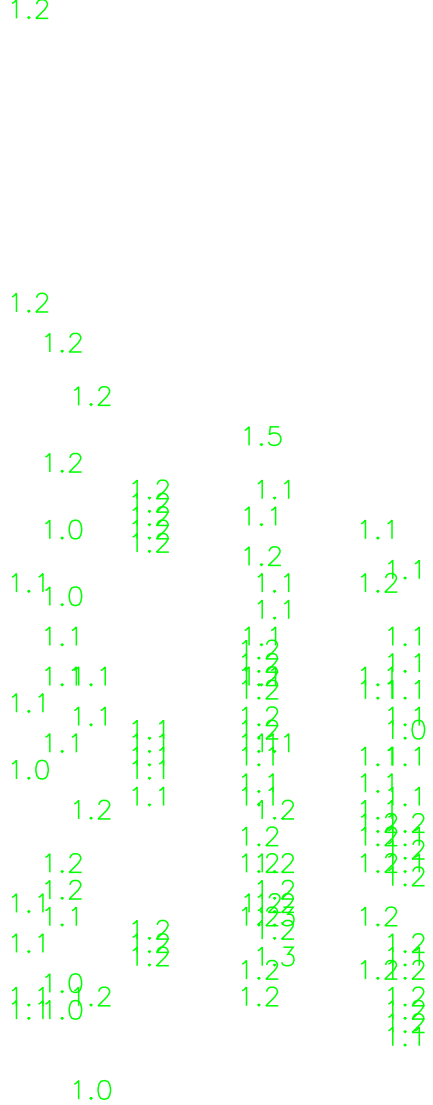
1.2
1.2
1.2
1.2
1.5
1.2
1.2
1.2
1.2
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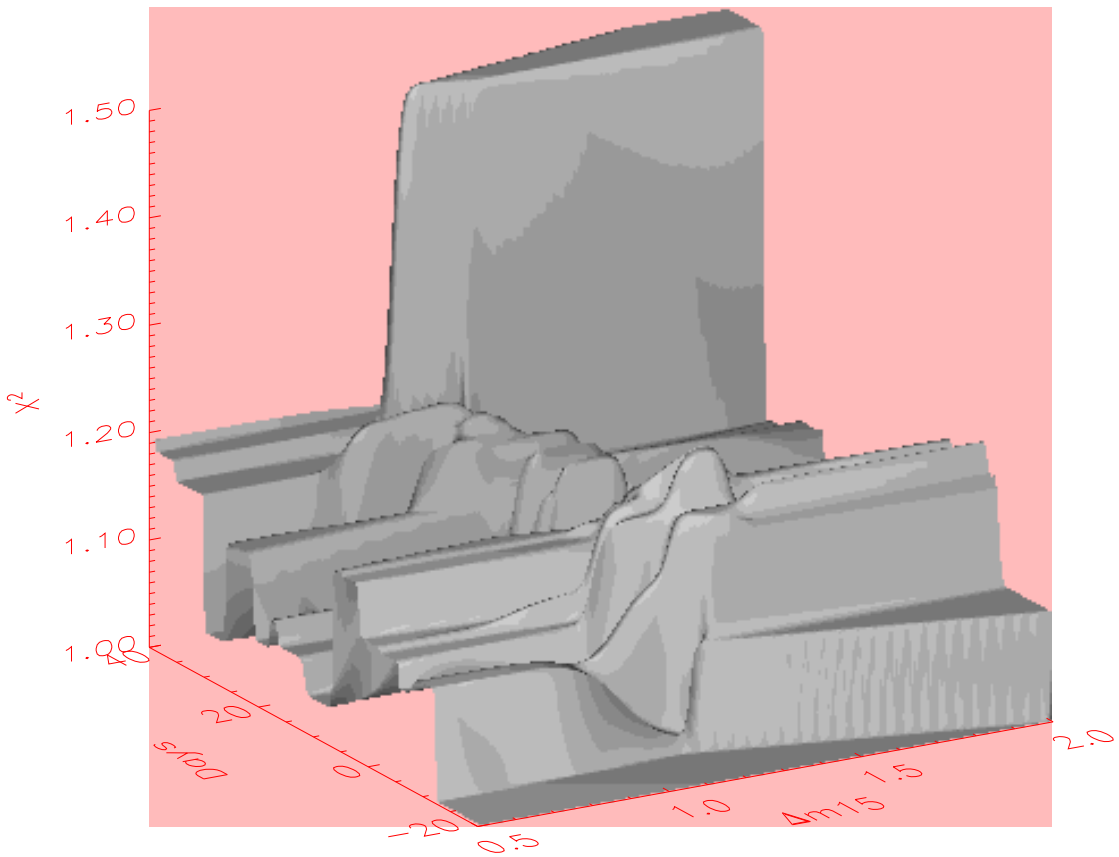
1.0
1.2
1.2
1.1
1.1
1.1
1.0
1.1
1.1
1.1



1.50
1.40
1.30
1.20
1.10
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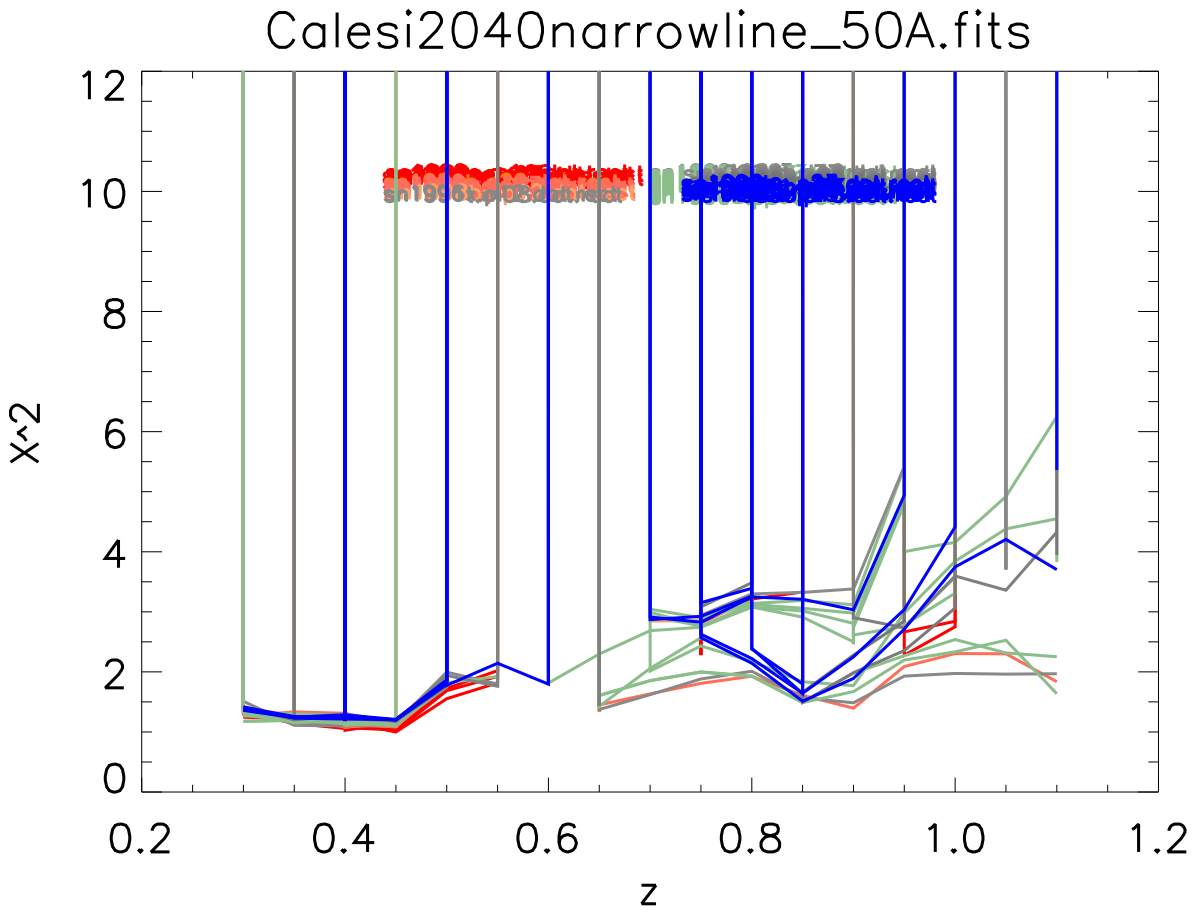
χ^2
40
20
0
−20
Days
0.5
1.0
1.5
2.0
Δm15


Calesi2040narrowline_50A.fits
X^2
z
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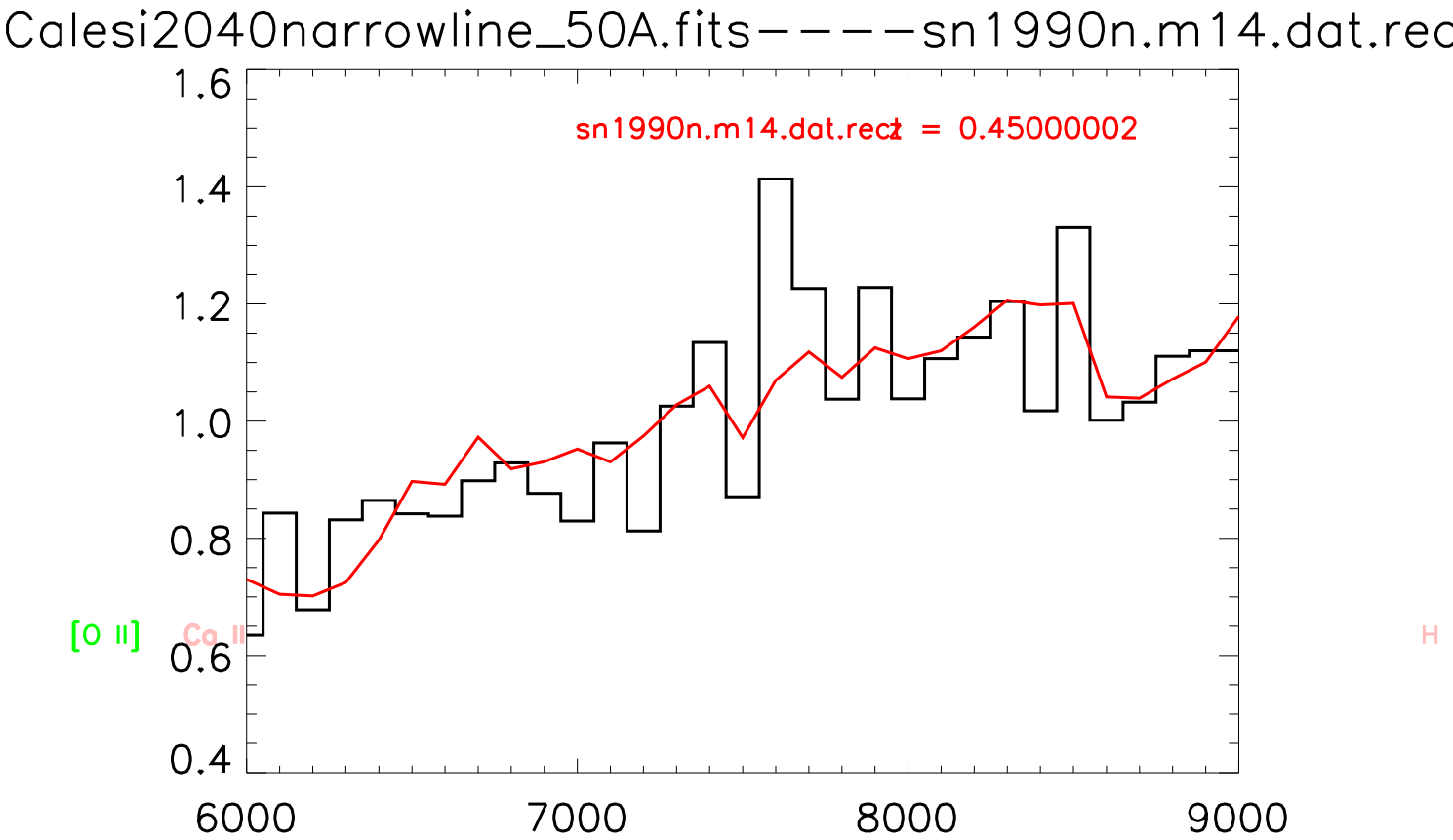
2
4
6
8
10
12
0.2
0.4
0.6
0.8
1.0
1.2


Calesi2040narrowline_50A.fits----sn1990n.m14.dat.rec
sn1990n.m14.dat.rect z = 0.45000002
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1.4
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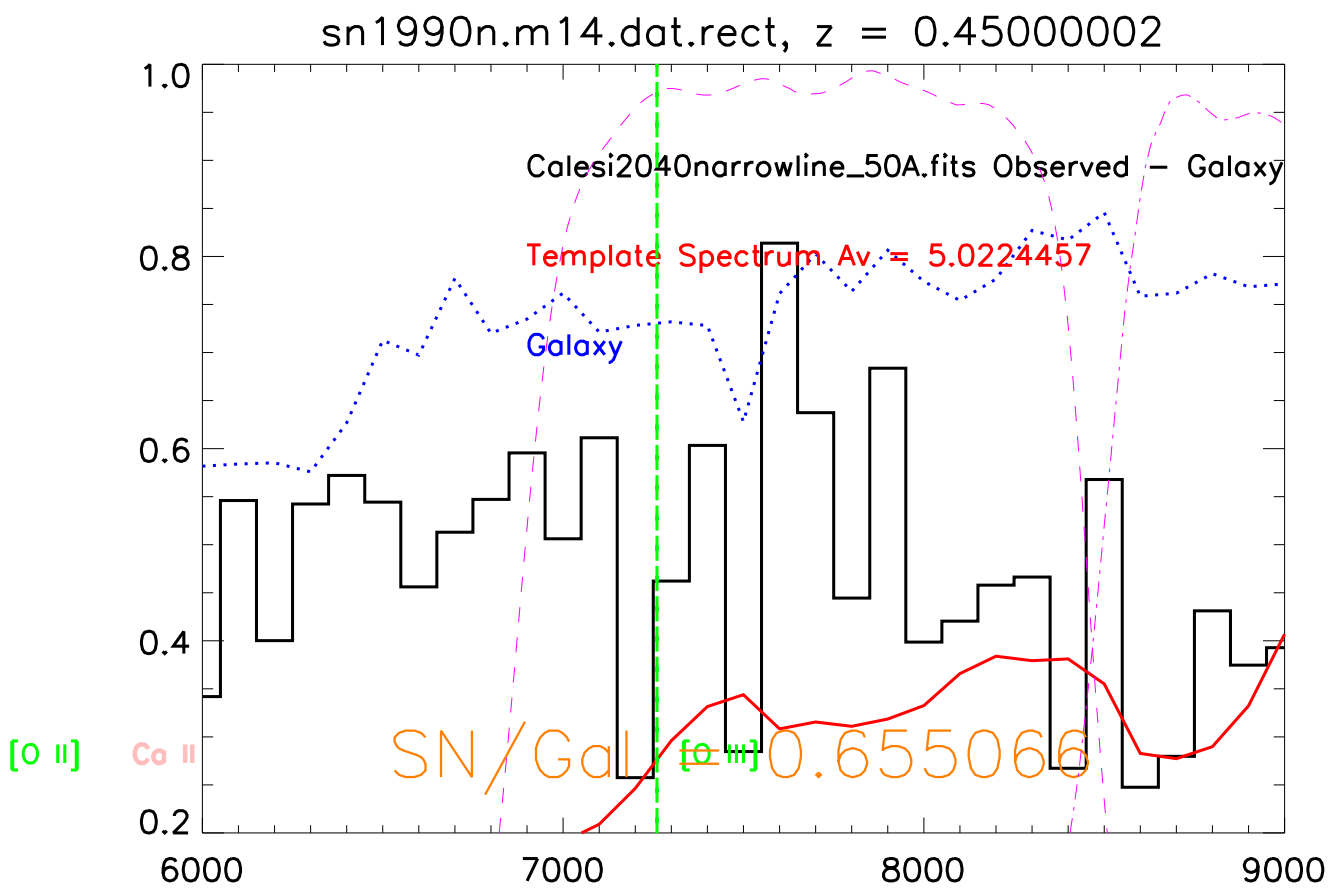
1.0
0.8
0.6
0.4
6000
7000
8000
9000
[O II]
Ca II
H


