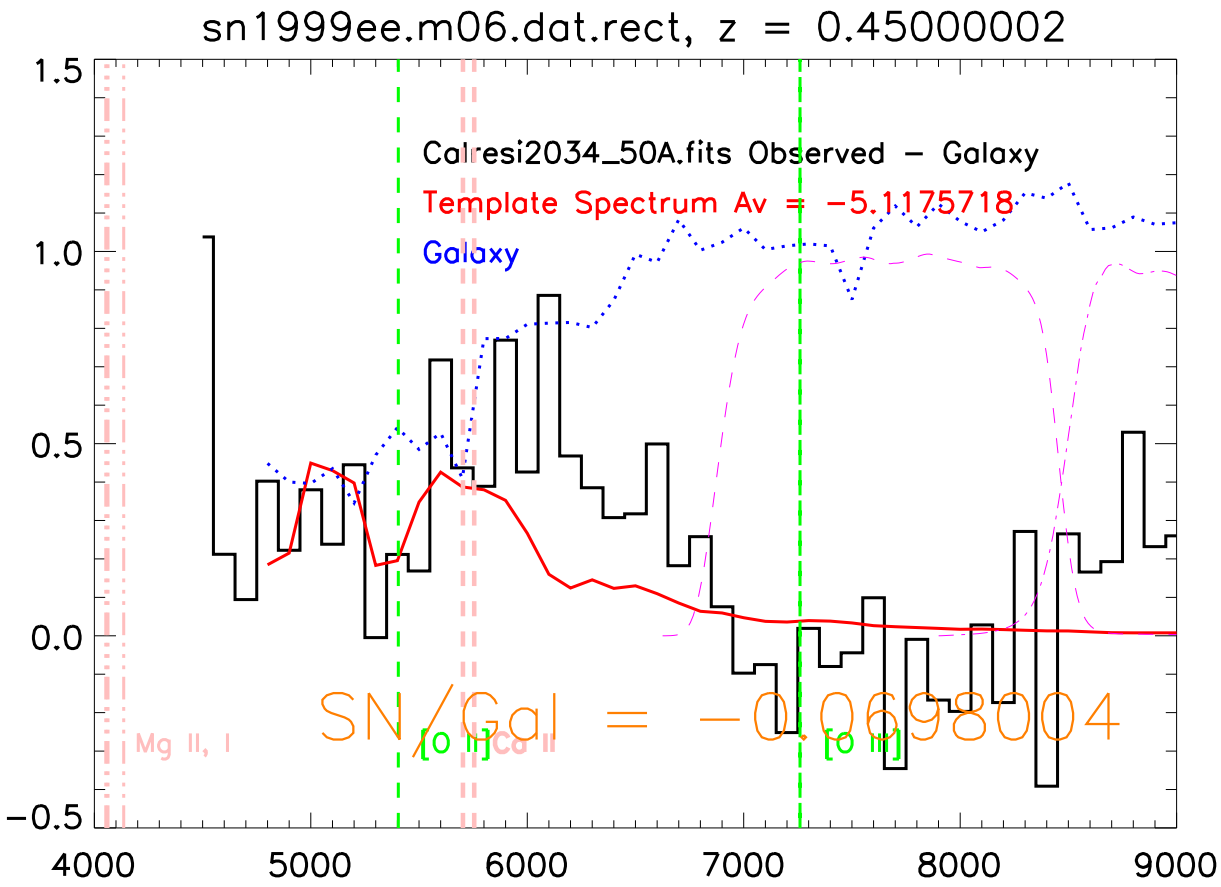

sn1994d.m09.dat.rect, z = 0.40000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −3.5882894
Galaxy
SN/Gal = +0.083668829
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

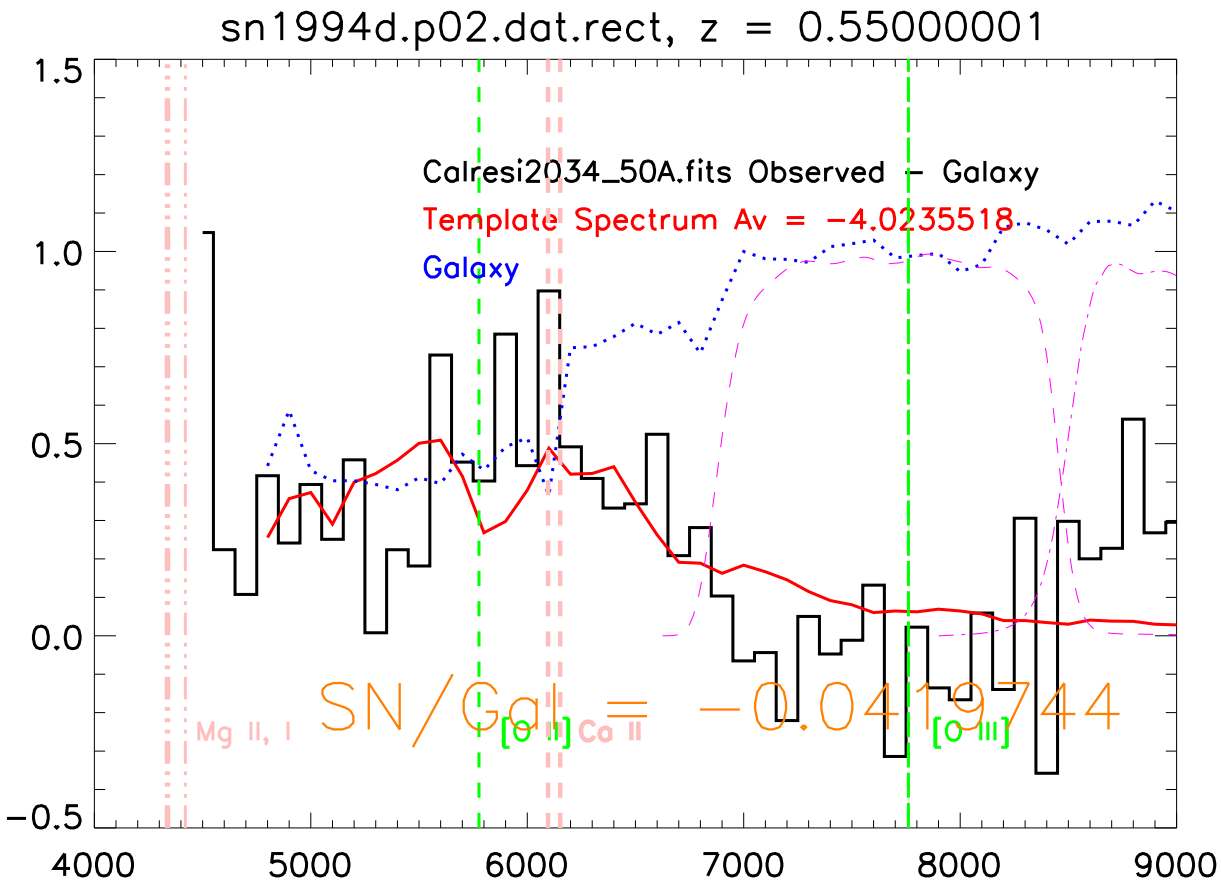

sn1994d.m05.dat.rect, z = 0.40000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −4.1262118
Galaxy
SN/Gal = −0.0698966
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