sn1990n.m14.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed − Galaxy
Template Spectrum Av = 5.0224457
Galaxy
SN/Gal [O III] 0.655066
[O II]
Ca II
1.0
0.8
0.6
0.4
0.2
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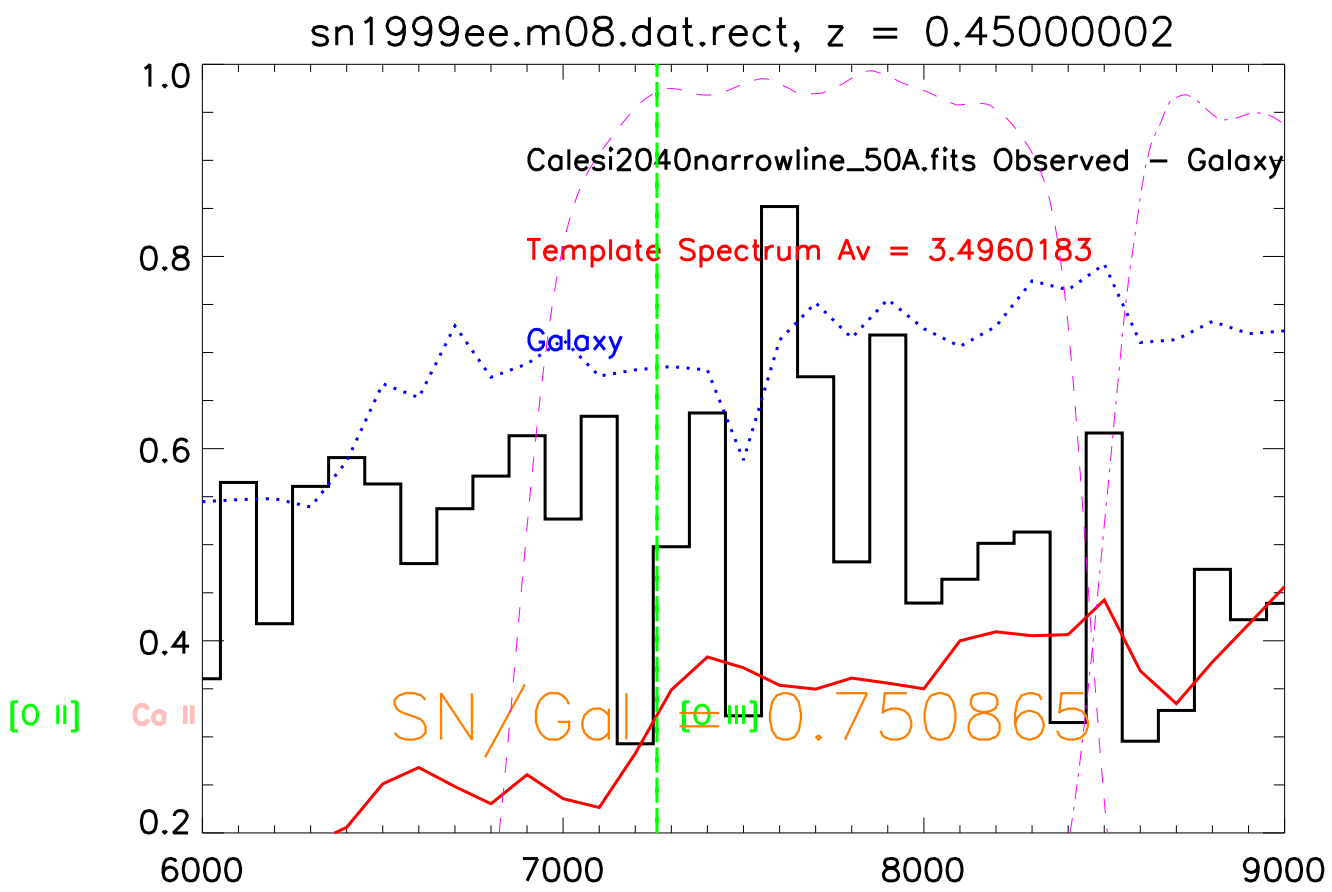
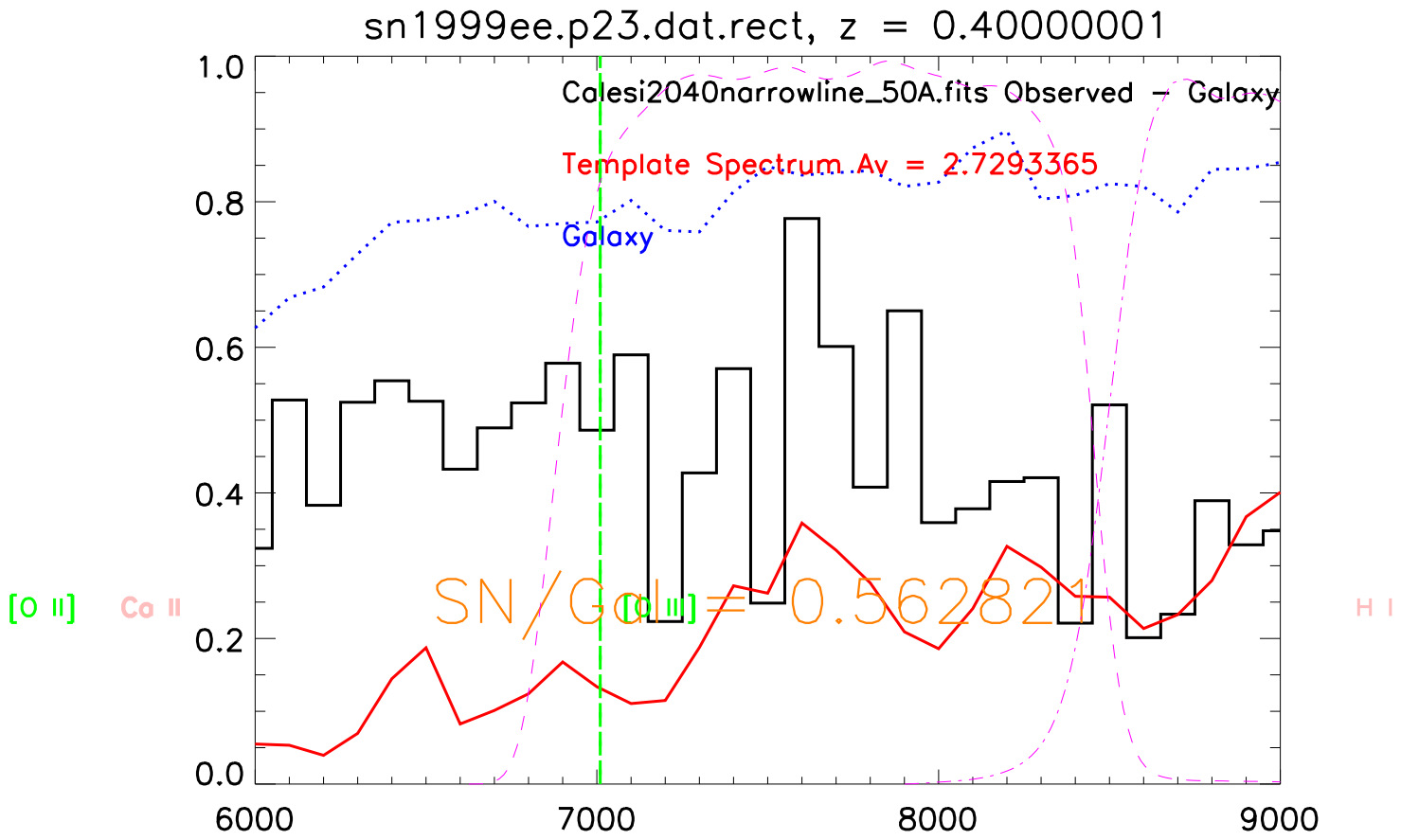
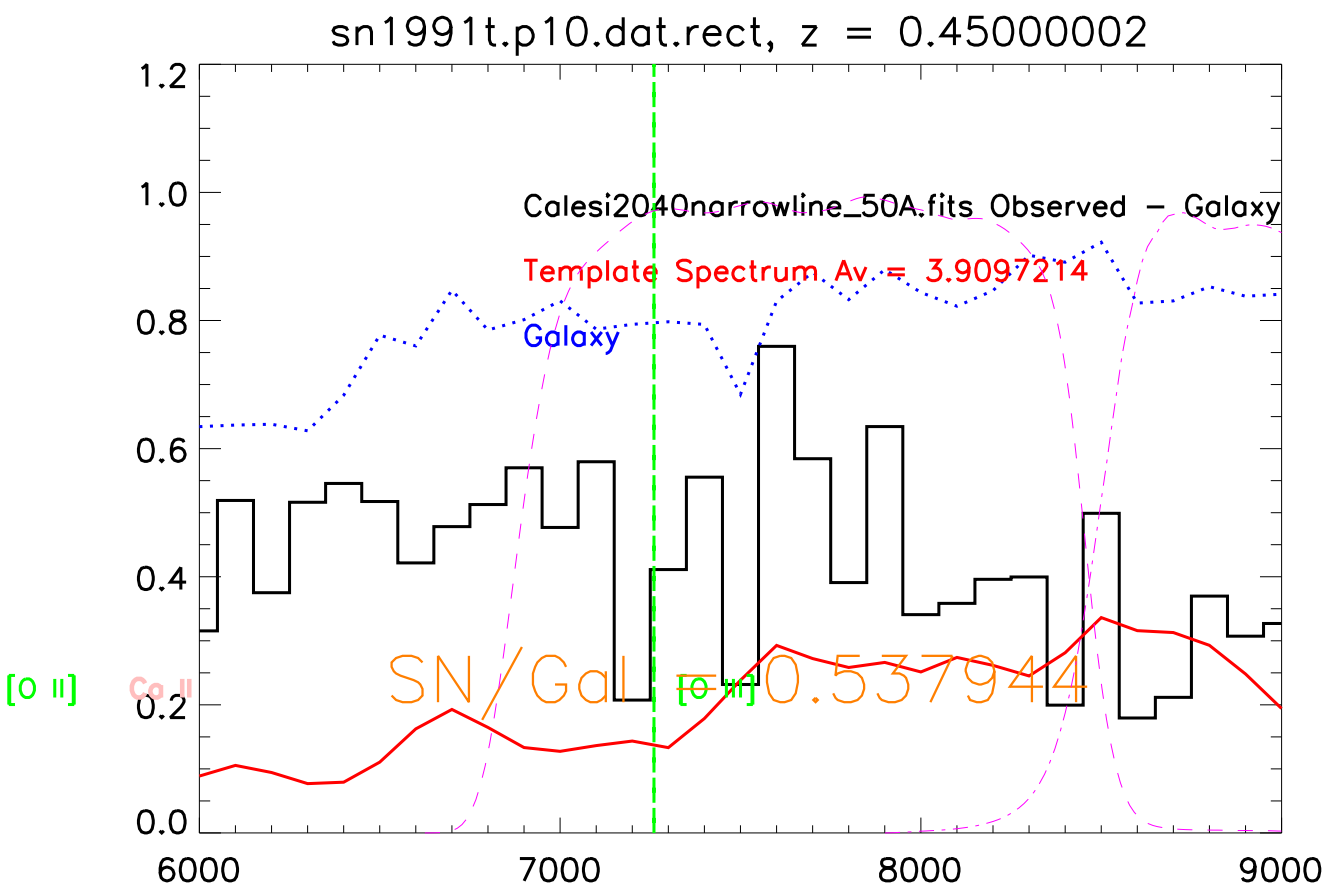
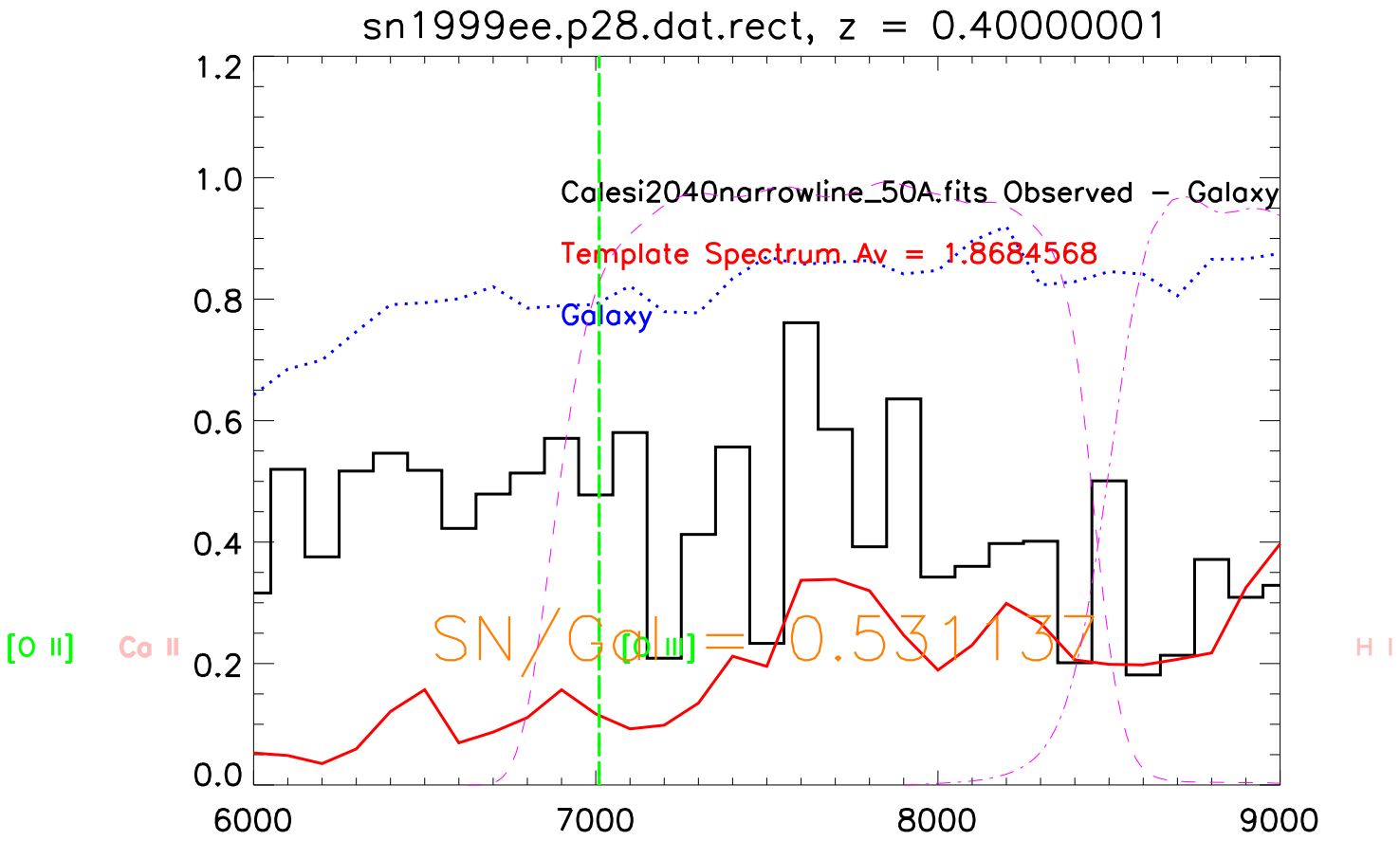
7000
8000
9000


sn1999ee.m08.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 3.4960183
Galaxy
SN/Gal: 0.750865
[O II]
Ca II
[O III]
1.0
0.8
0.6
0.4
0.2
6000
7000
8000
9000


sn1999ee.p23.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 2.7293365
Galaxy
SN/Gal=0.562821
[O II]
Ca II
[O III]
H I
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1991t.p10.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 3.9097214
Galaxy
SN/Gal: 0.537944
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1999ee.p28.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 1.8684568
Galaxy
SN/Gal=0.531137
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
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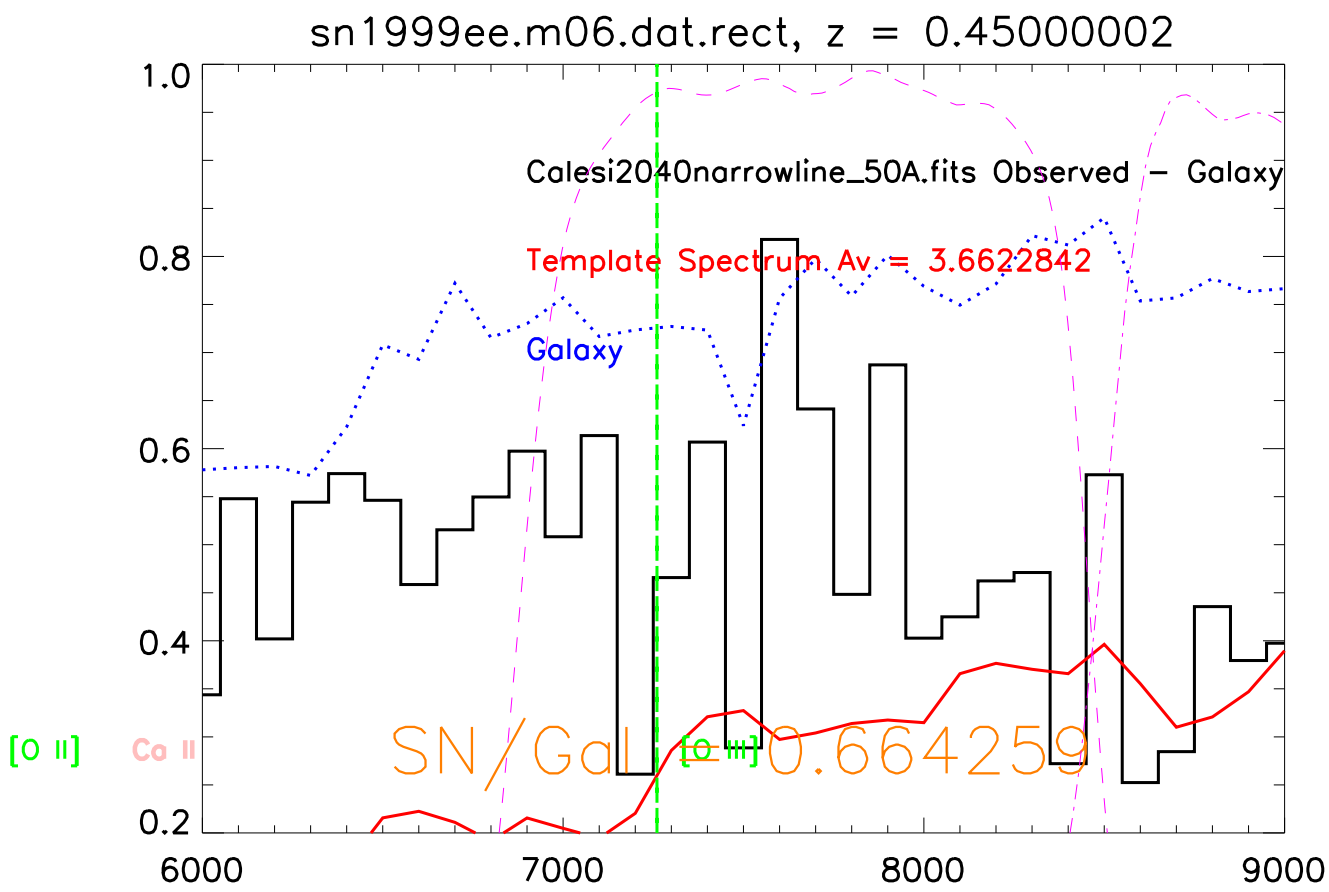
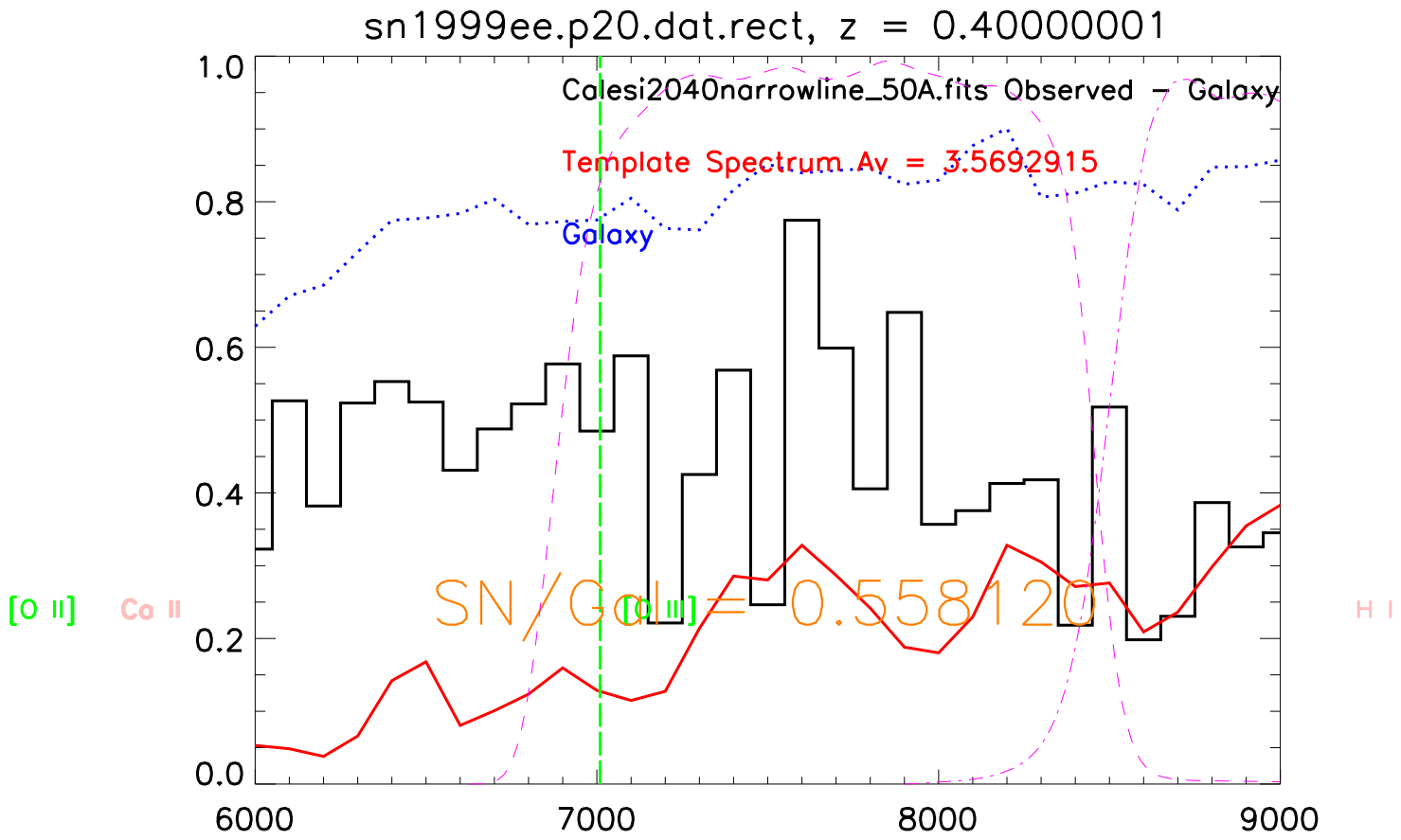
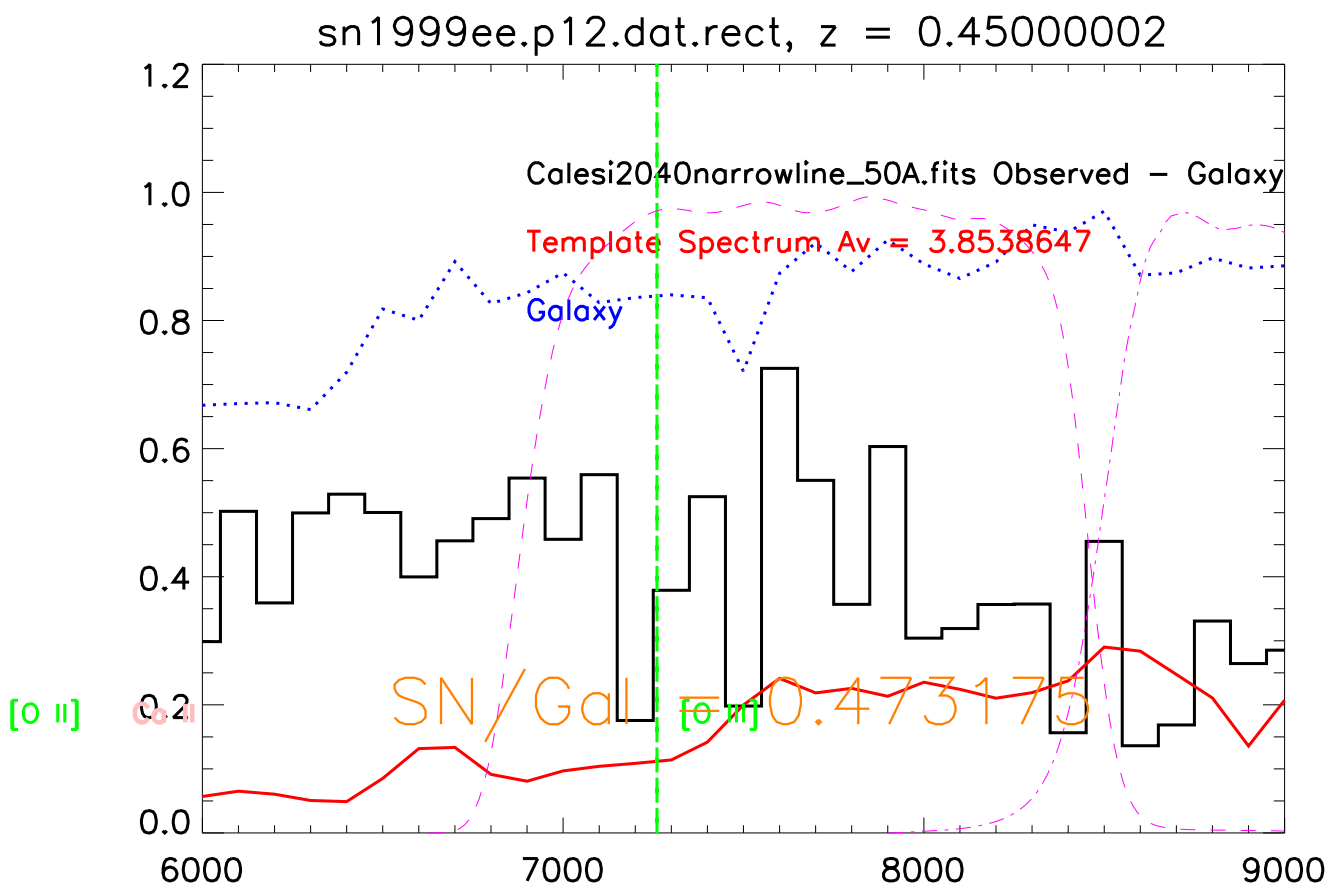
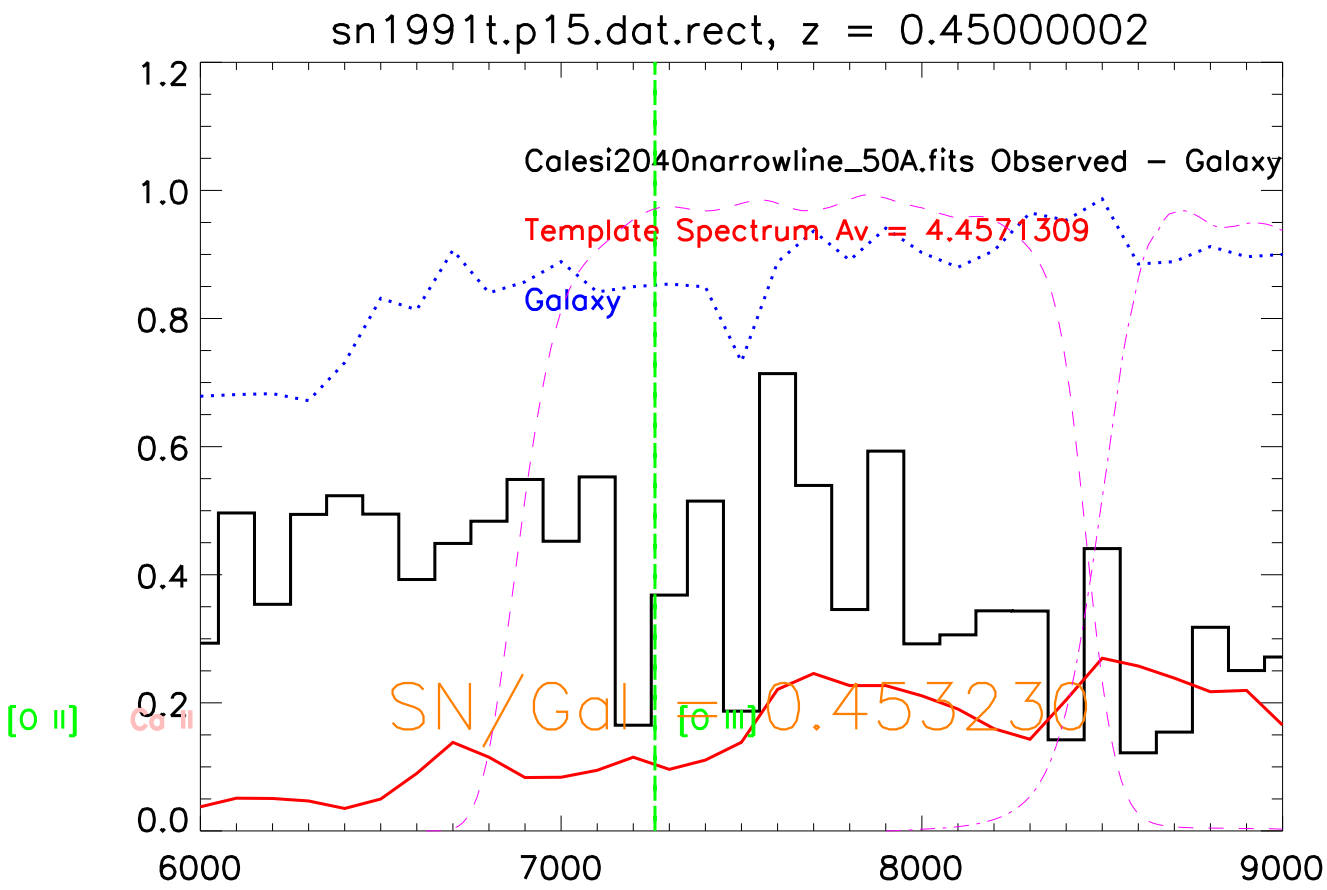
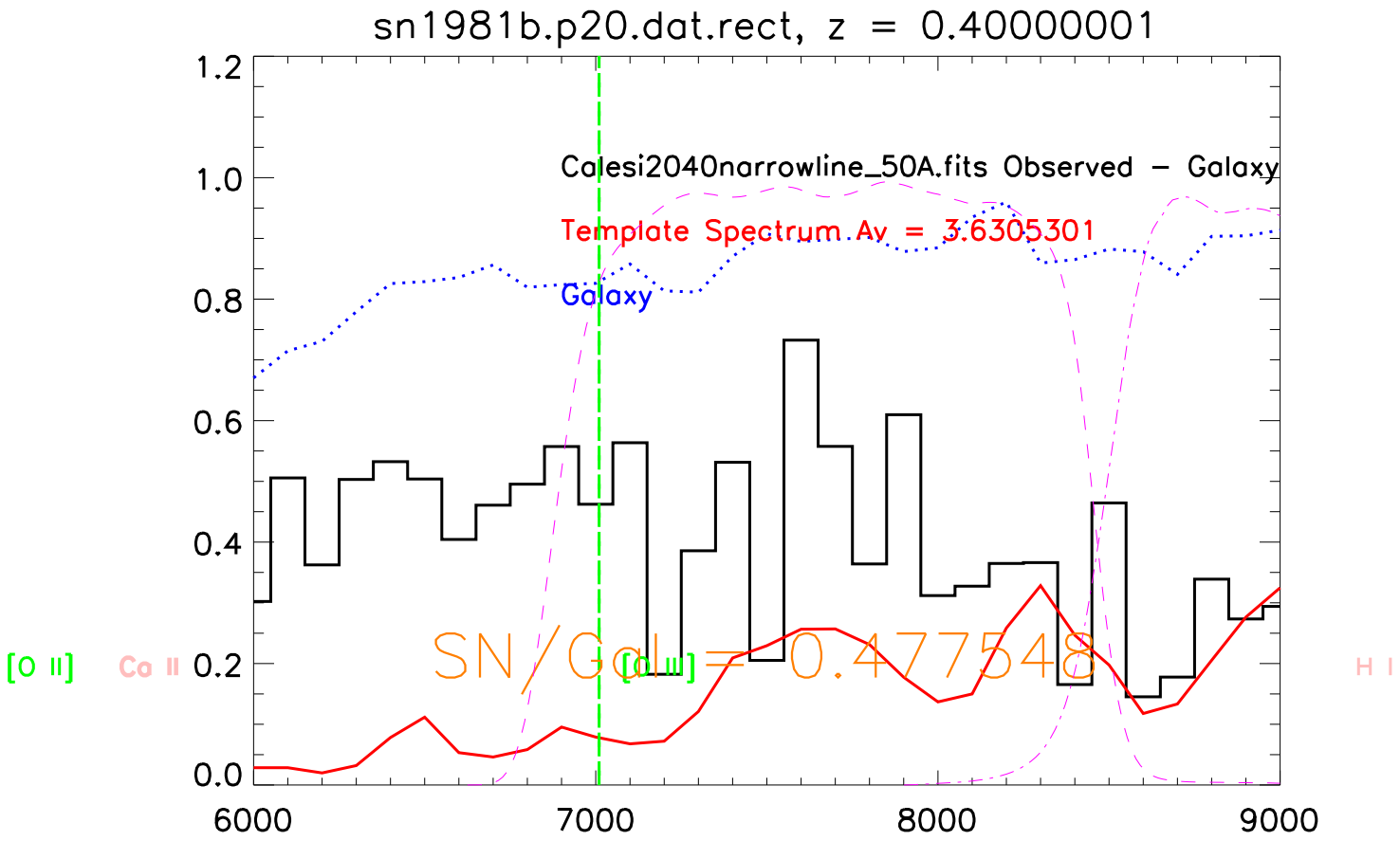
6000
7000
8000
9000

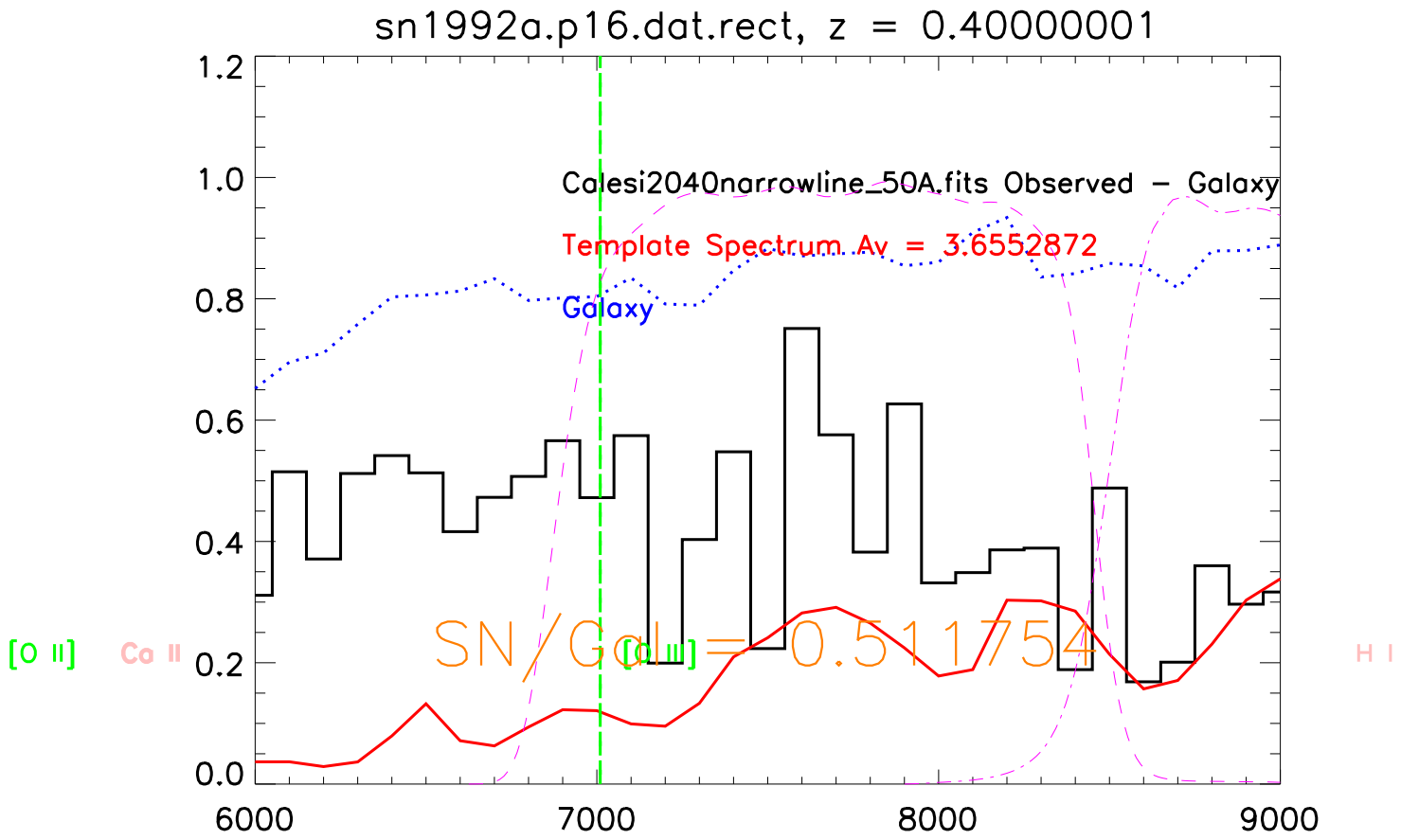

sn1999ee.m06.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed − Galaxy
Template Spectrum Av = 3.6622842
Galaxy
SN/Gal [O III]0.664259
[O II]
Ca II
1.0
0.8
0.6
0.4
0.2
6000
7000
8000
9000

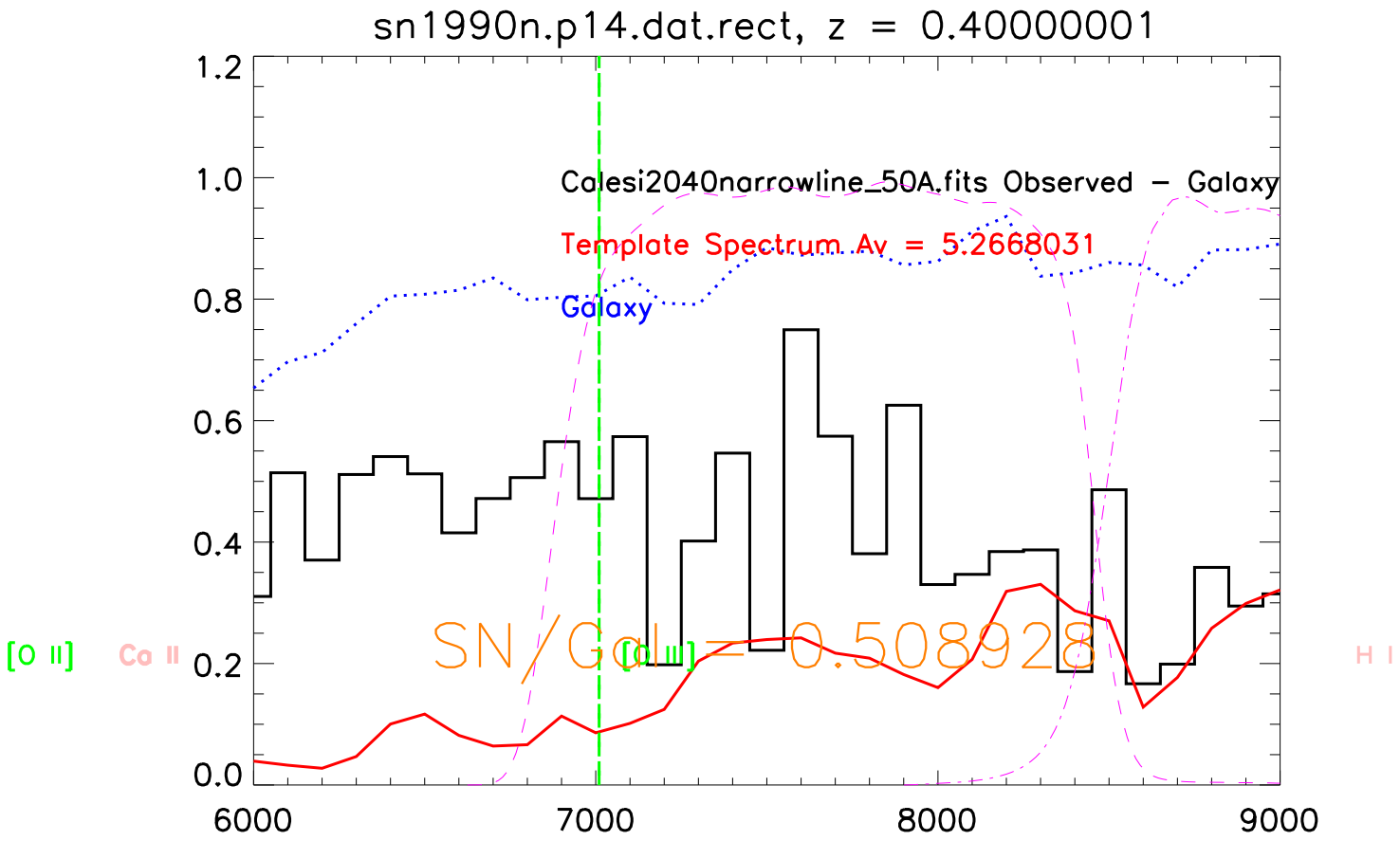

sn1999ee.p20.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 3.5692915
Galaxy
SN/Gal[O III]=0.558120
[O II]
Ca II
H I
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

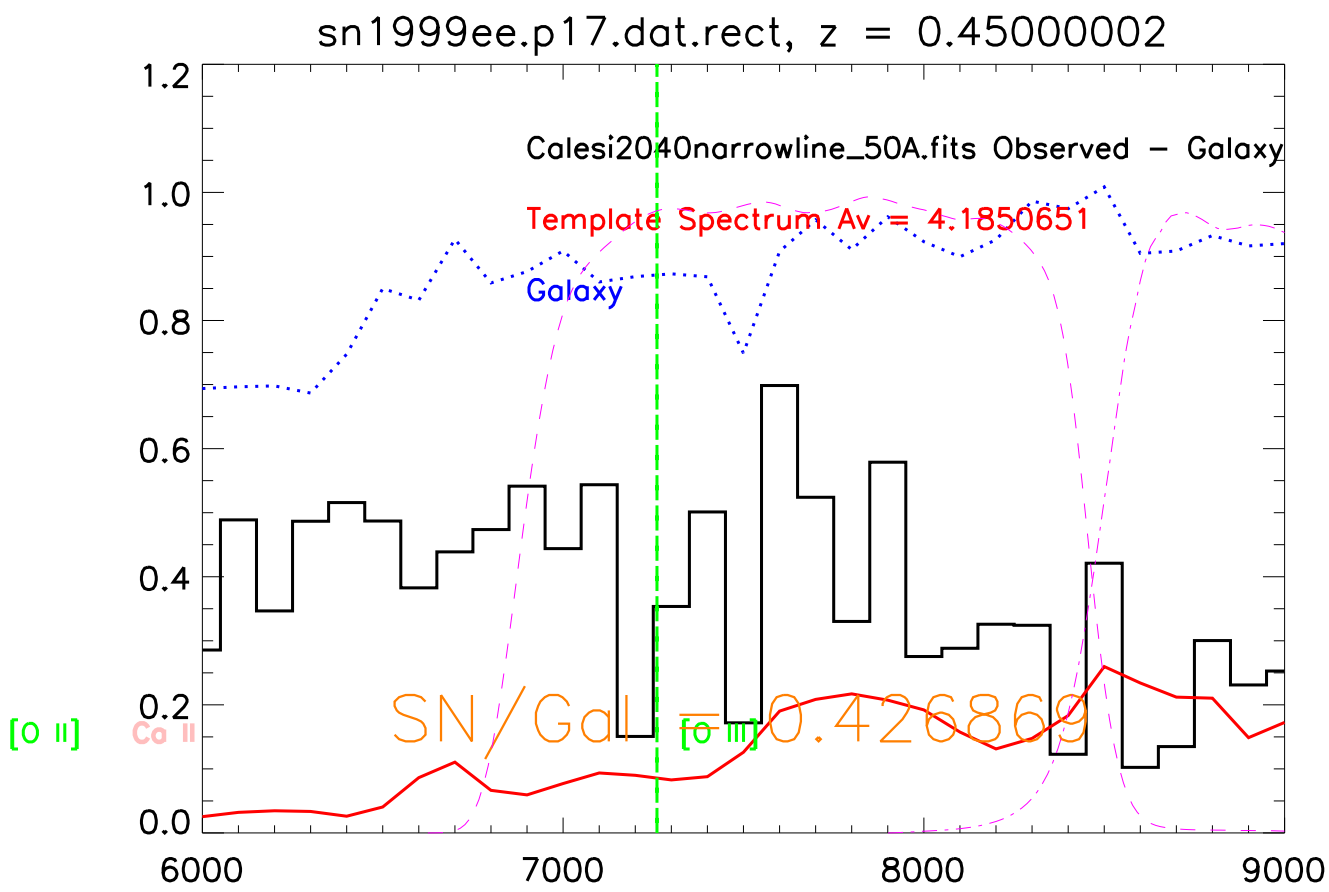

sn1999ee.p12.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av. = 3.8538647
Galaxy
SN/Gal = 0.473175
[O II]
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

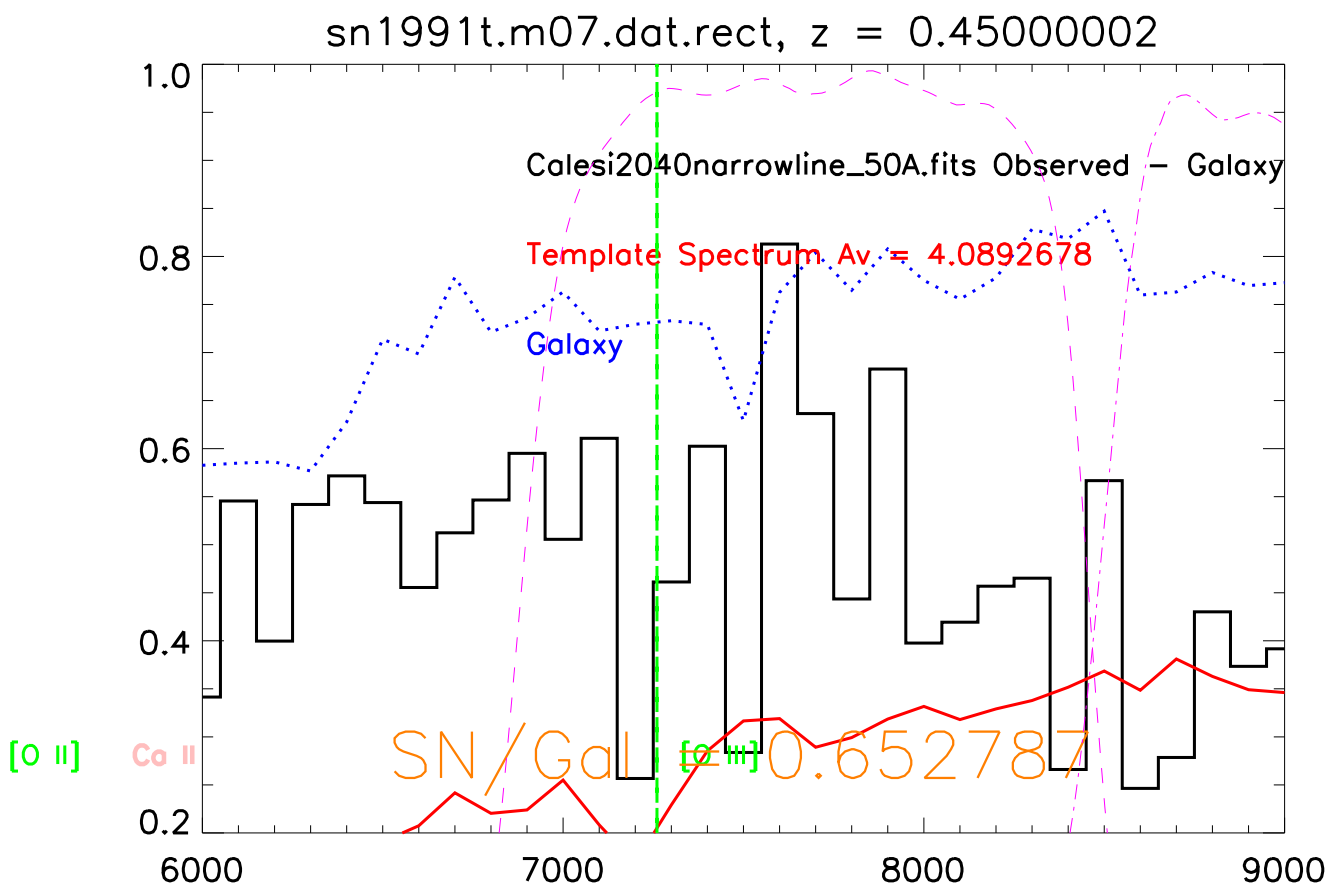

sn1991t.p15.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed − Galaxy
Template Spectrum Av = 4.4571309
Galaxy
SN/GaL = 0.453230
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