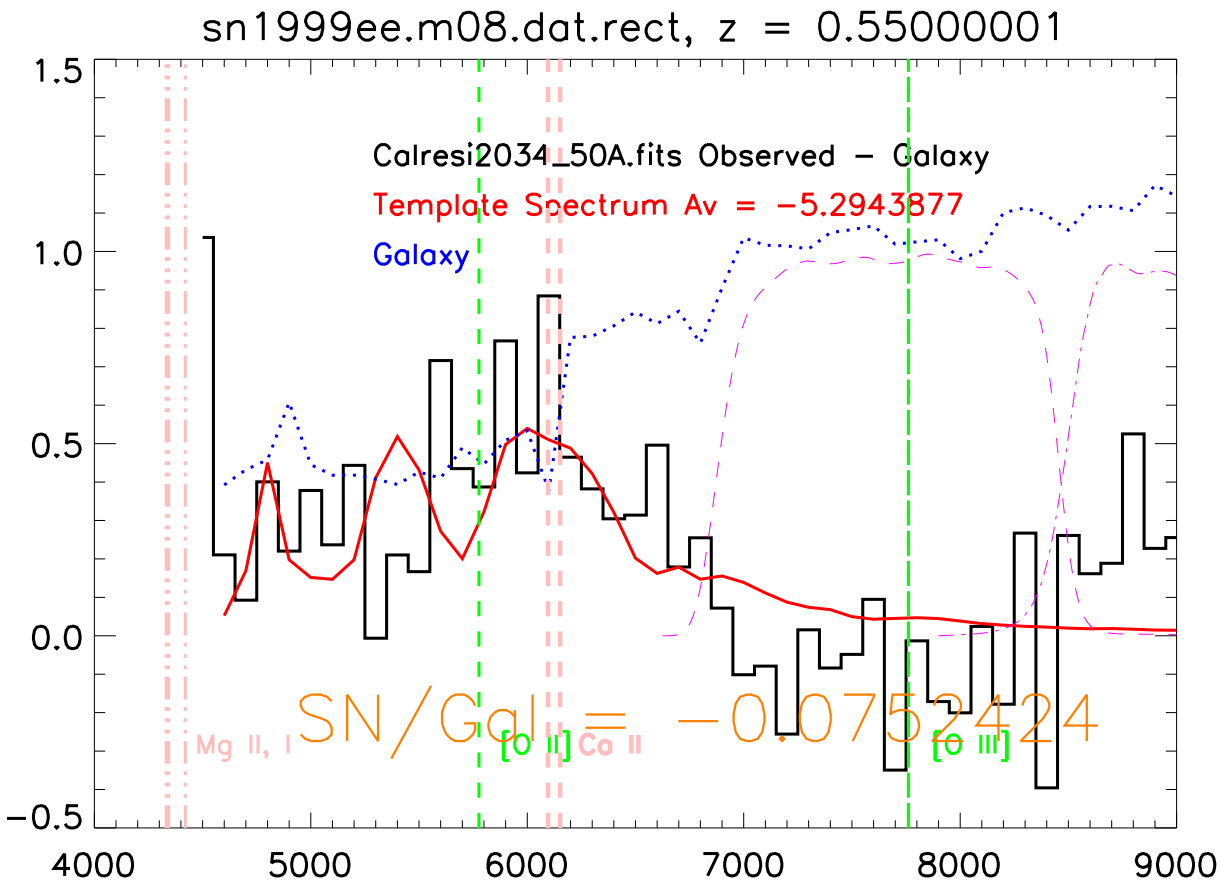

sn1996x.m00.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed – Galaxy
Template Spectrum Av = −4.7106104
Galaxy
SN/Gal = −0.0559186
Mg II, I
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

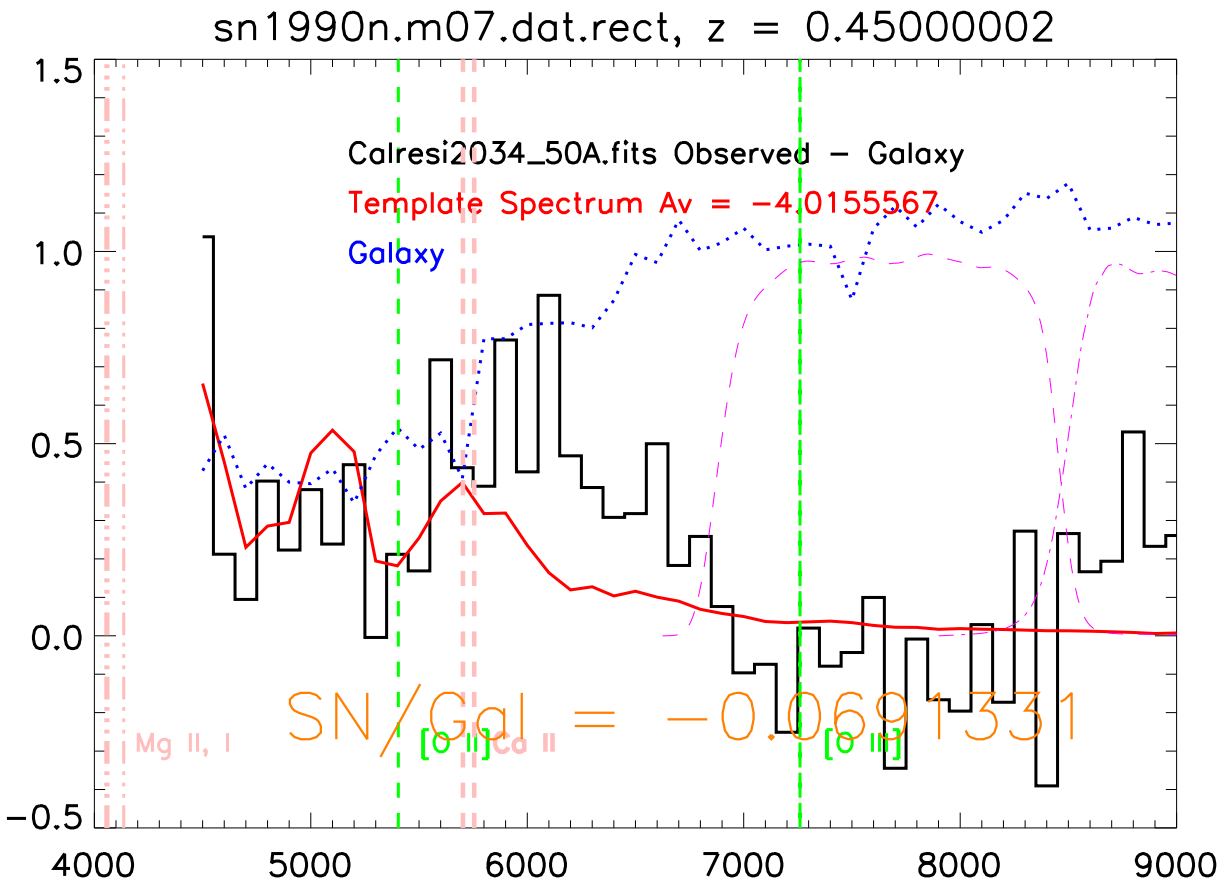

sn1990n.m14.dat.rect, z = 0.45000002
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −5.5104146
Galaxy
SN/Gal = −0.0732759
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