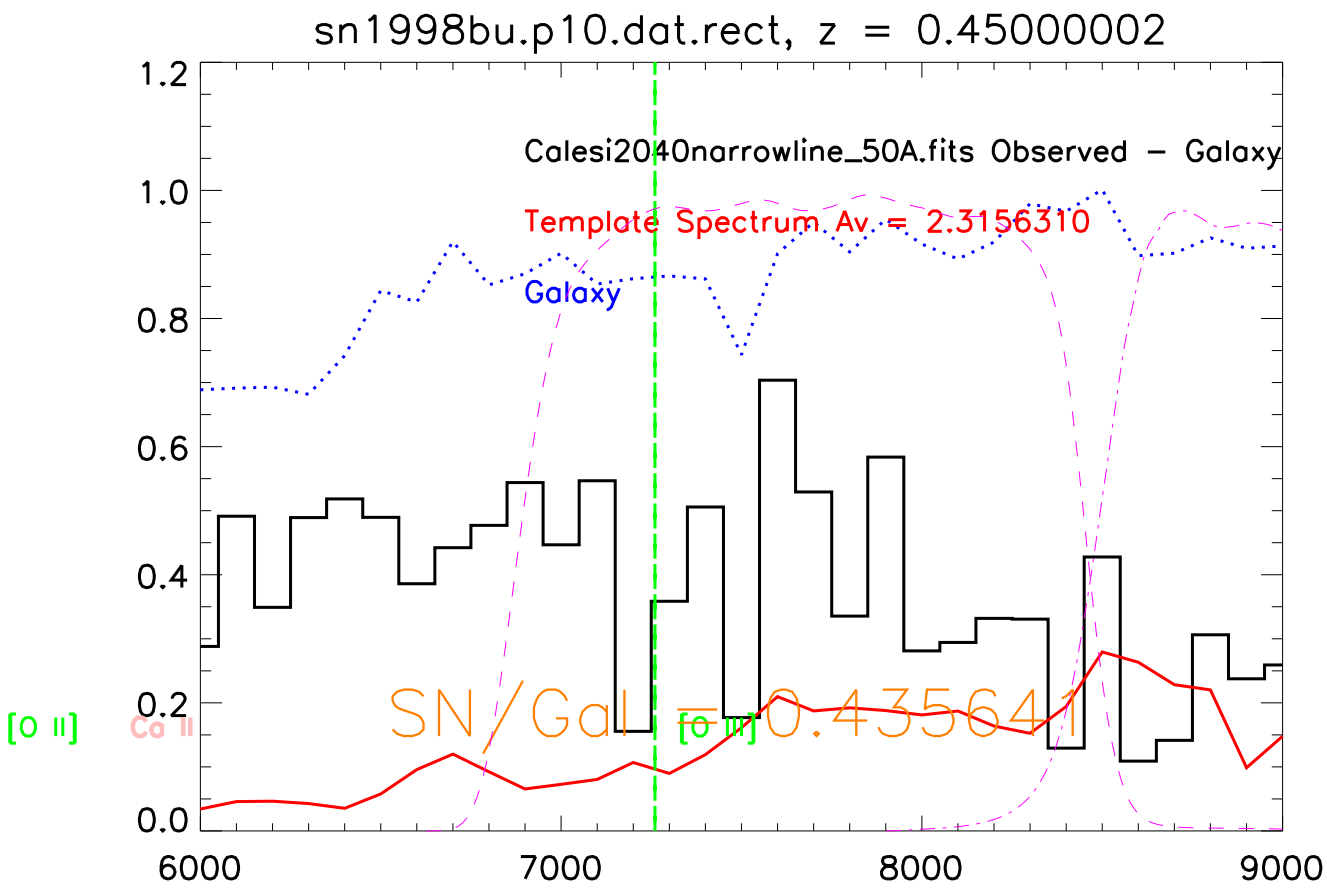

sn1981b.p20.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 3.6305301
Galaxy
SN/Gal=0.477548
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

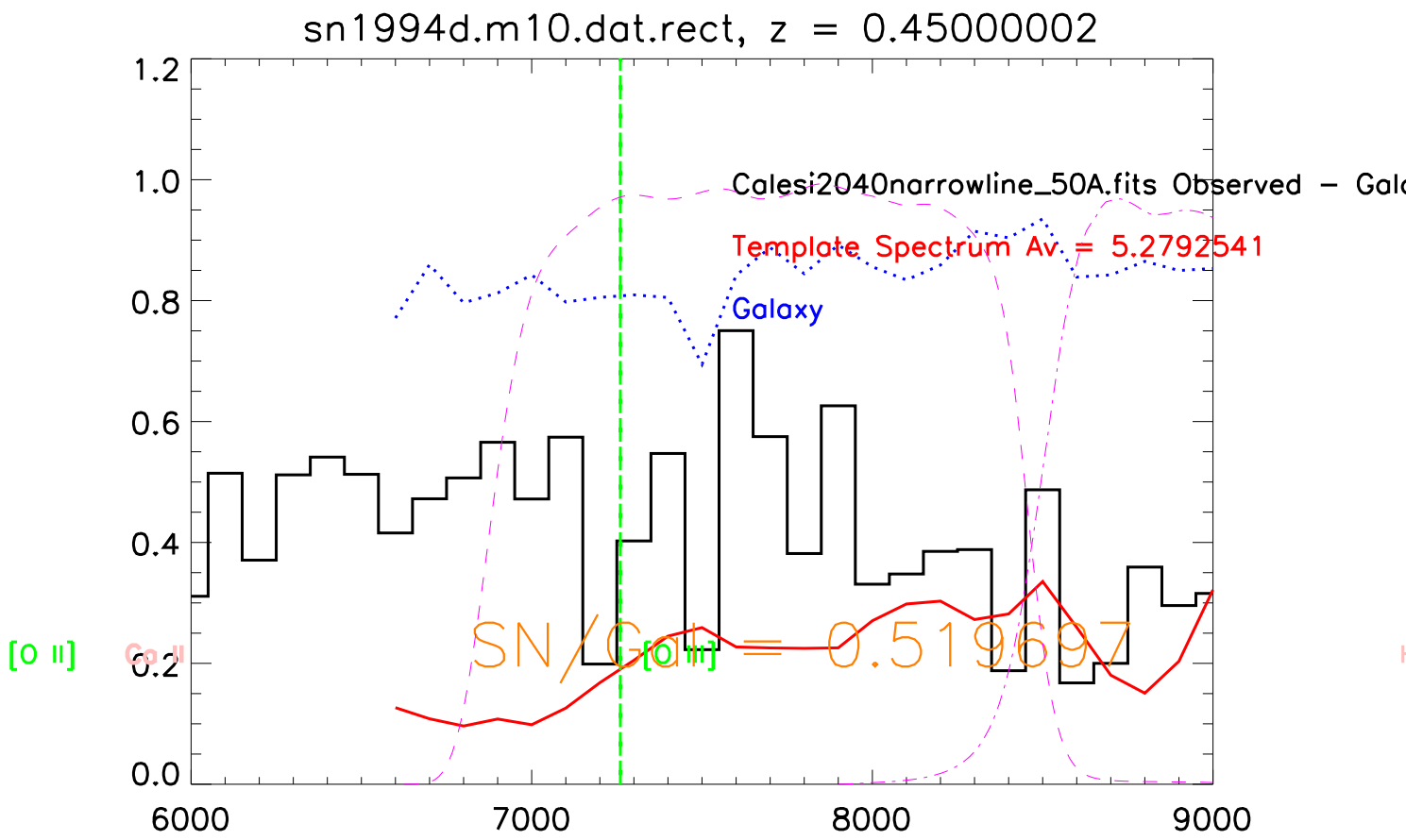

sn1992a.p16.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed − Galaxy
Template Spectrum Av = 3.6552872
Galaxy
SN/Gal = 0.511754
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

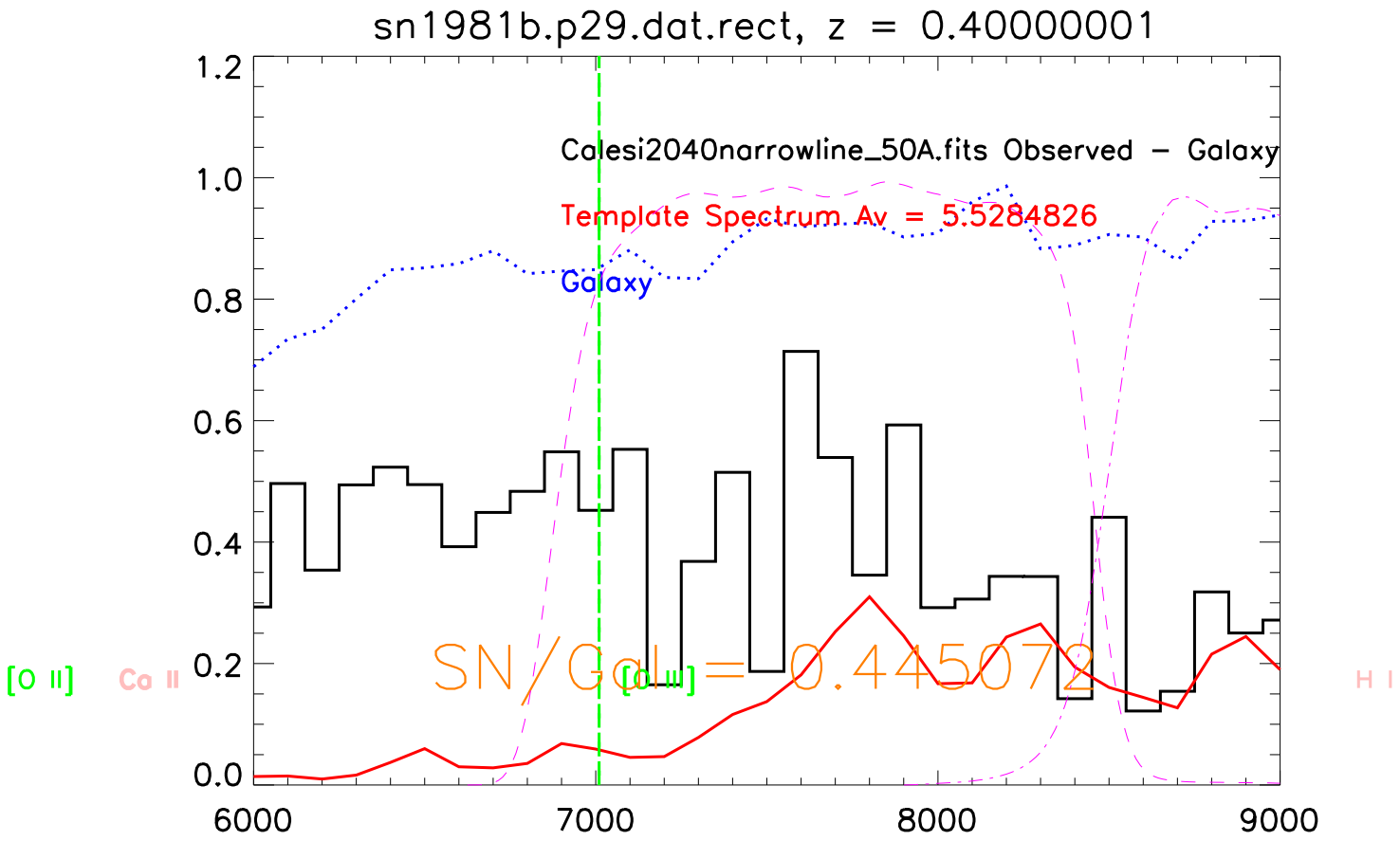

sn1990n.p14.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed − Galaxy
Template Spectrum Av = 5.2668031
Galaxy
SN/Gal z=0.508928
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

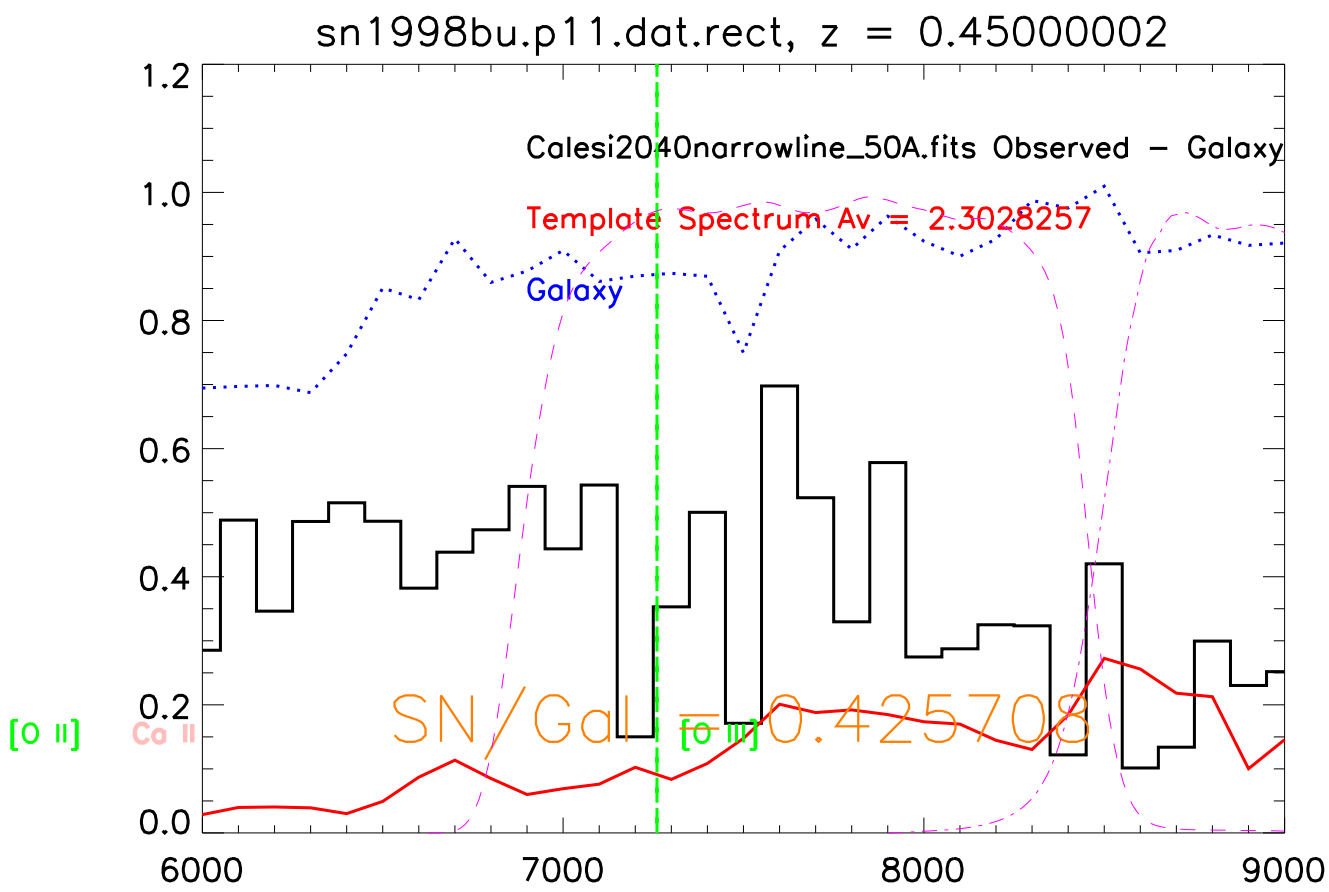

sn1999ee.p17.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 4.1850651
Galaxy
SN/Gal = 0.426869
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

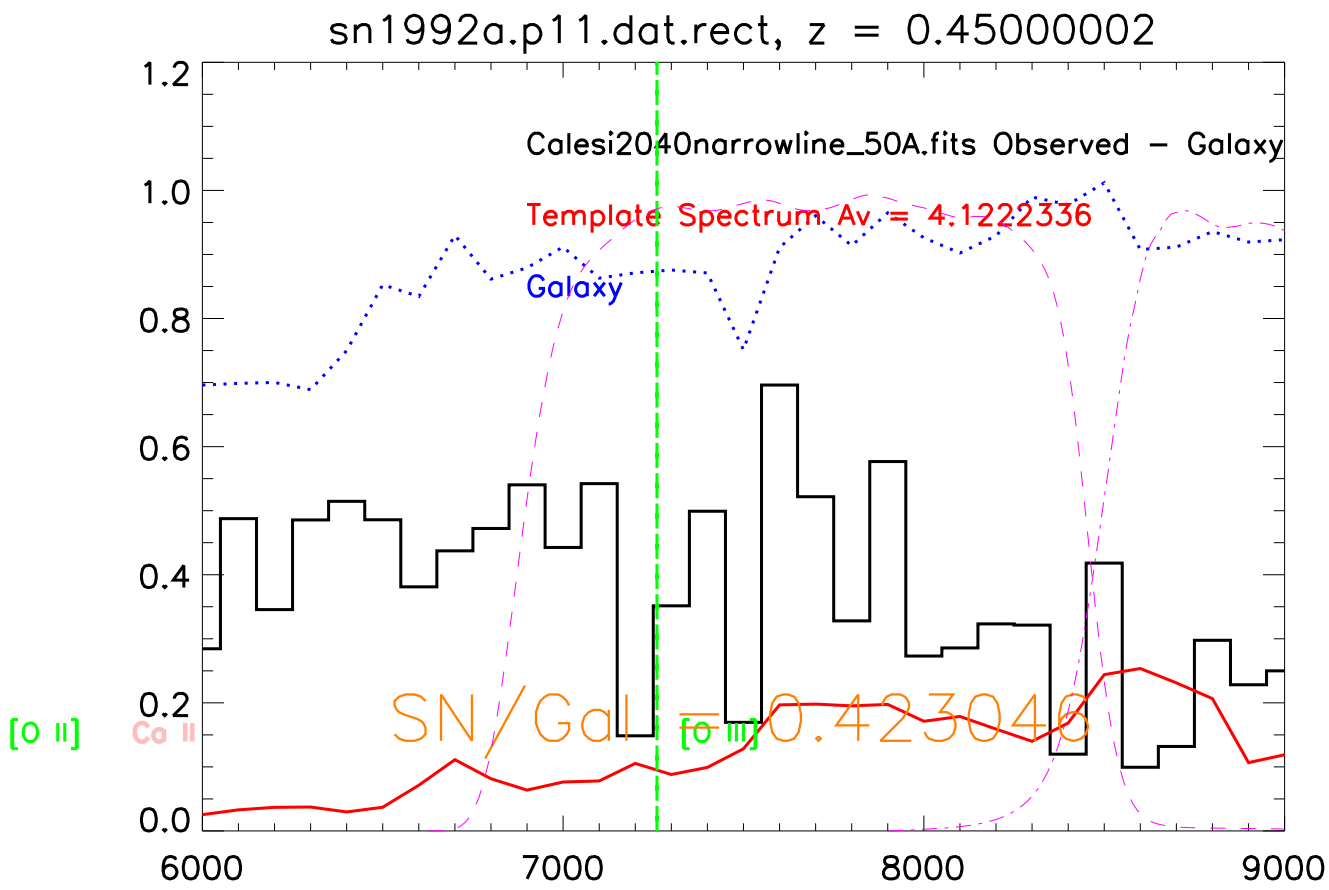

sn1991t.m07.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 4.0892678
Galaxy
SN/Gal [O III] 0.652787
[O II]
Ca II
1.0
0.8
0.6
0.4
0.2
6000
7000
8000
9000

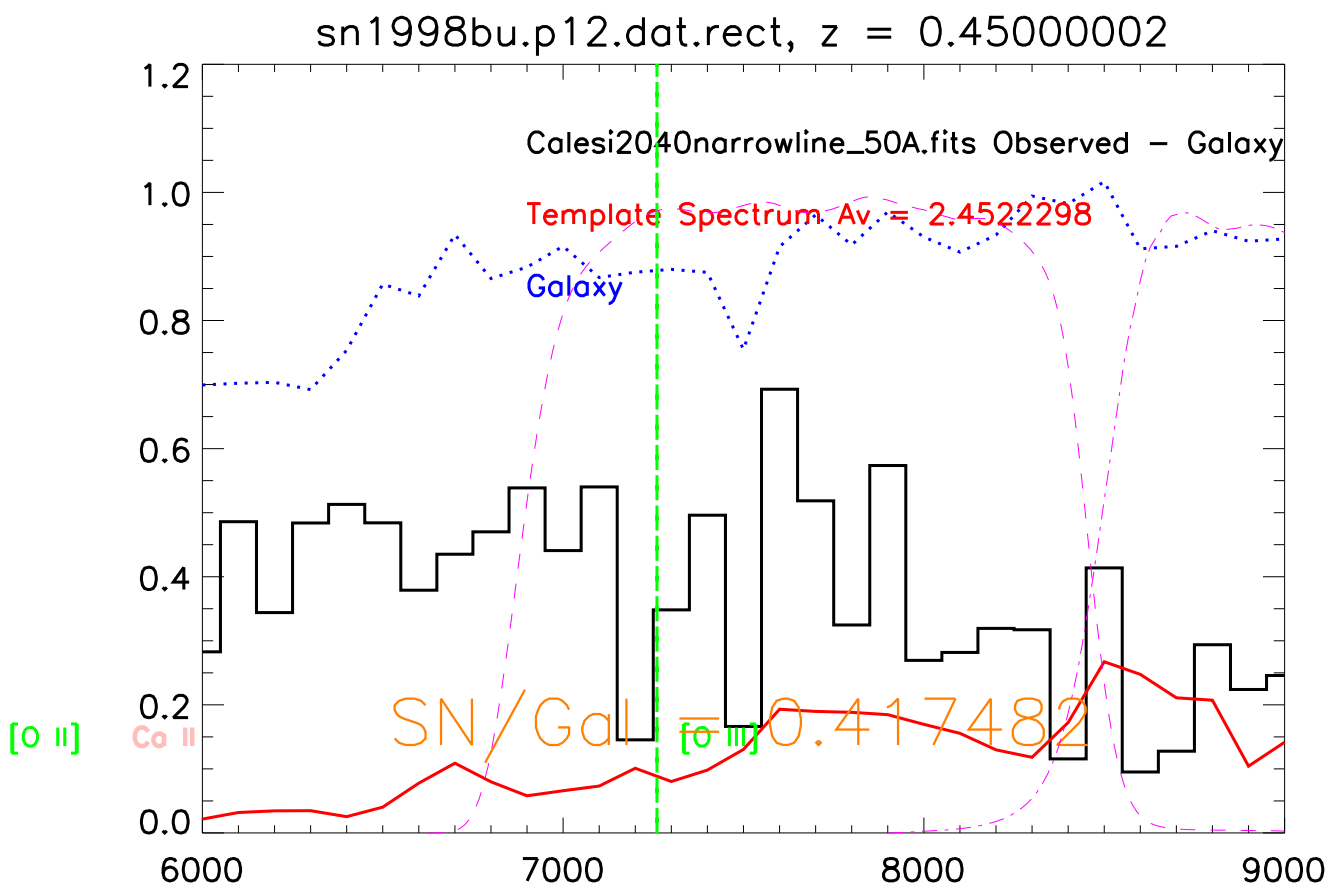

sn1998bu.p10.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av. = 2.3156310
Galaxy
SN/Gal = 0.435641
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

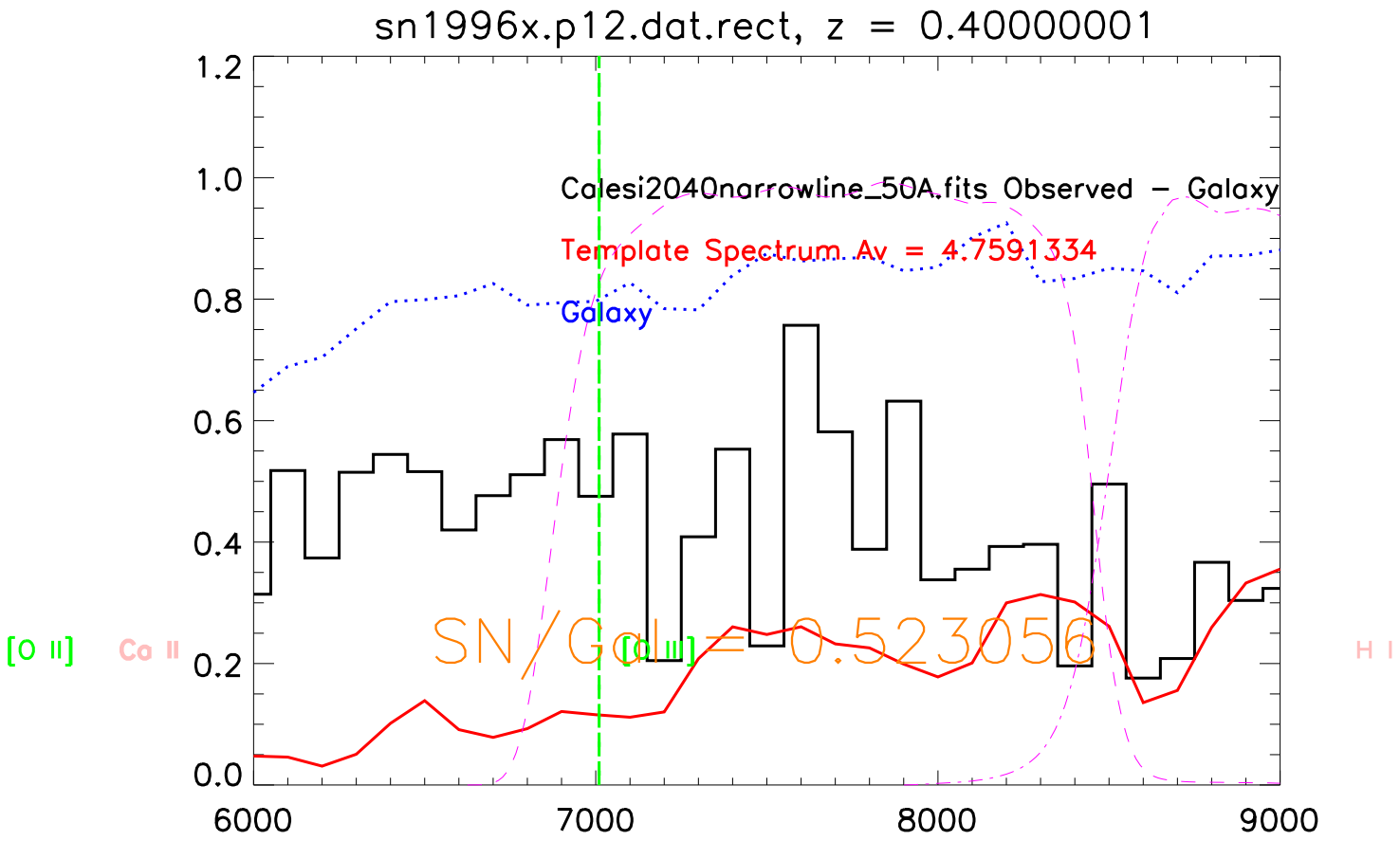

sn1994d.m10.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Gala
Template Spectrum Av = 5.2792541
Galaxy
SN/Gal = 0.519697
[O II]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

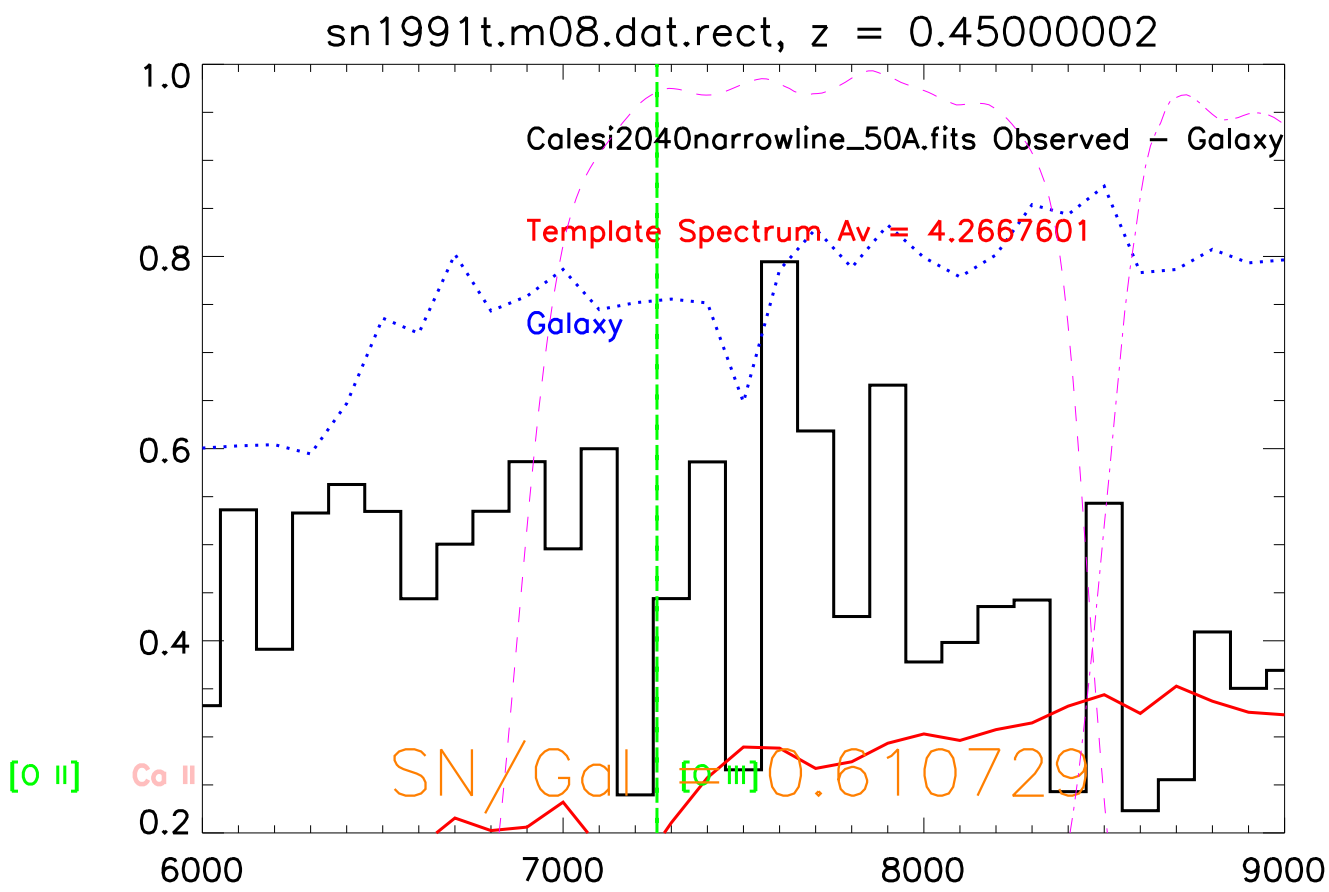

sn1981b.p29.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 5.5284826
Galaxy
SN/Gal=0.445072
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1998bu.p11.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 2.3028257
Galaxy
SN/Gal = 0.425708
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

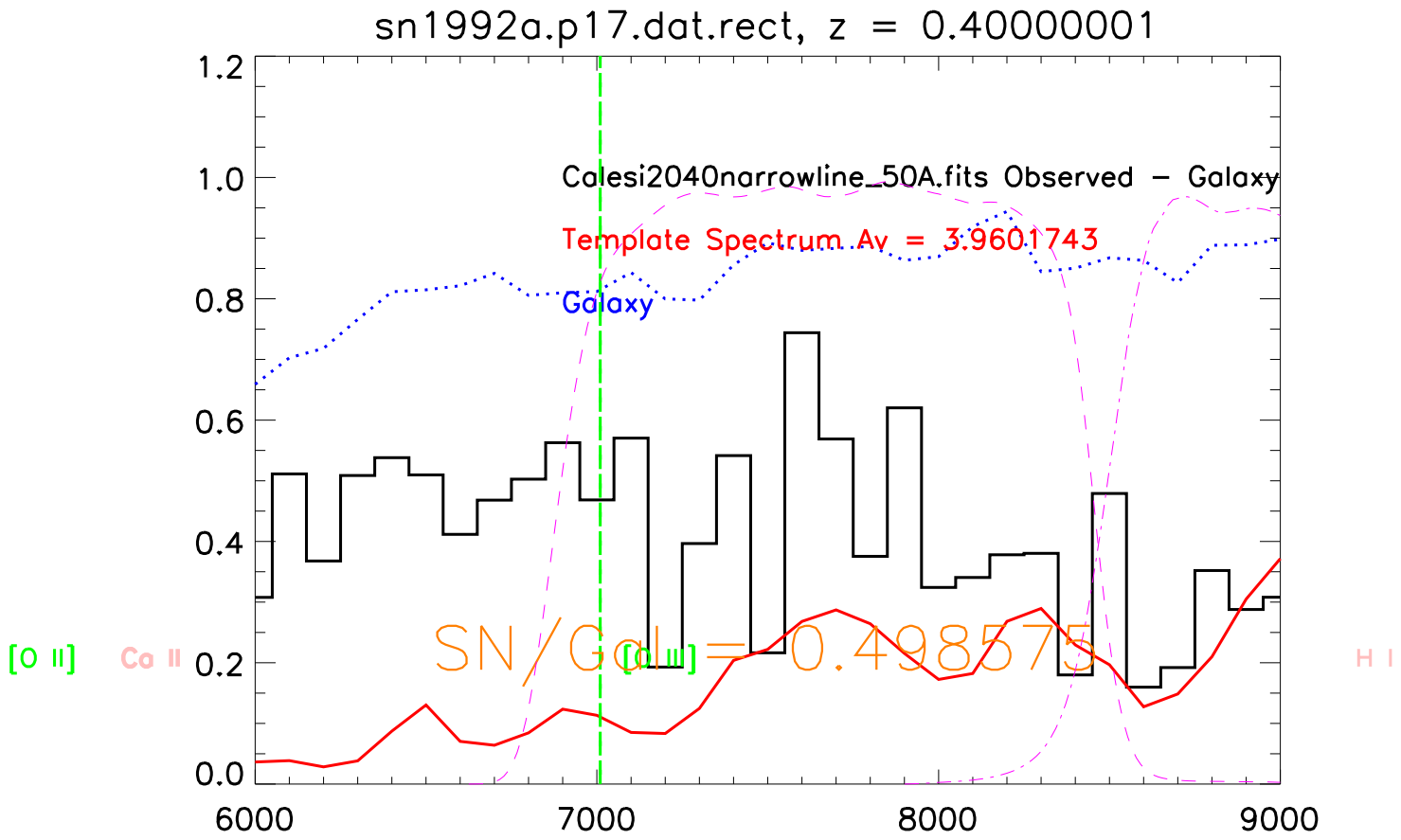

sn1992a.p11.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 4.1222336
Galaxy
SN/Gal = 0.423046
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

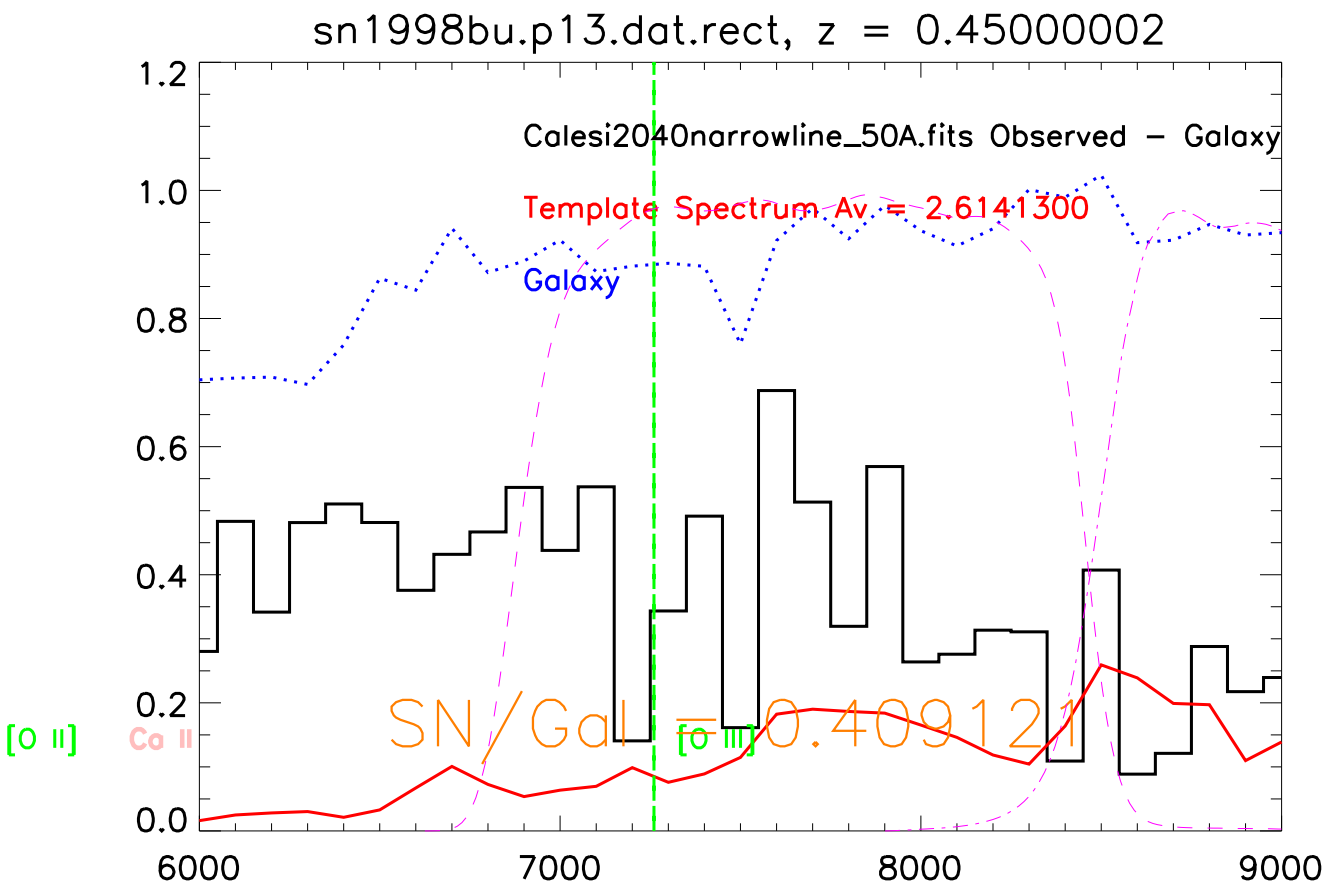

sn1998bu.p12.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 2.4522298
Galaxy
SN/Gal = 0.417482
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

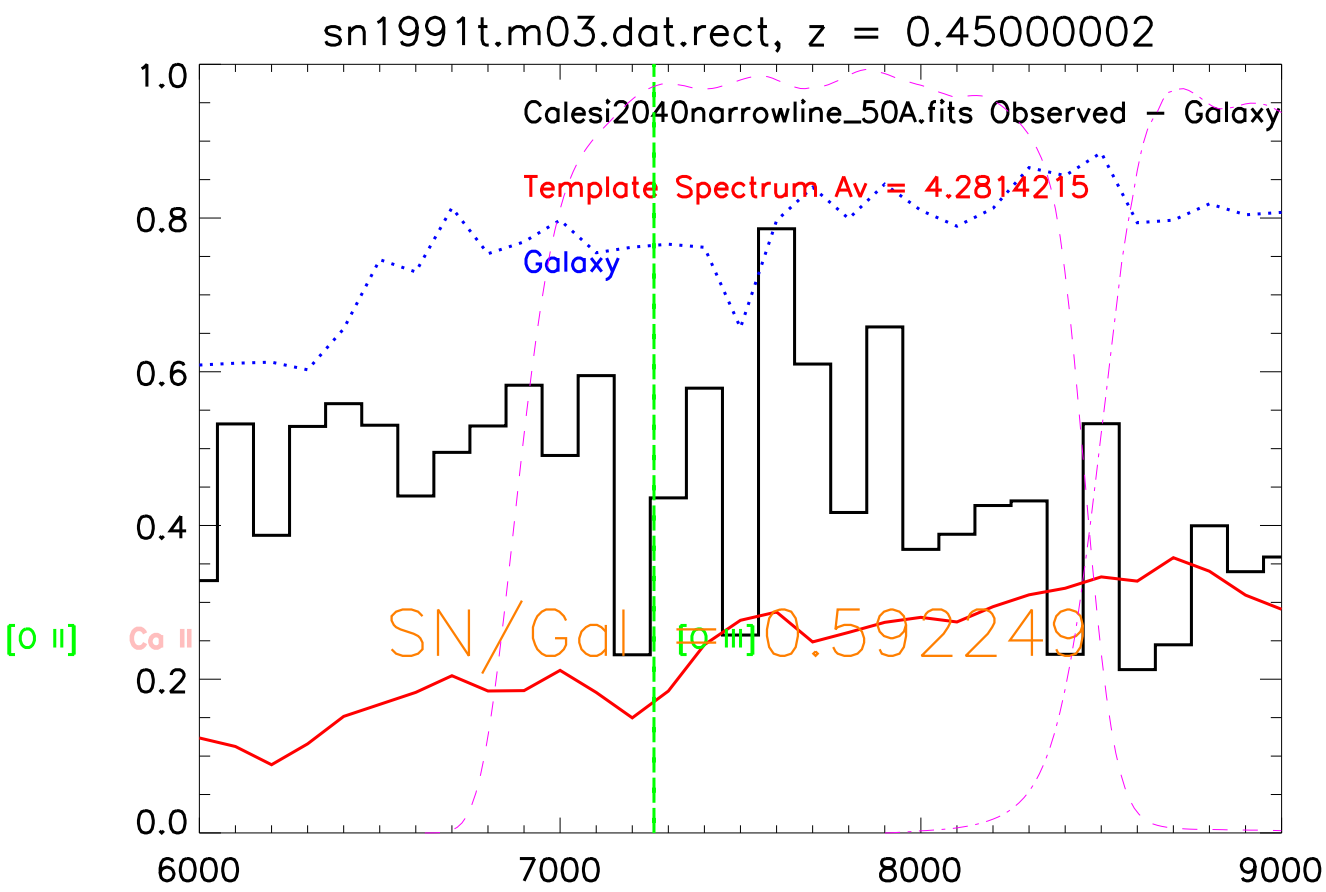

sn1996x.p12.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 4.7591334
Galaxy
SN/Gal=0.523056
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