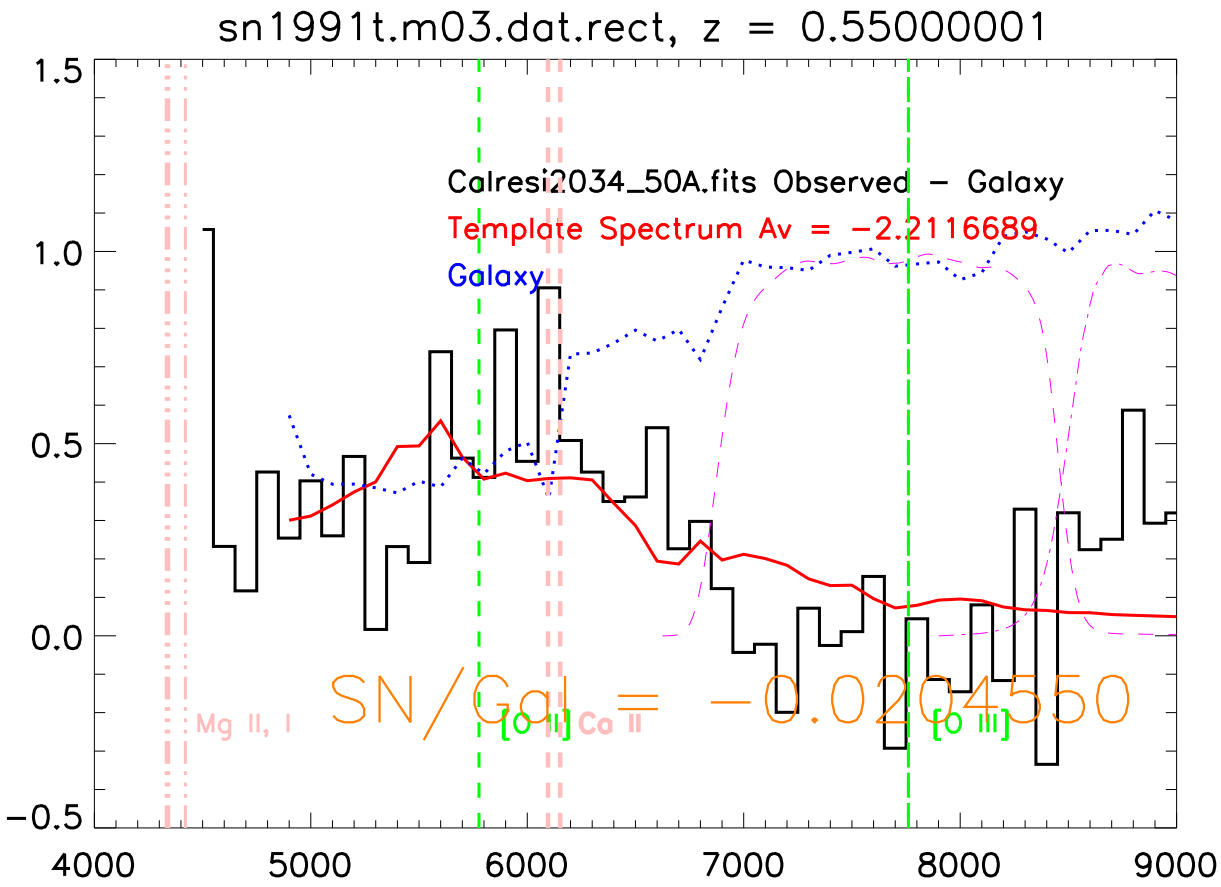

sn1996x.p01.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed – Galaxy
Template Spectrum Av = −3.8038165
Galaxy
SN/Gal = −0.042161621
Mg II, I
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

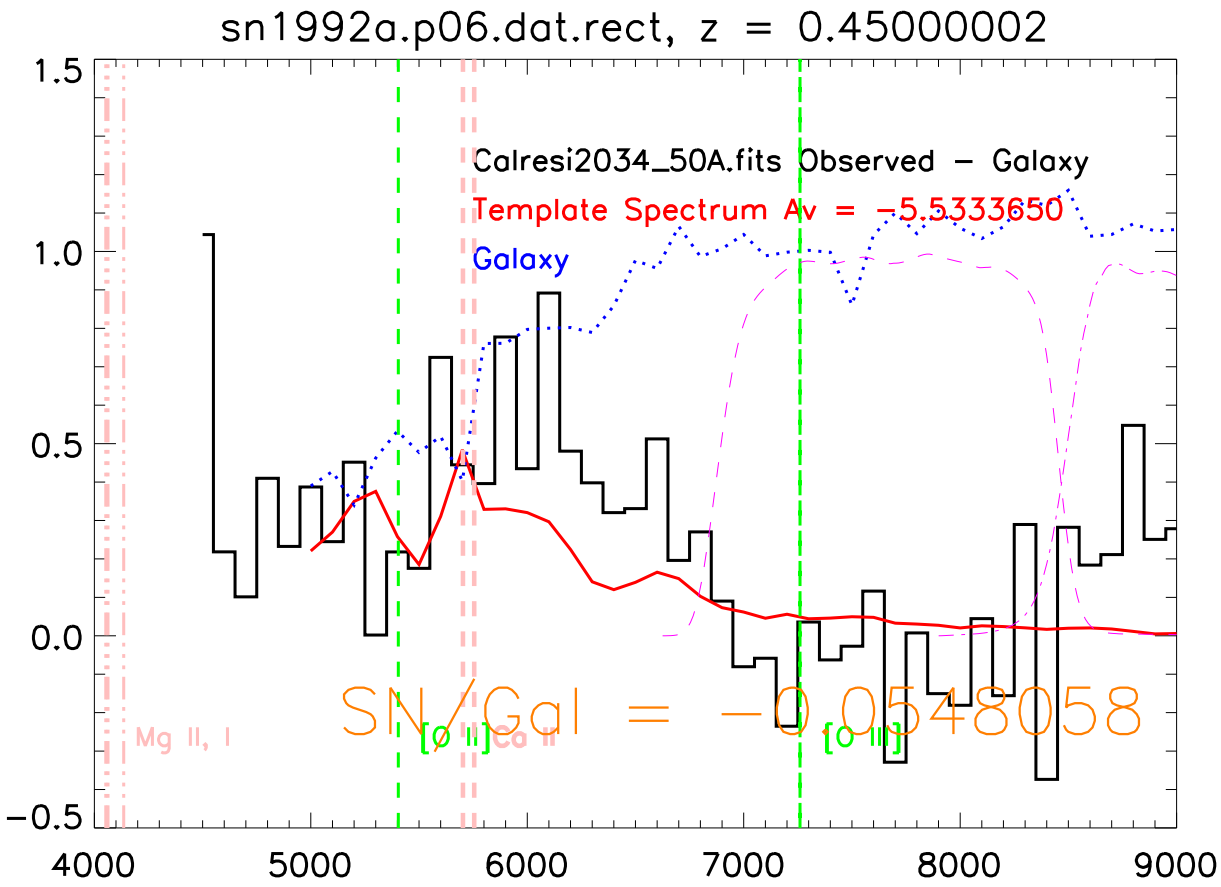

sn1999ee.m06.dat.rect, z = 0.45000002
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −5.1175718
Galaxy
SN/Gal = −0.06980004
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

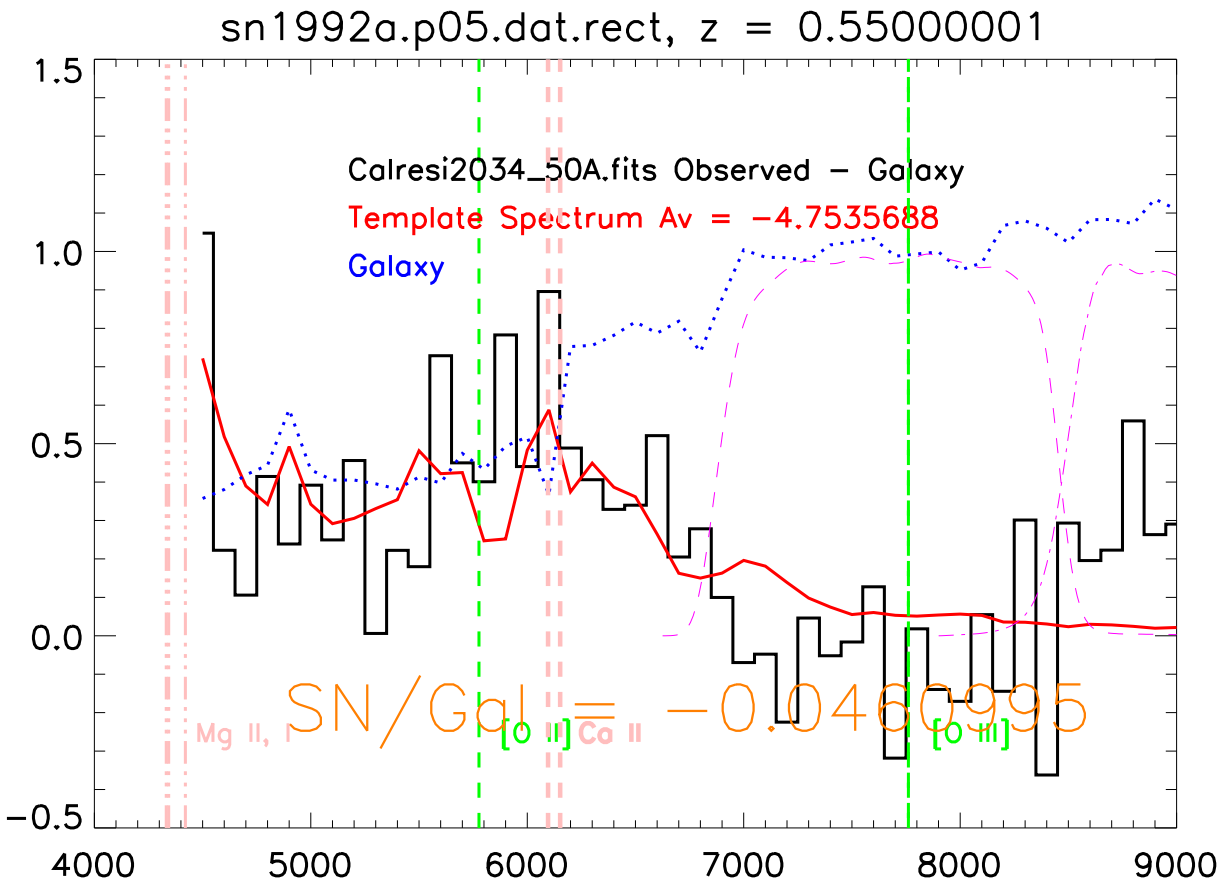

sn1994d.p02.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed – Galaxy
Template Spectrum Av = −4.0235518
Galaxy
SN/Gal = −0.0419744
Mg II, I
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000


sn1999ee.m08.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −5.2943877
Galaxy
SN/Gal = −0.0752424
Mg II, I
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

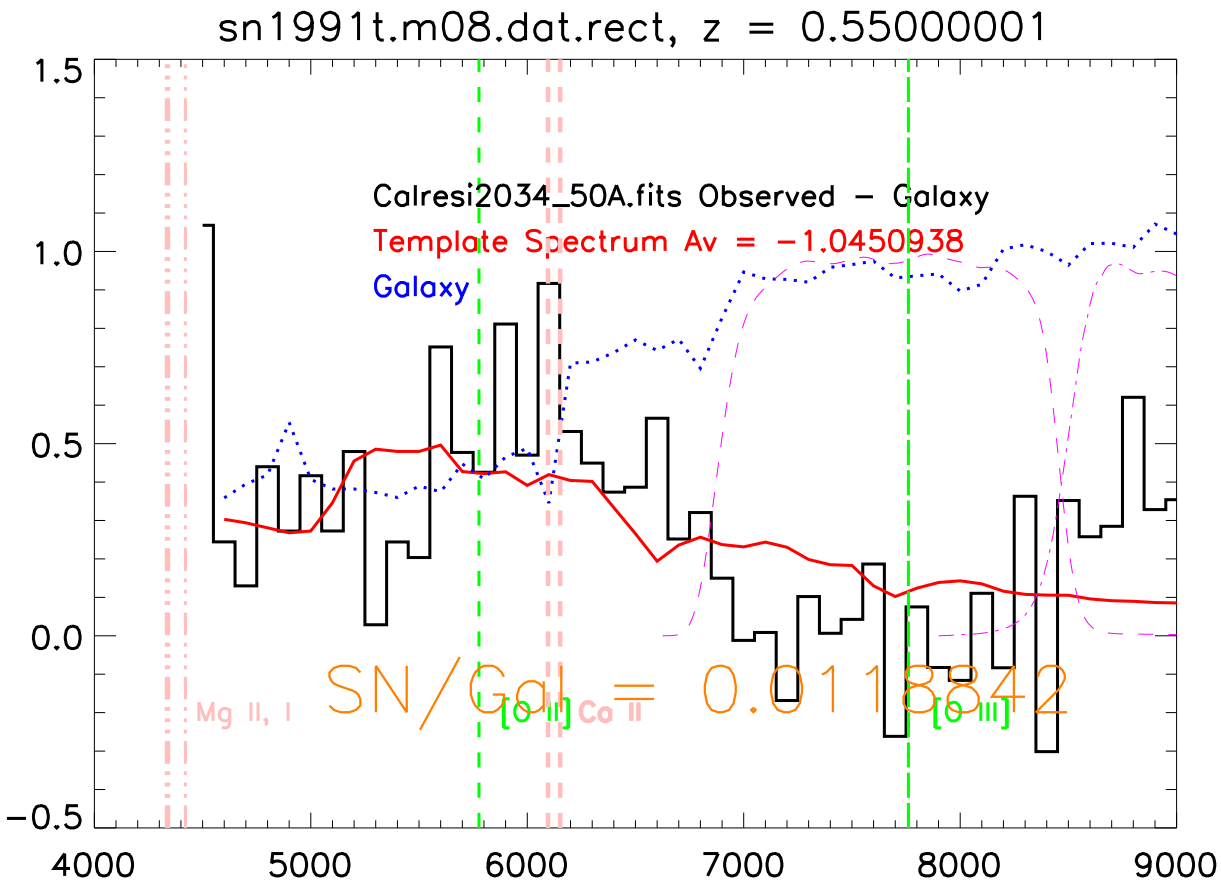

sn1990n.m07.dat.rect, z = 0.45000002
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −4.0155567
Galaxy
SN/Gal = −0.069131331
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

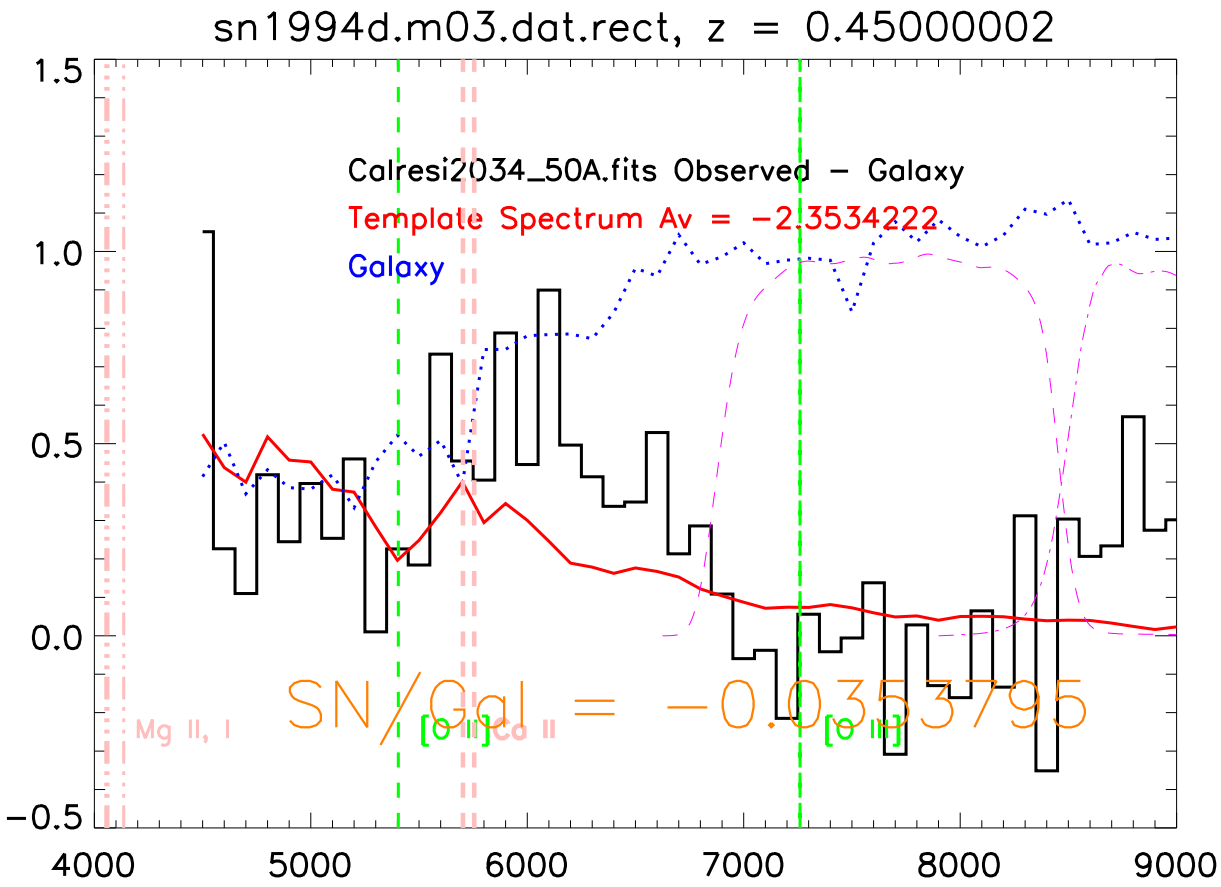

sn1991t.m03.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −2.2116689
Galaxy
SN/Gal = −0.020045500
Mg II, I
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