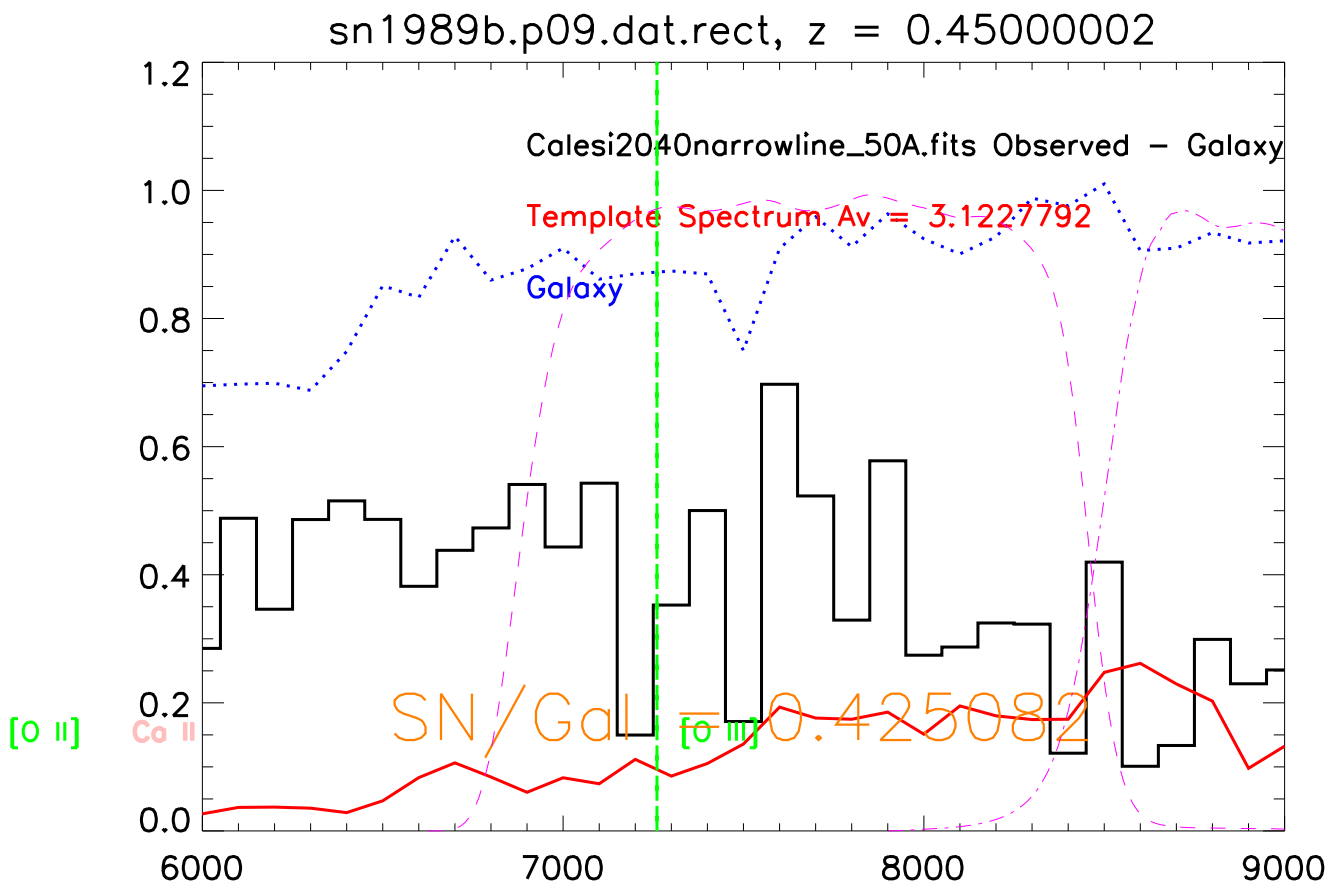


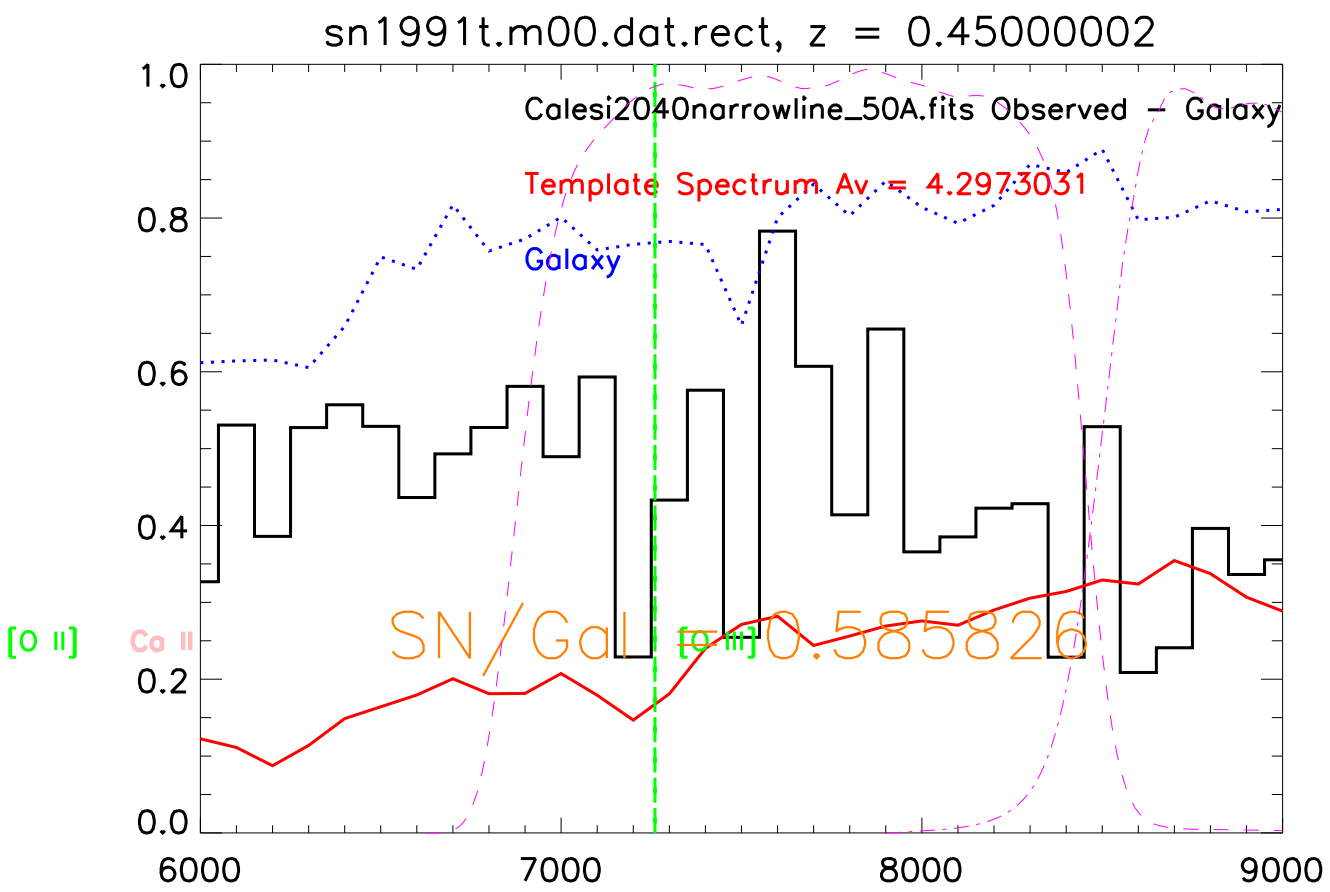
sn1991t.m08.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed - Galaxy
Template Spectrum Av = 4.2667601
Galaxy
SN/Gal = 0.610729
[O II]
Ca II
[O III]
1.0
0.8
0.6
0.4
0.2
6000
7000
8000
9000

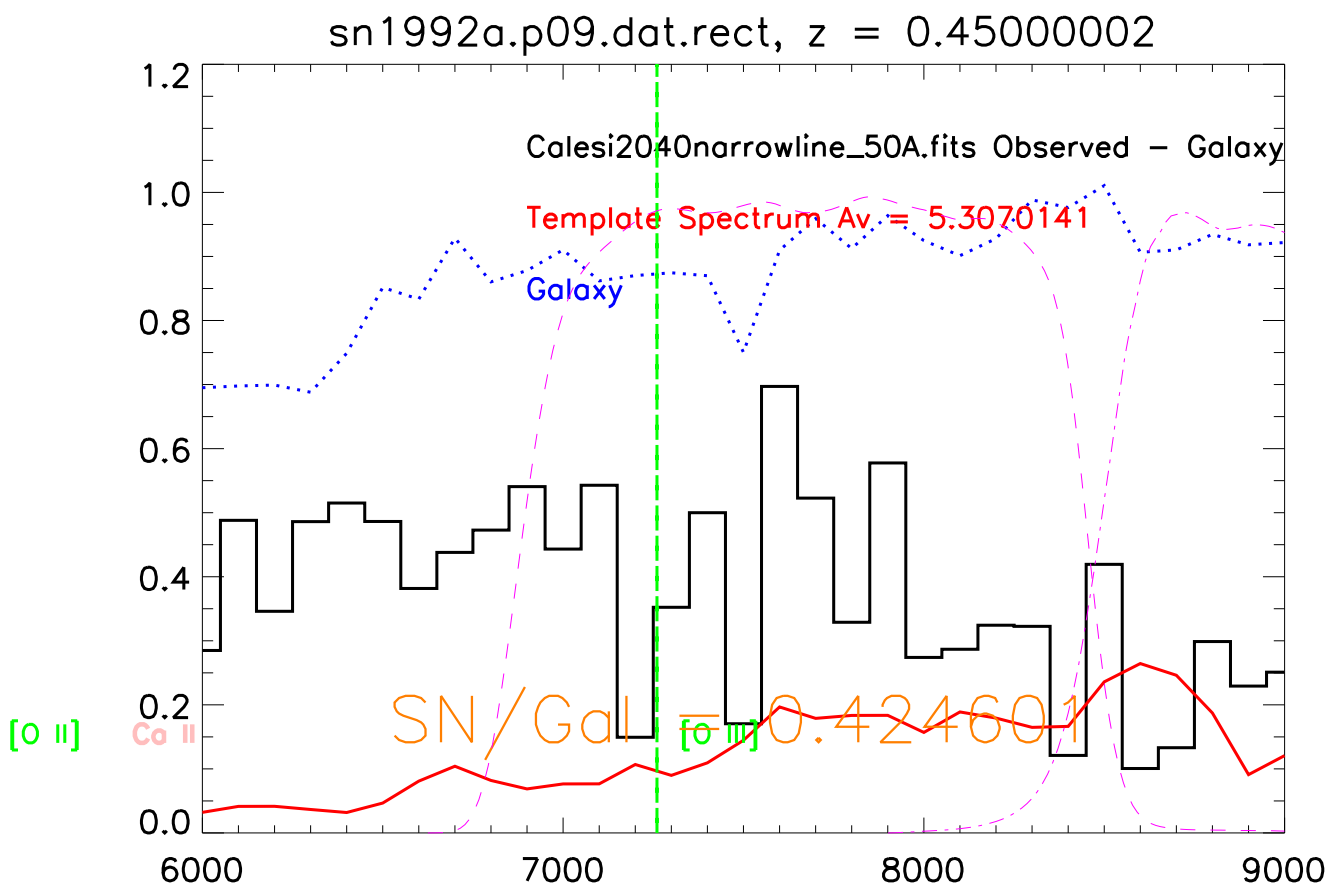

sn1992a.p17.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 3.9601743
Galaxy
SN/Gal=0.498575
[O II]
Co II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

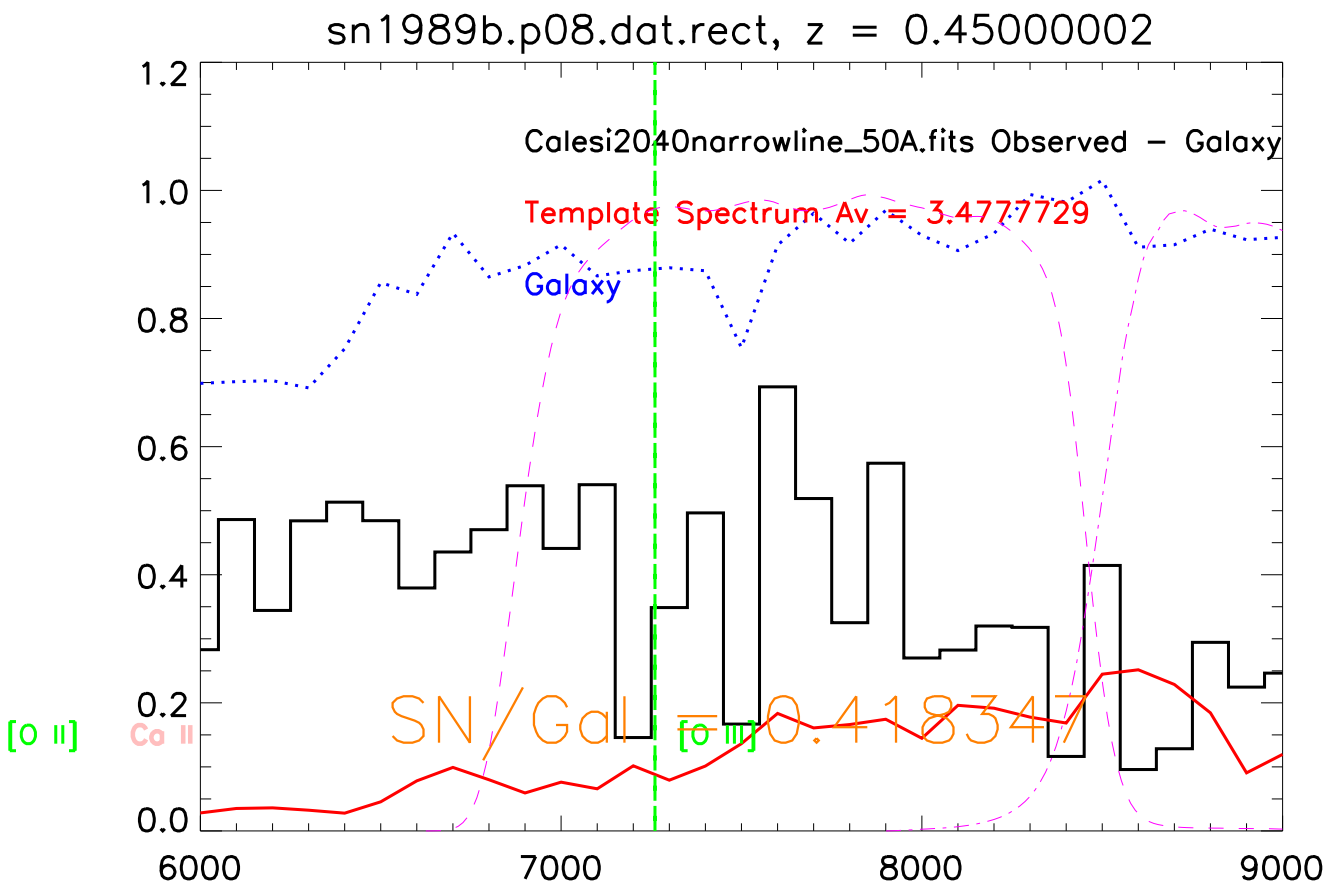

sn1998bu.p13.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av. = 2.6141300
Galaxy
SN/Gal = 0.409121
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

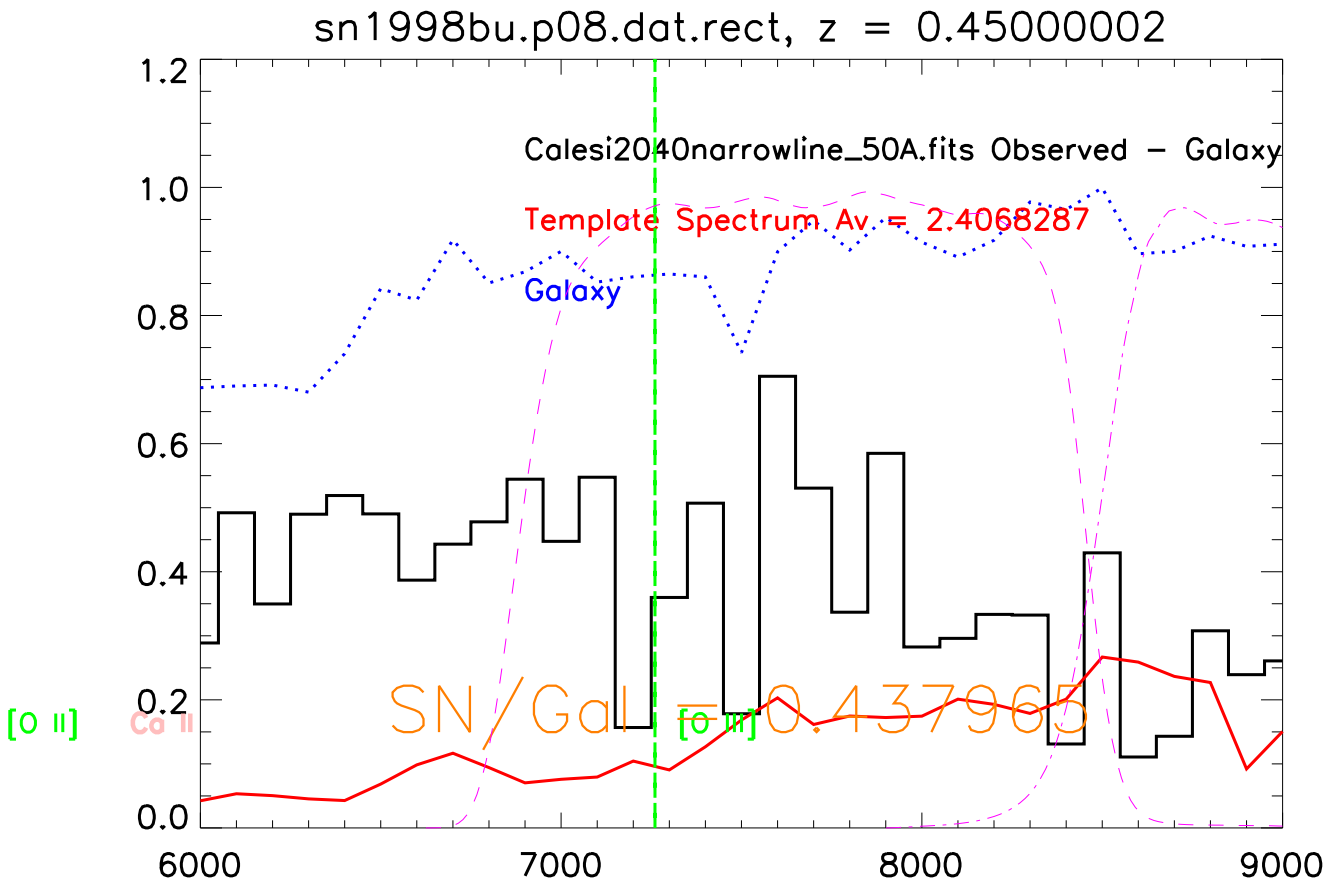

sn1991t.m03.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 4.2814215
Galaxy
SN/Gal: 0.592249
[O II]
Ca II
[O III]
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

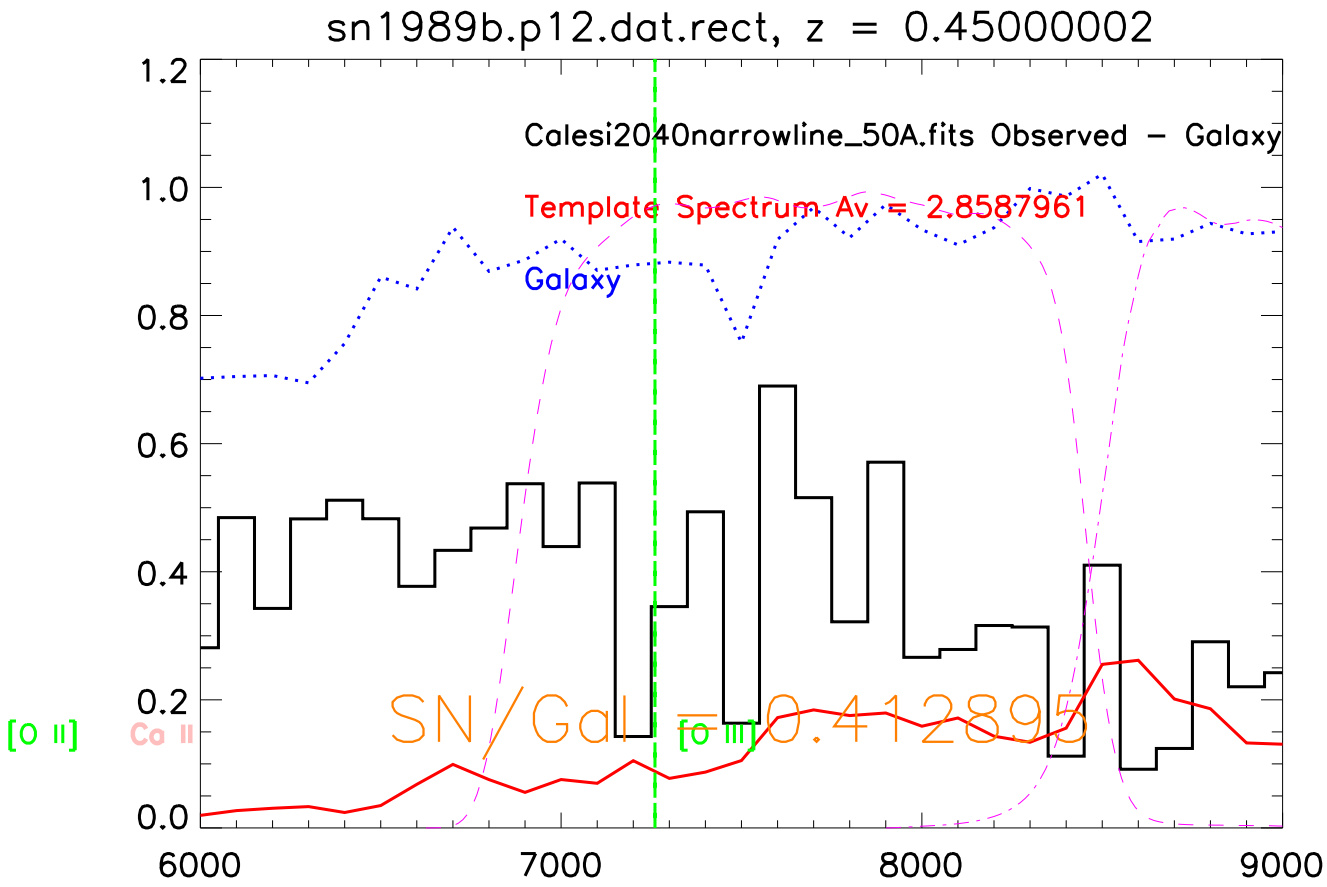

sn1989b.p09.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 3.1227792
Galaxy
SN/Gal = 0.425082
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