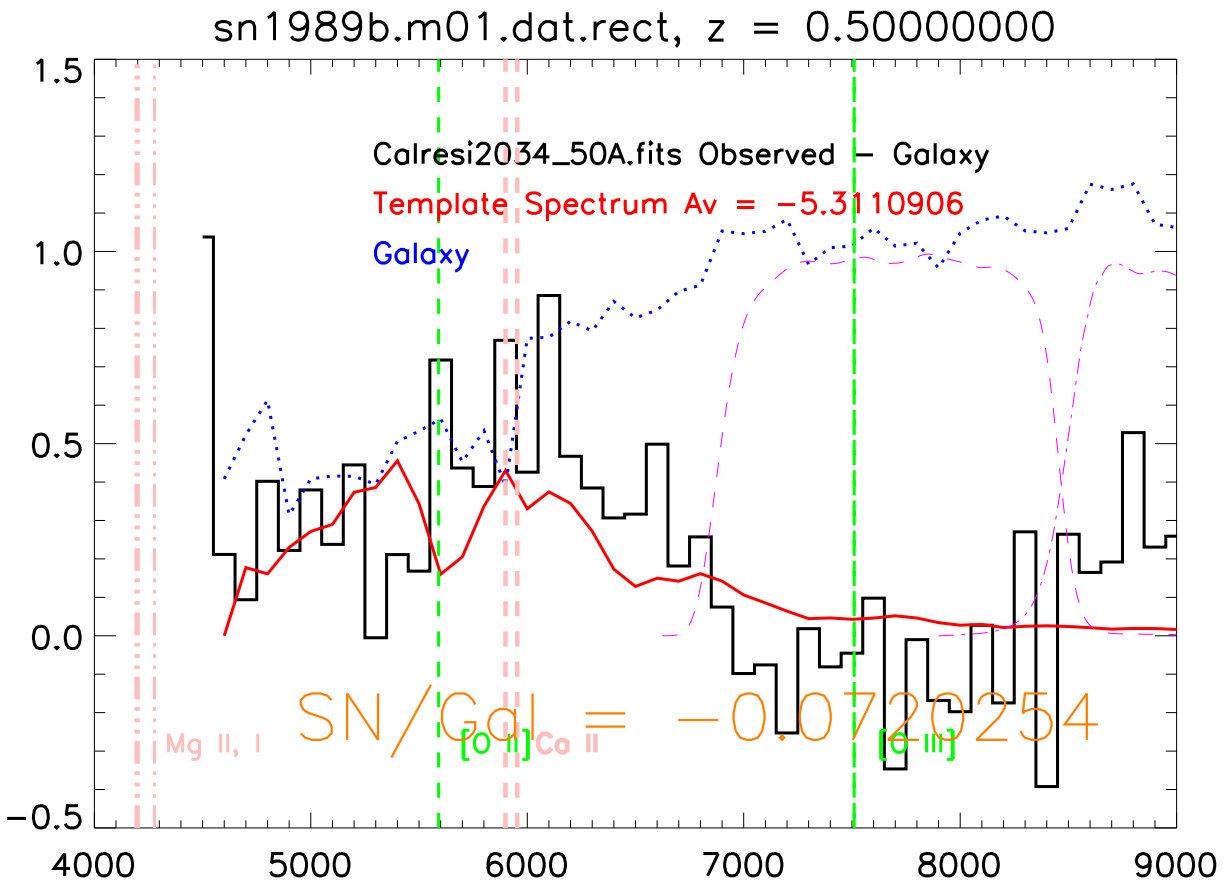

sn1992a.p06.dat.rect, z = 0.45000002
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −5.5333650
Galaxy
SN/Gal = −0.05480058
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

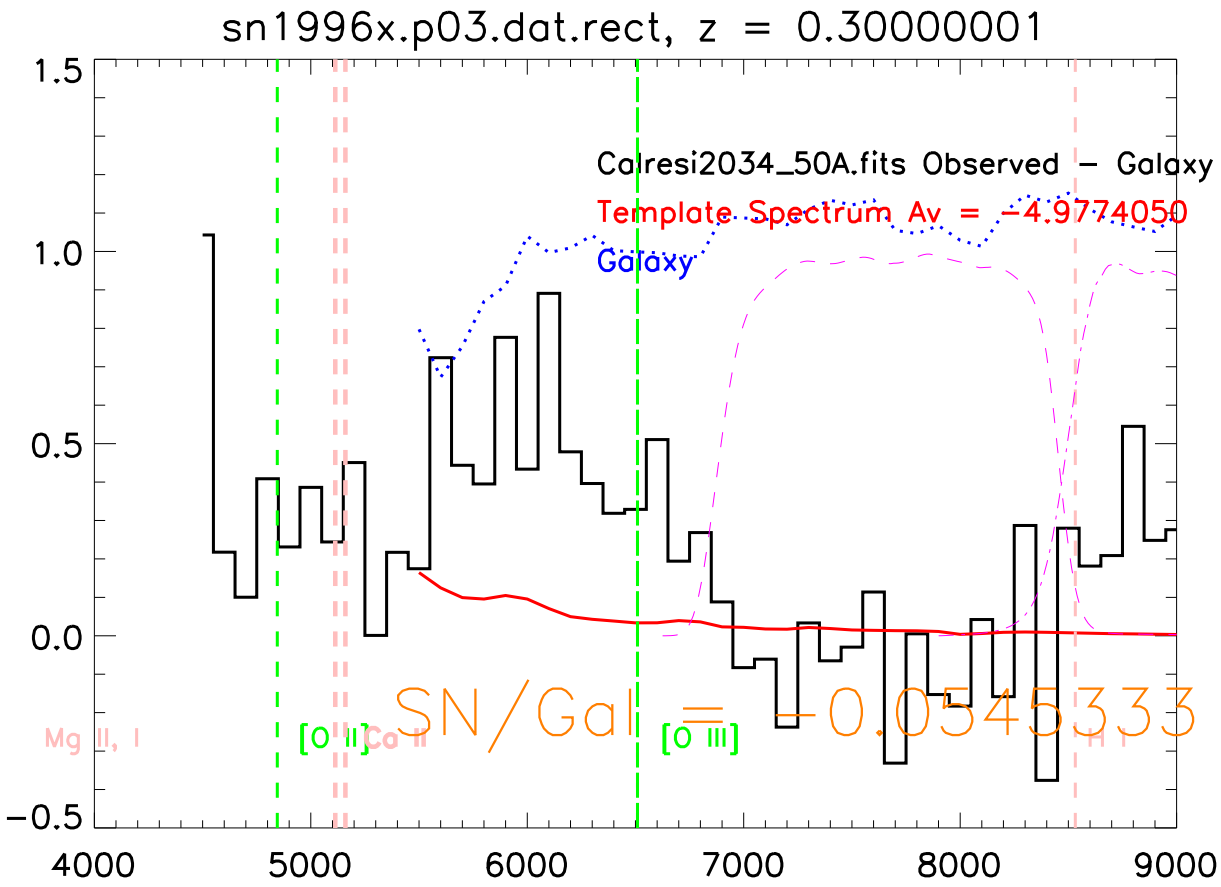


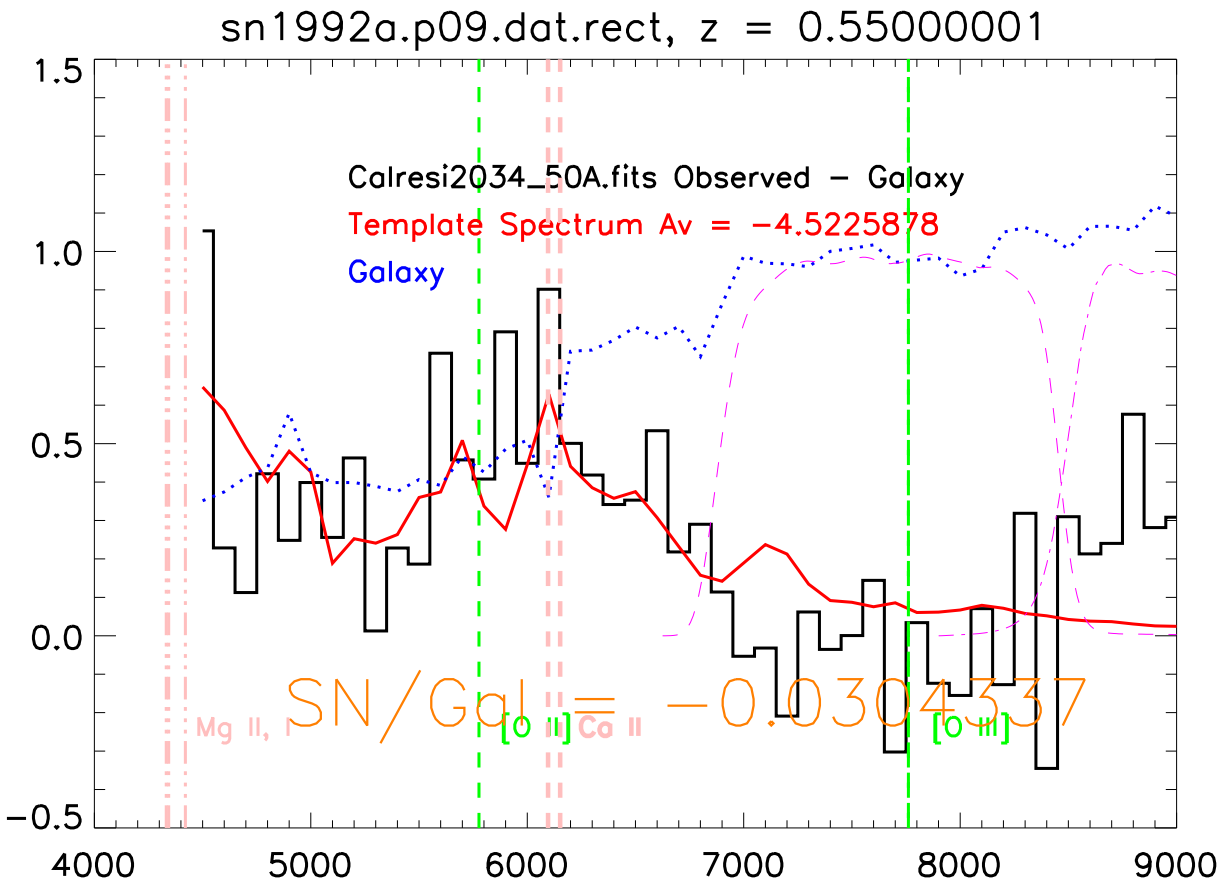
sn1992a.p05.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −4.7535688
Galaxy
SN/Gal = −0.0460995
Mg II, I
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

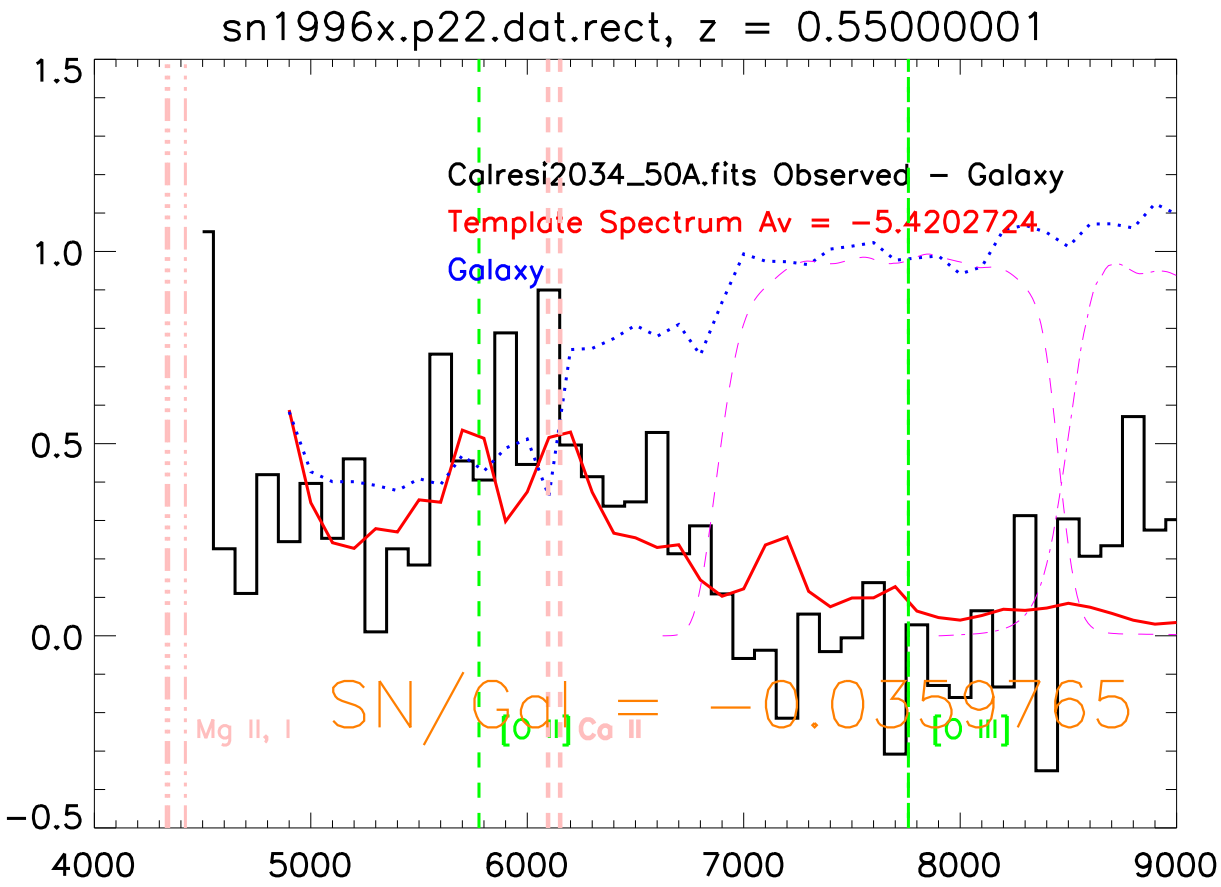

sn1991t.m08.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −1.0450938
Galaxy
SN/Gal = 0.011883
Mg II, I
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

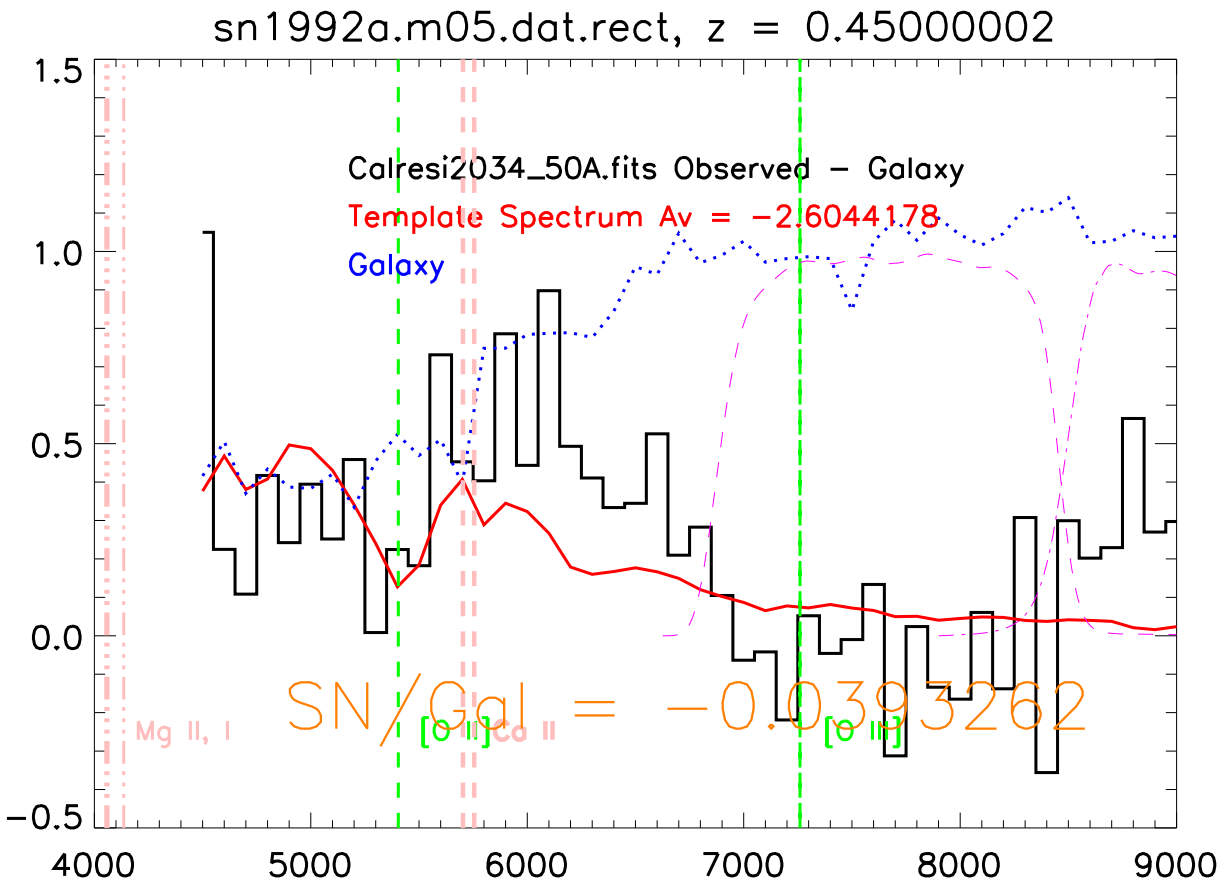

sn1994d.m03.dat.rect, z = 0.45000002
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −2.3534222
Galaxy
SN/Gal = −0.0353795
Mg II, I
[O II]Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