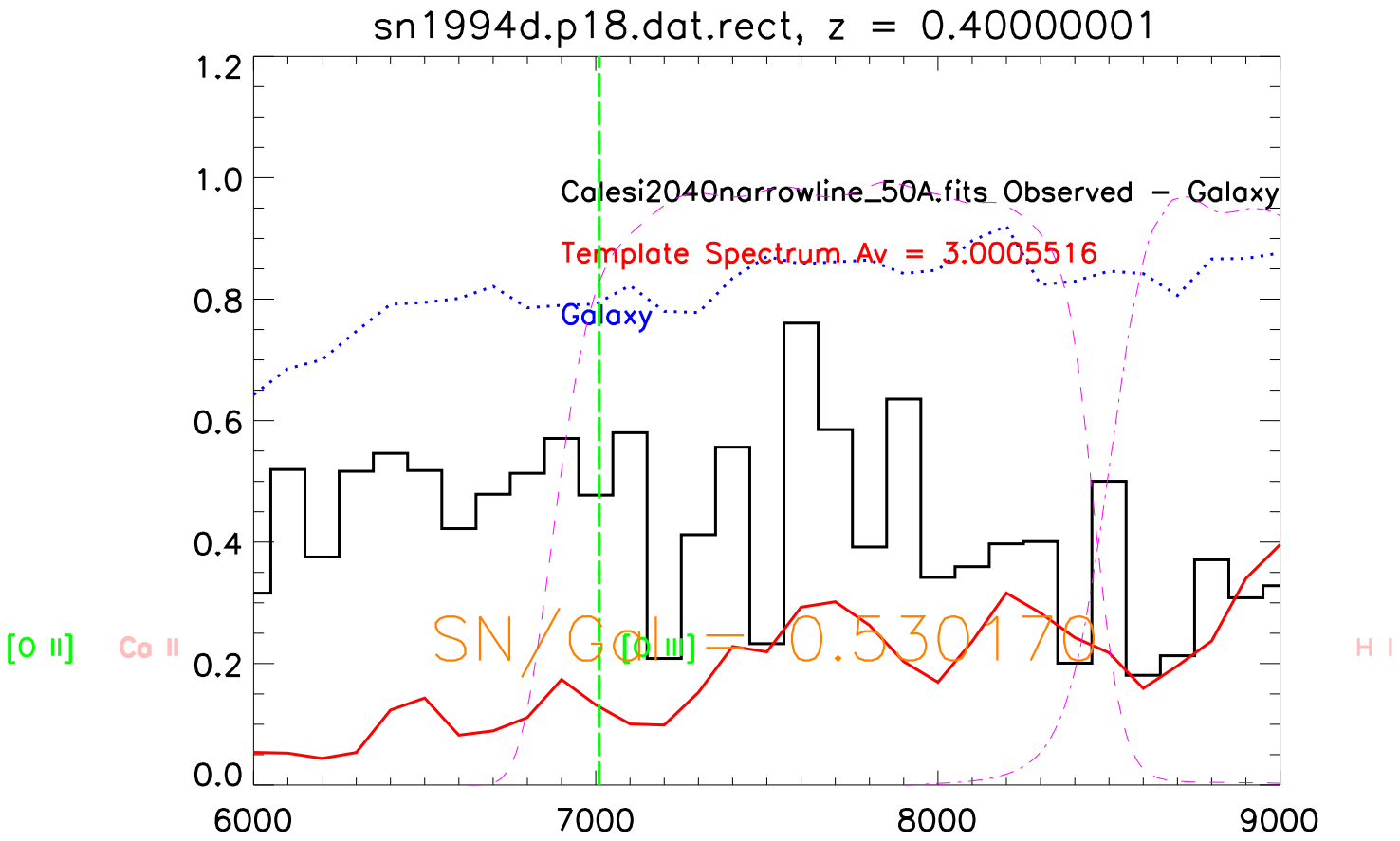

sn1991t.m00.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 4.2973031
Galaxy
SN/Gal: 0.585826
[O II]
Ca II
[O III]
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

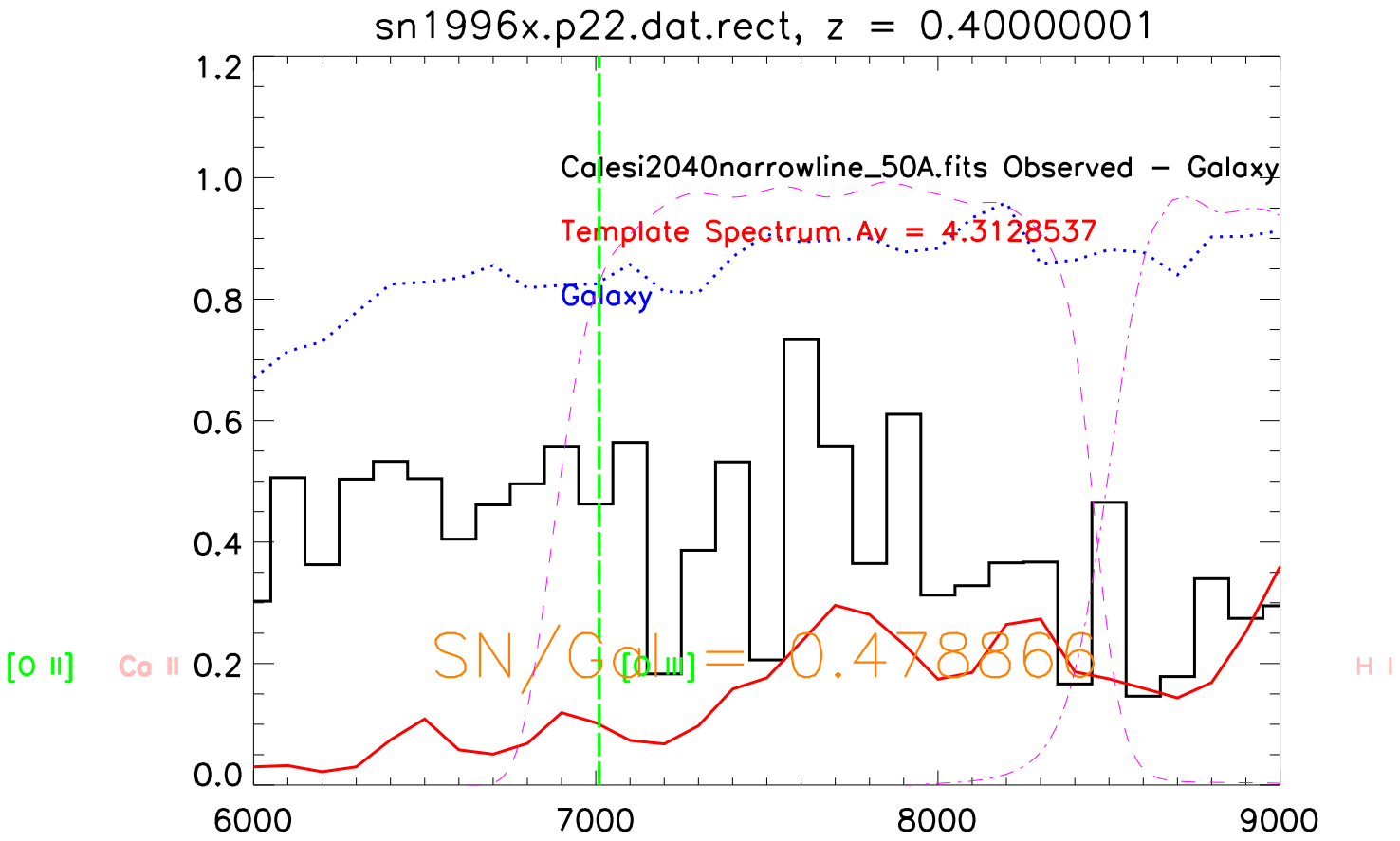

sn1992a.p09.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 5.3070141
Galaxy
SN/Gal = 0.424601
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

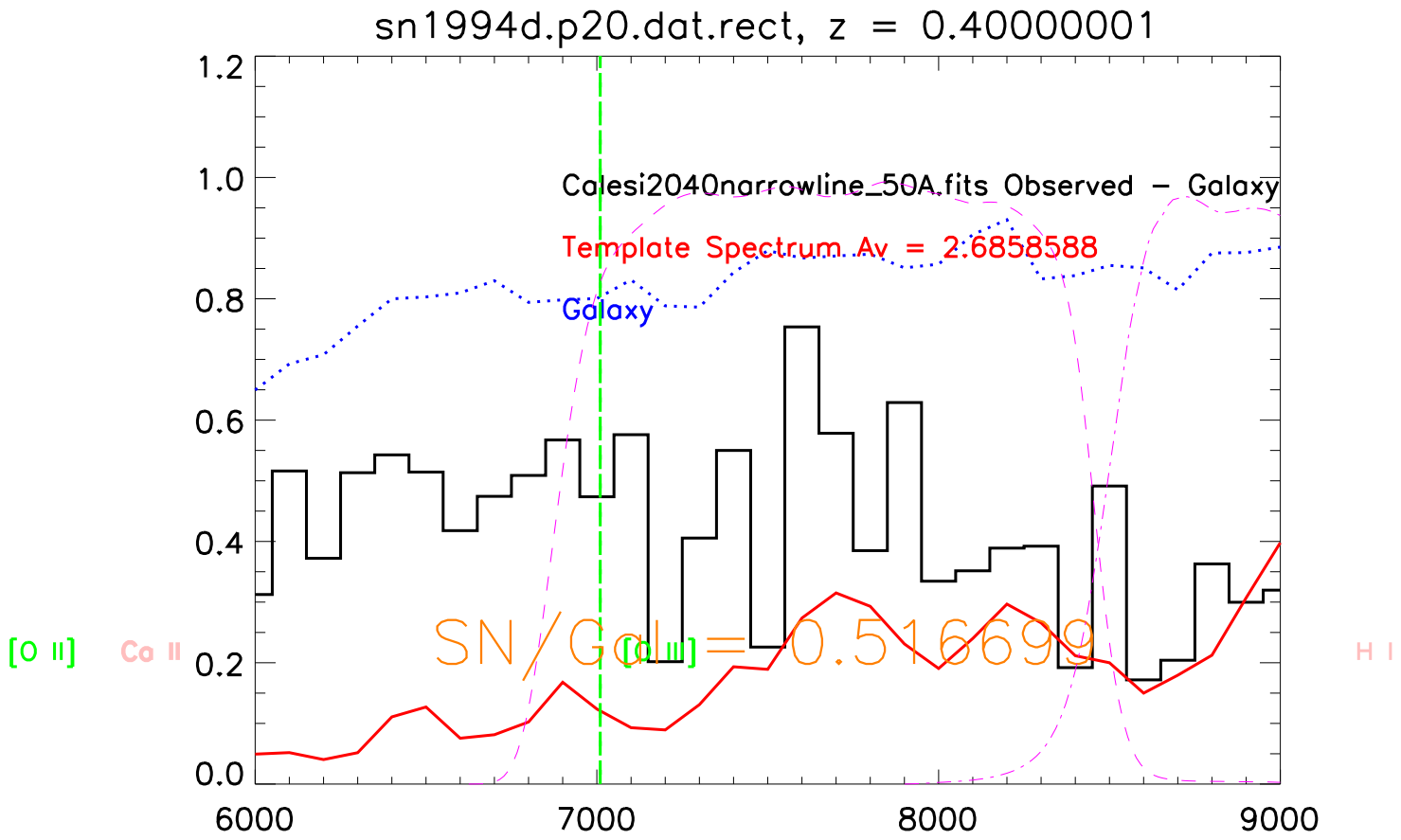

sn1989b.p08.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 3.4777729
Galaxy
SN/Gal = 0.418347
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

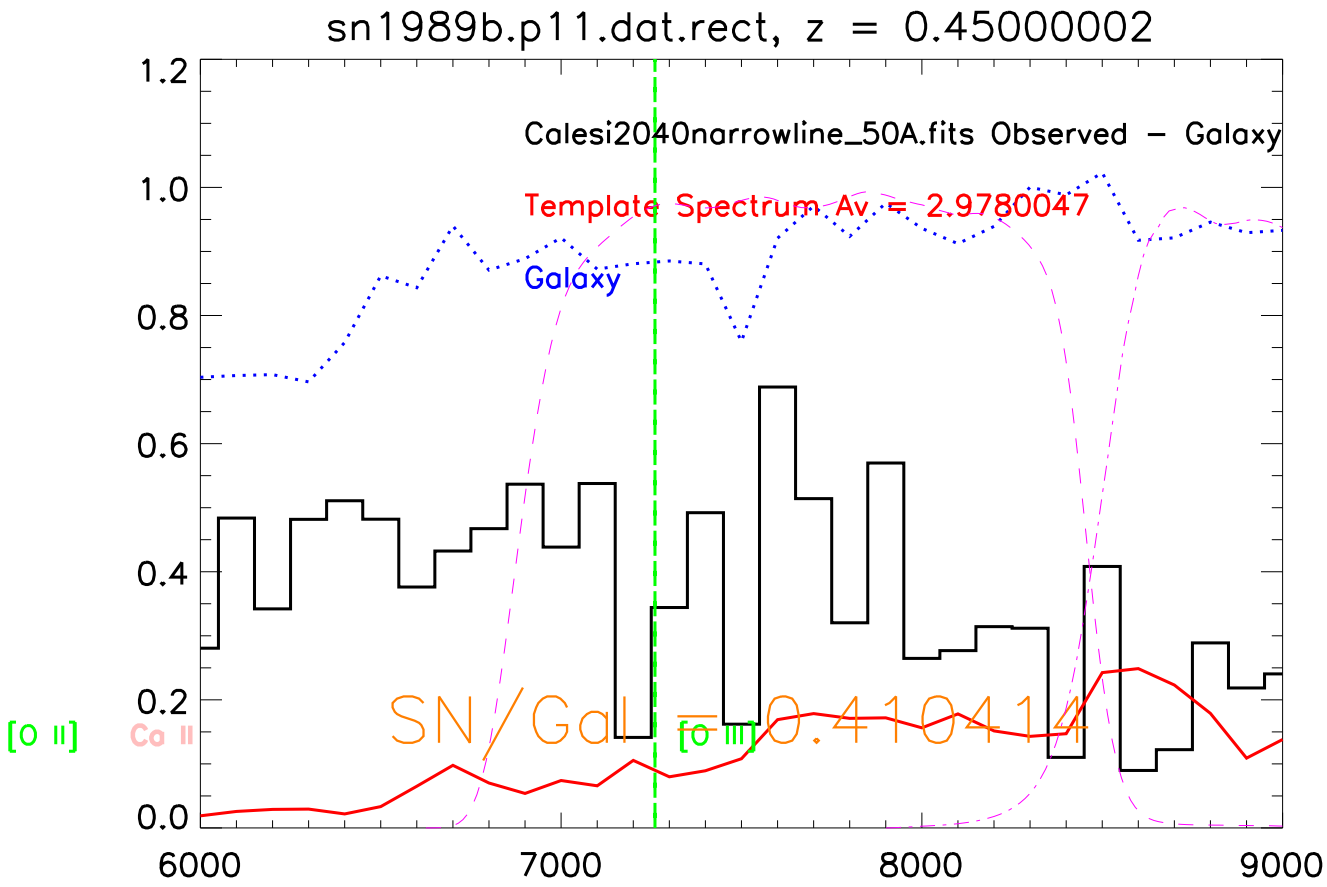

sn1998bu.p08.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av. = 2.4068287
Galaxy
SN/Gal = 0.437965
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

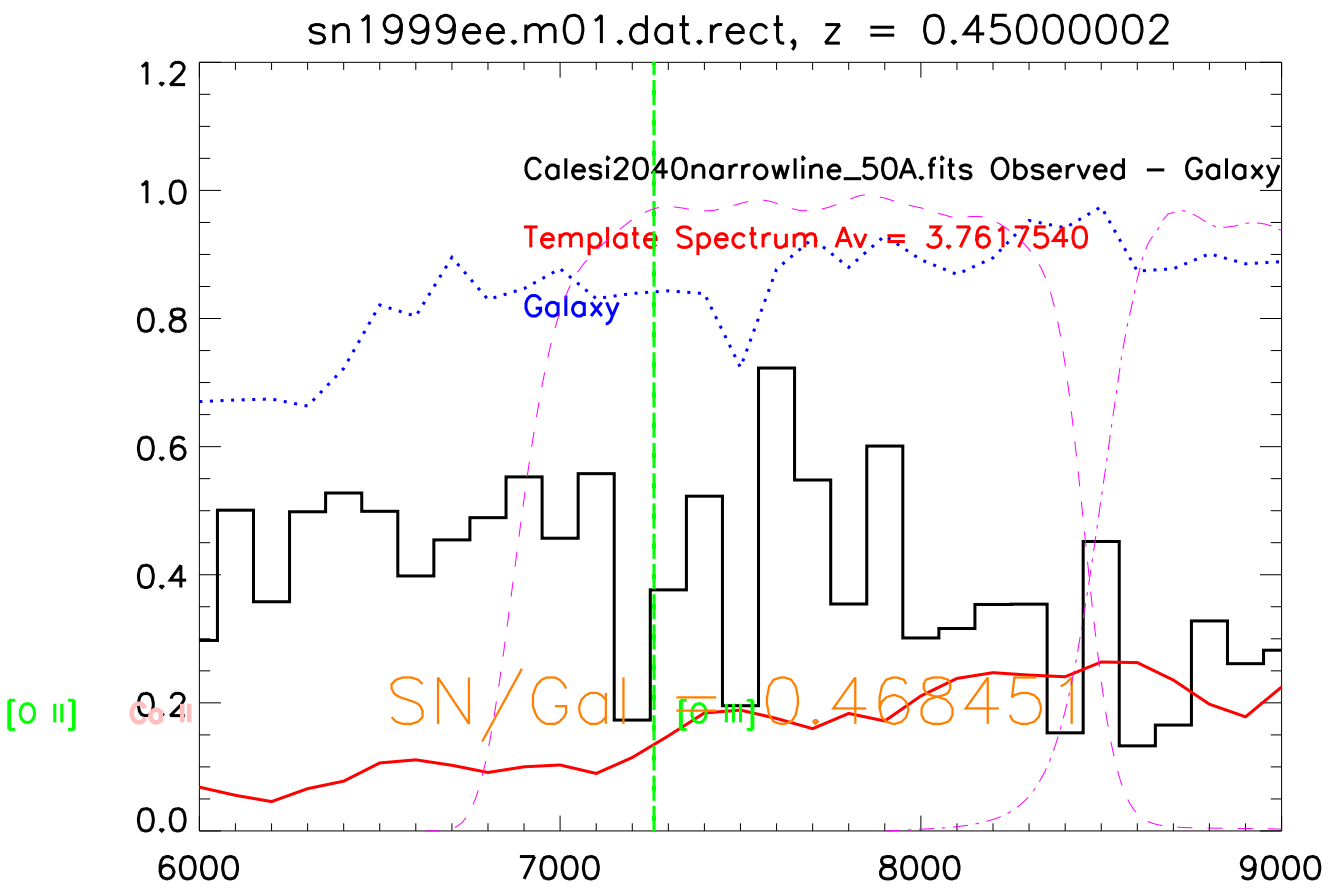

sn1989b.p12.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av. = 2.8587961
Galaxy
SN/Gal = 0.412895
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