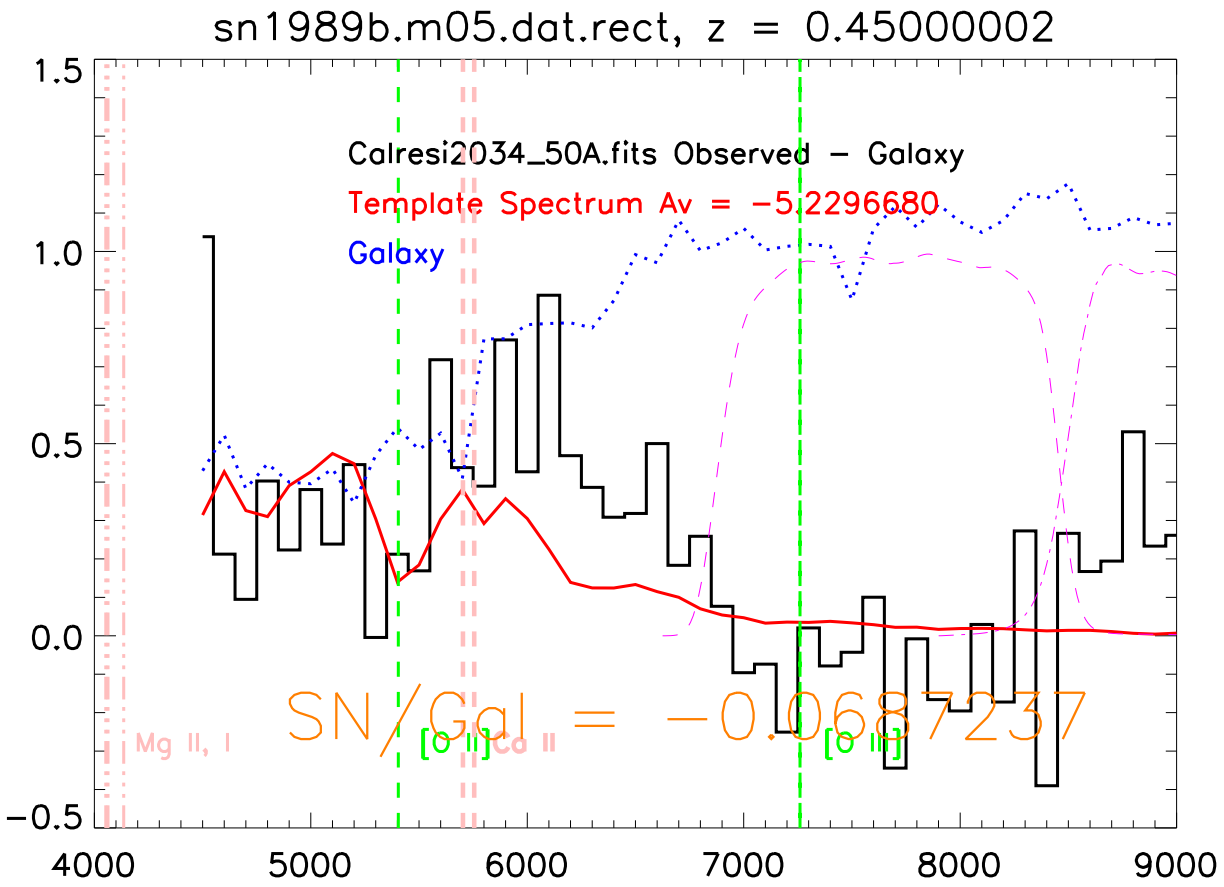

sn1989b.m01.dat.rect, z = 0.50000000
Calresi2034_50A.fits Observed – Galaxy
Template Spectrum Av = −5.3110906
Galaxy
SN/Gal = −0.0072020254
Mg II, I
[O II]
Ca II
[6 III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

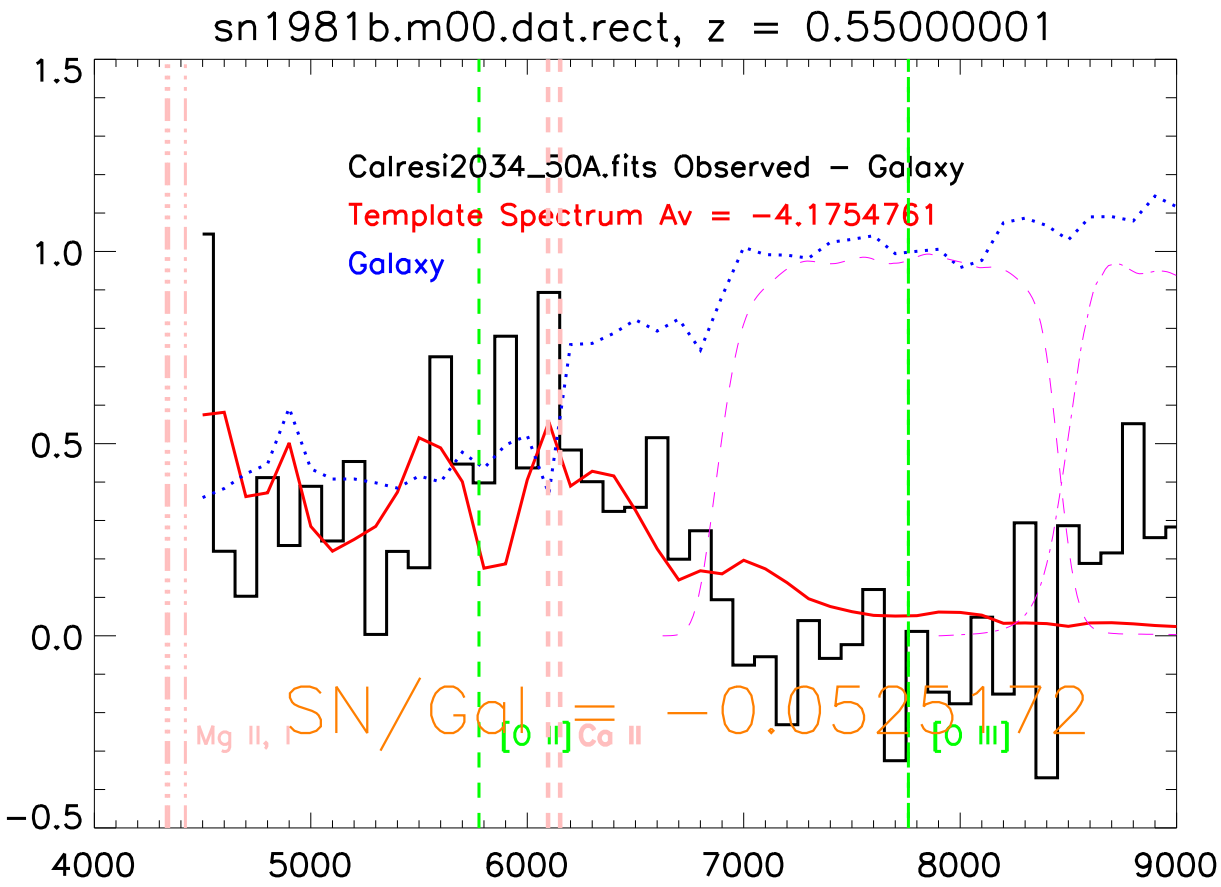

sn1996x.p03.dat.rect, z = 0.30000001
Calresi2034_50A.fits Observed – Galaxy
Template Spectrum Av = -4.9774050
Galaxy
SN/Gal = -0.054545333
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

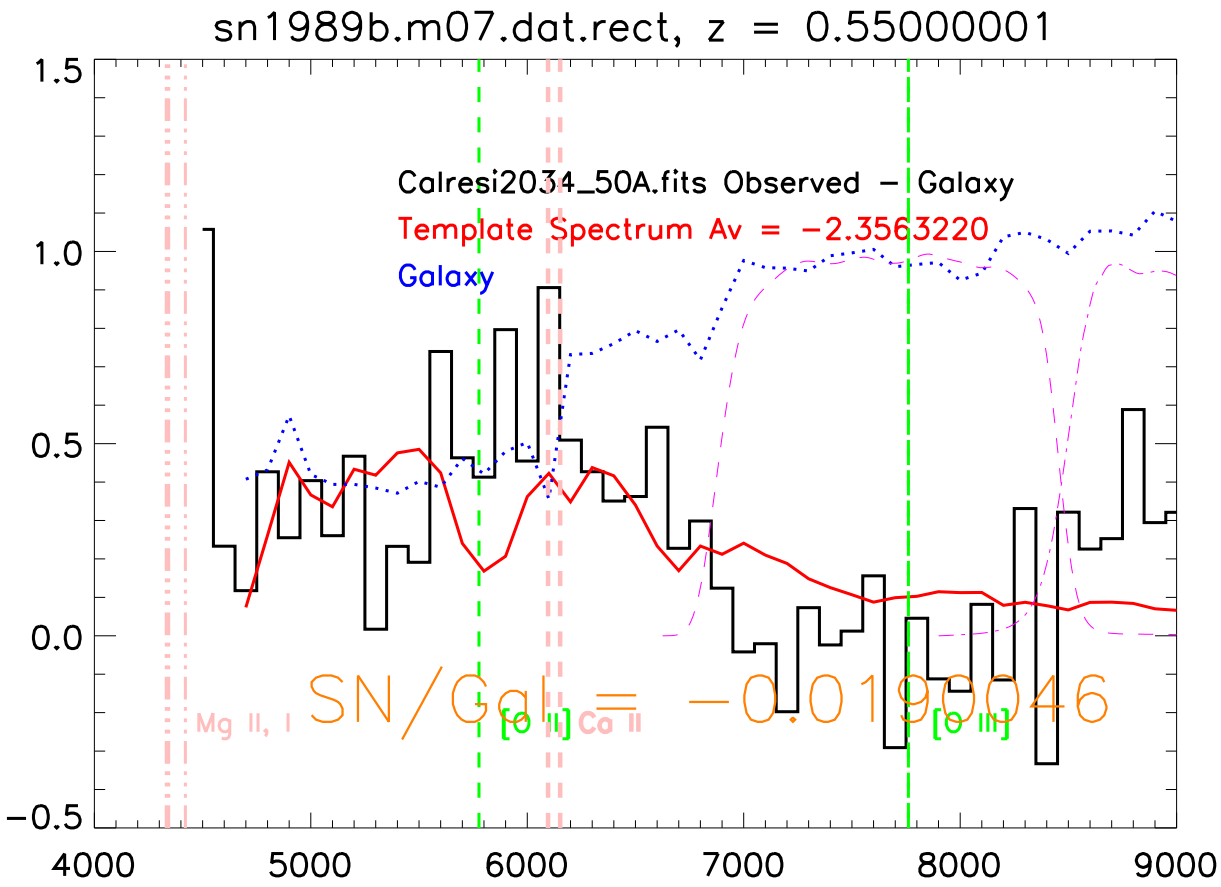

sn1992a.p09.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −4.5225878
Galaxy
SN/Gal = −0.030435537
Mg II,
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000

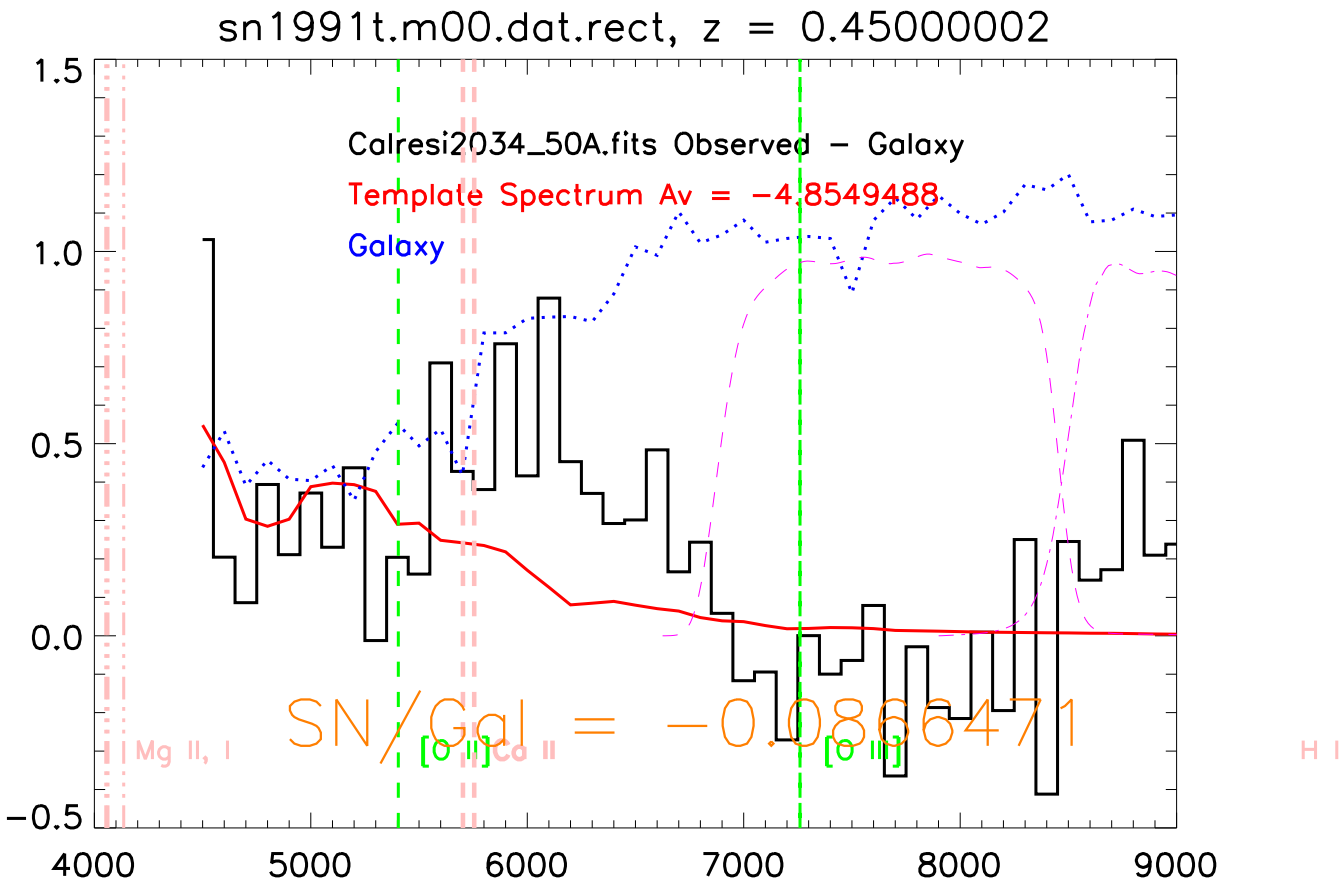

sn1996x.p22.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −5.4202724
Galaxy
SN/Gal = −0.0359765
Mg II, I
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000


sn1992a.m05.dat.rect, z = 0.45000002
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −2.6044178
Galaxy
SN/Gal = −0.0393262
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000


sn1989b.m05.dat.rect, z = 0.45000002
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −5.2296680
Galaxy
SN/Gal = −0.0687237
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000


sn1981b.m00.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −4.1754761
Galaxy
SN/Gal = −0.0525172
Mg II, Fe
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000


sn1989b.m07.dat.rect, z = 0.55000001
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −2.3563220
Galaxy
SN/Gal = −0.0199046
Mg II, I
[O II]
Ca II
[O III]
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000


sn1991t.m00.dat.rect, z = 0.45000002
Calresi2034_50A.fits Observed − Galaxy
Template Spectrum Av = −4.8549488
Galaxy
SN/Gal = −0.0866471
Mg II, I
[O II]
Ca II
[O III]
H I
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000