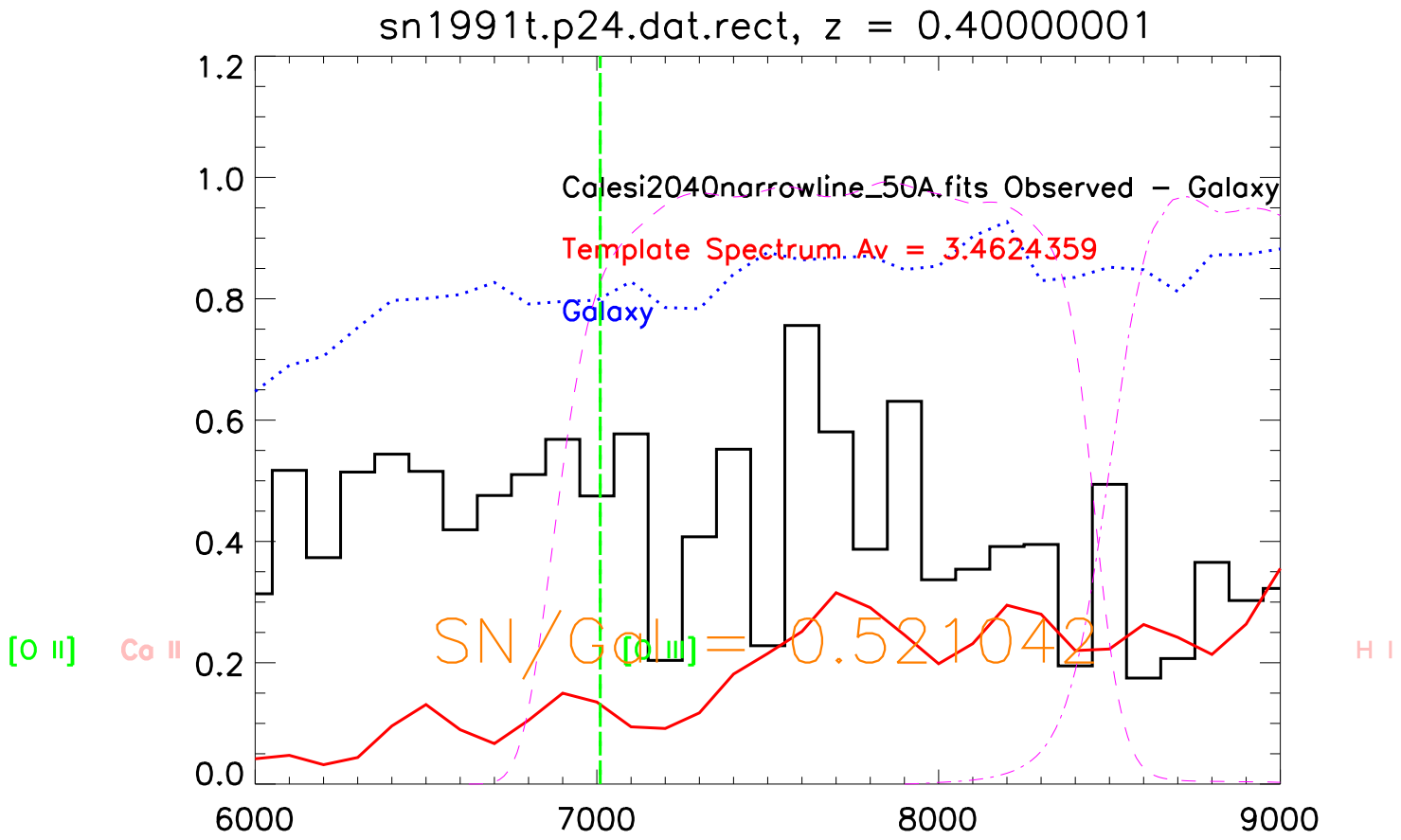

sn1994d.p18.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 3.0005516
Galaxy
SN/Gal=0.530176
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

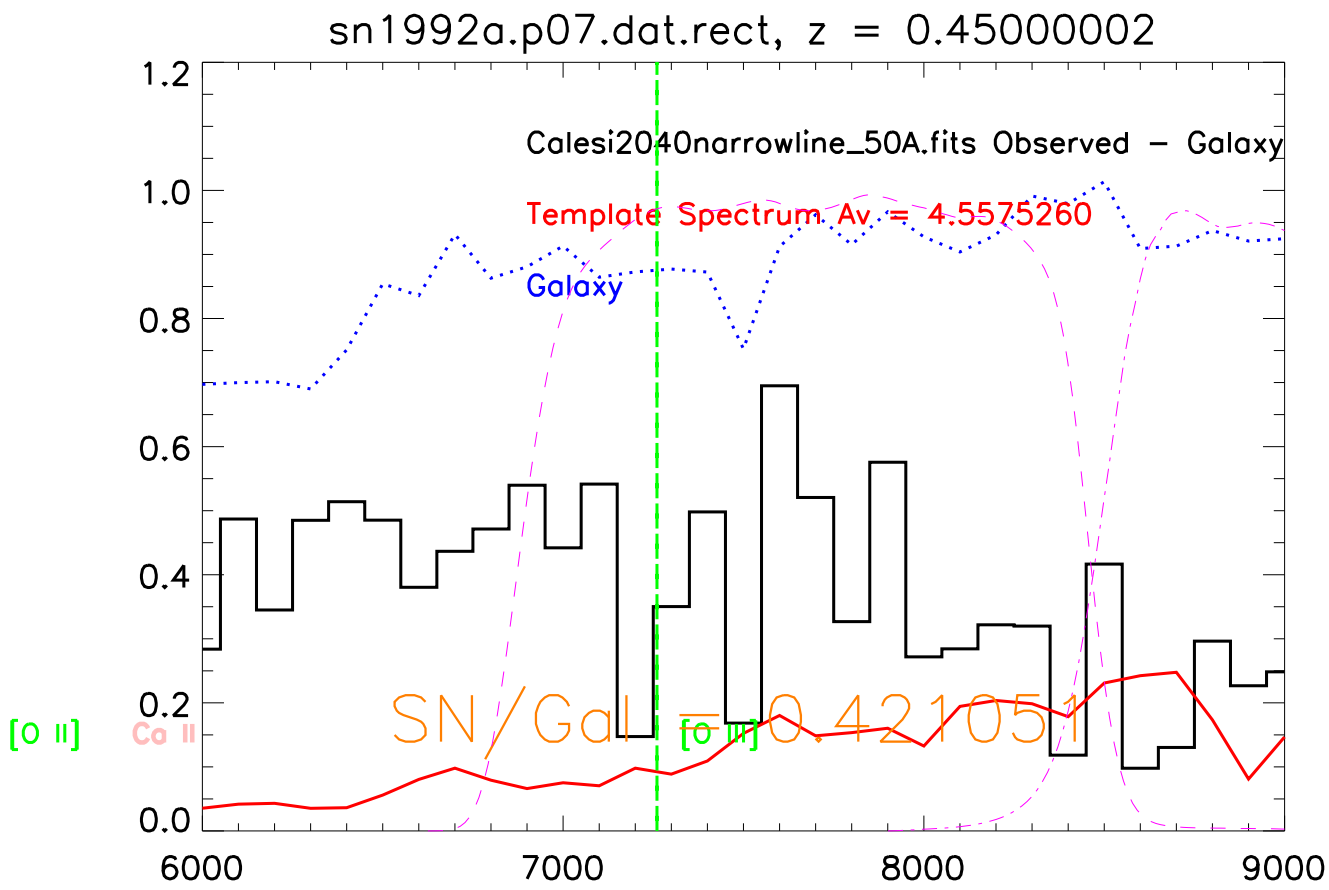

sn1996x.p22.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum.Av = 4.3128537
Galaxy
SN/Gal=0.478866
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

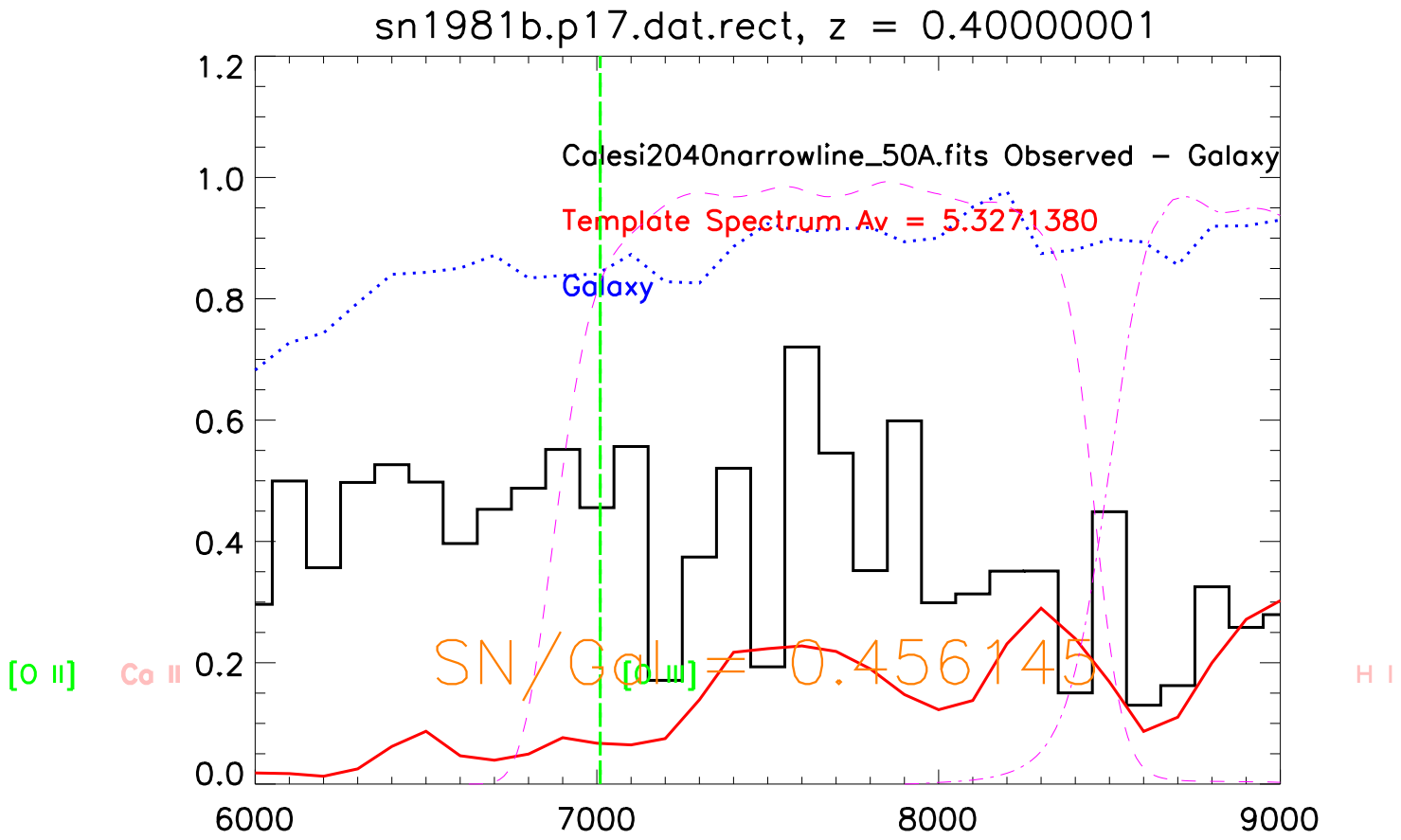

sn1994d.p20.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed − Galaxy
Template Spectrum Av = 2.6858588
Galaxy
SN/Gal=0.516699
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

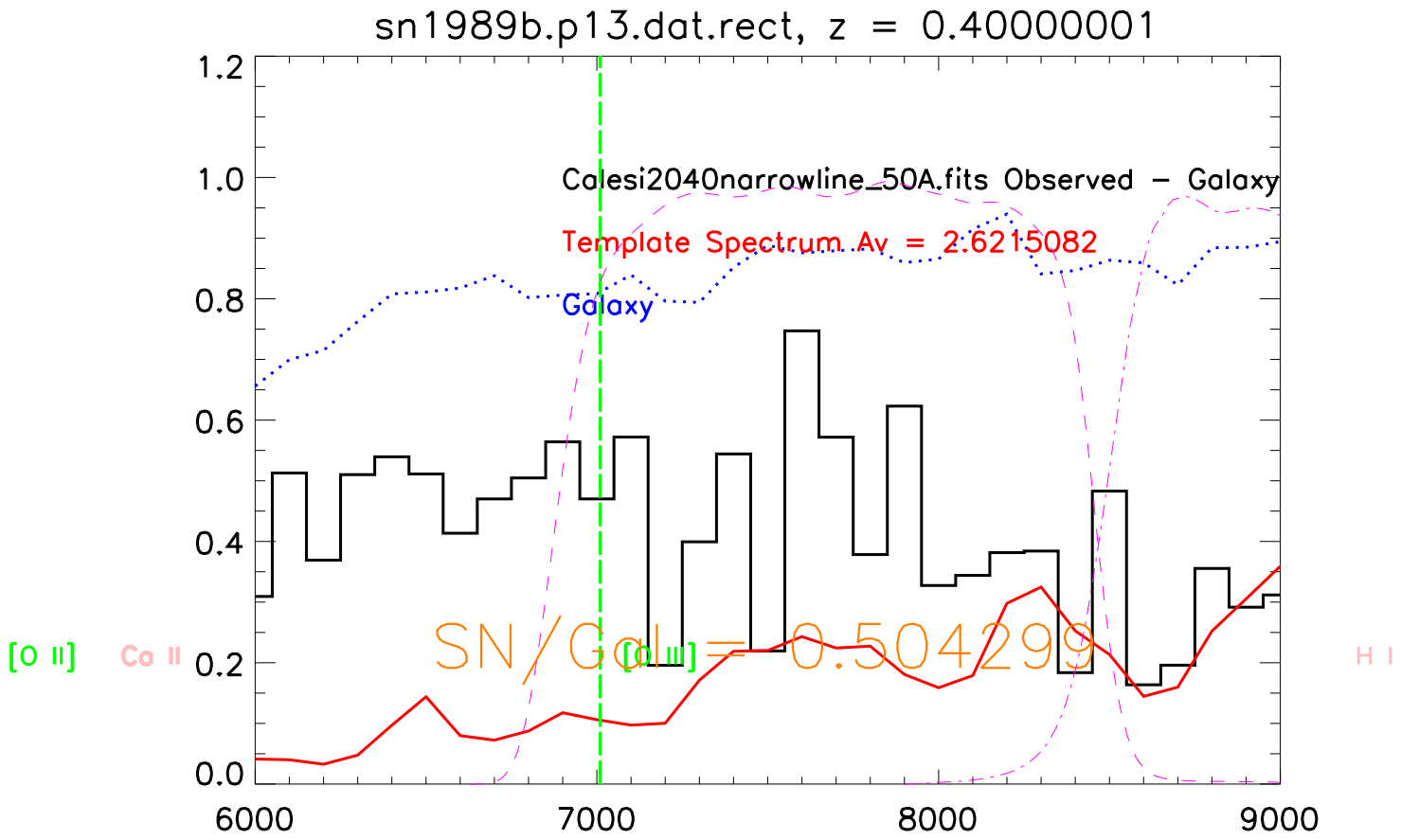

sn1989b.p11.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av. = 2.9780047
Galaxy
SN/Gal = 0.4104414
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

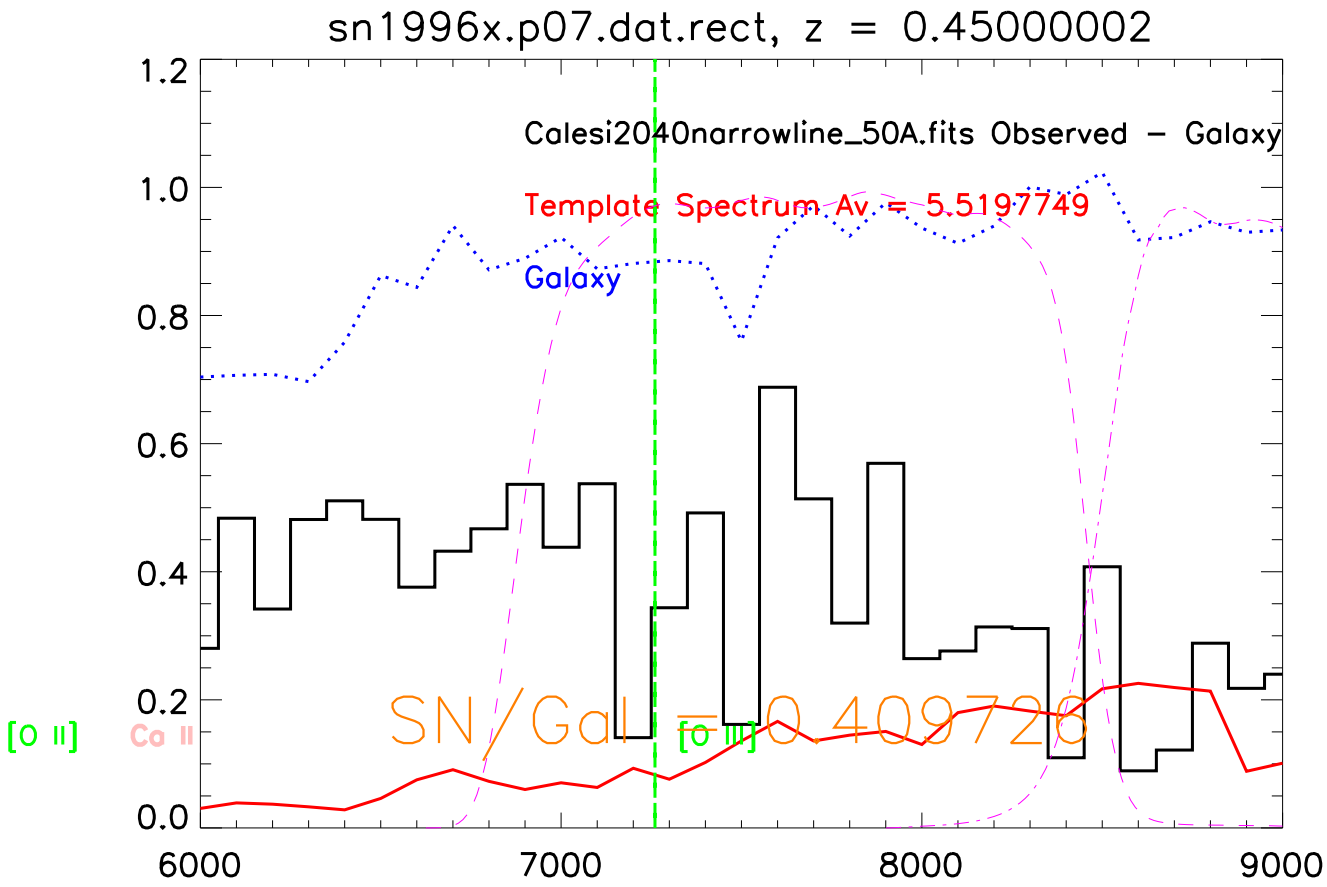

sn1999ee.m01.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av. = 3.7617540
Galaxy
SN/Gal. F=0.468451
[O II]
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

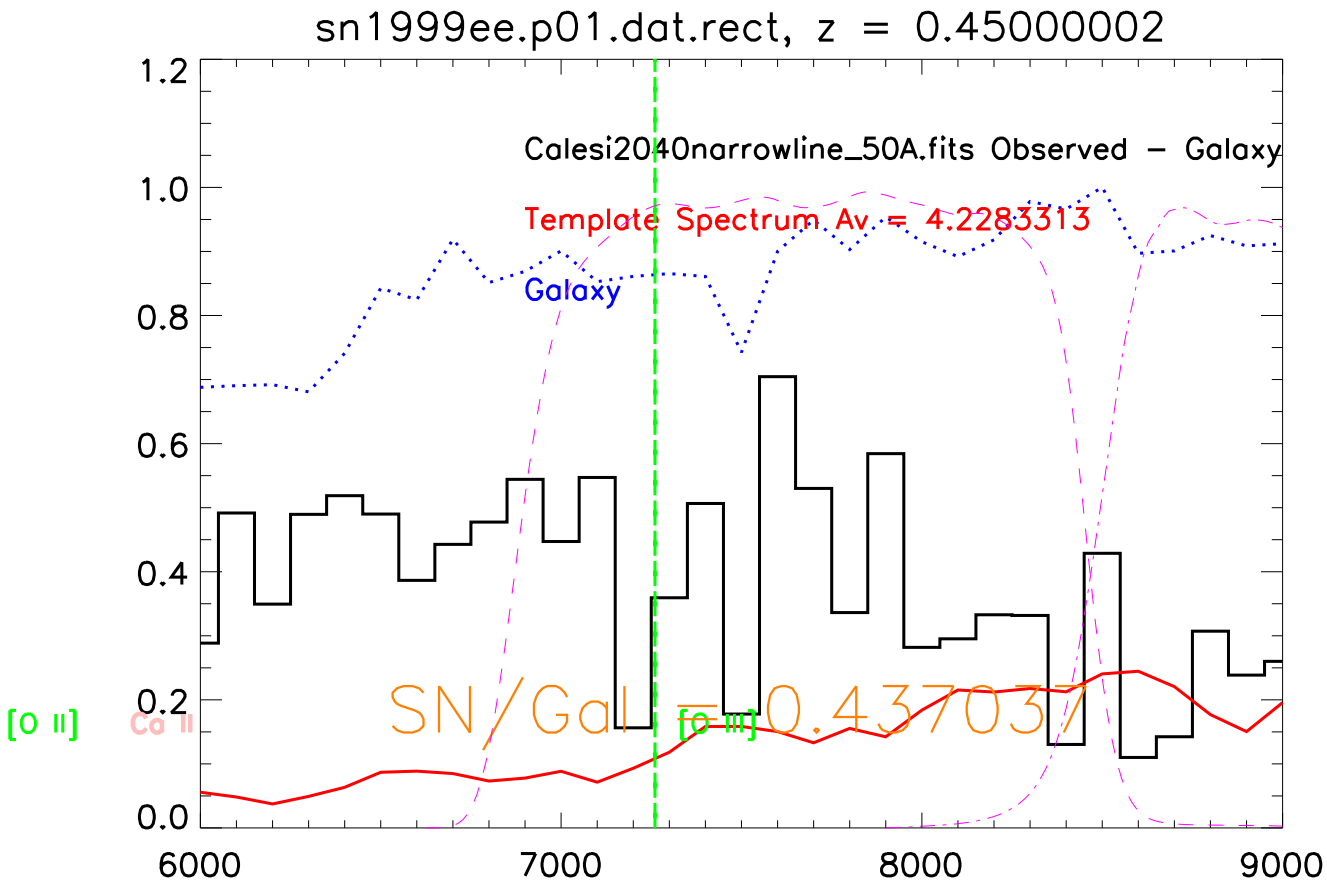

sn1991t.p24.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 3.4624359
Galaxy
SN/Gal=0.521042
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

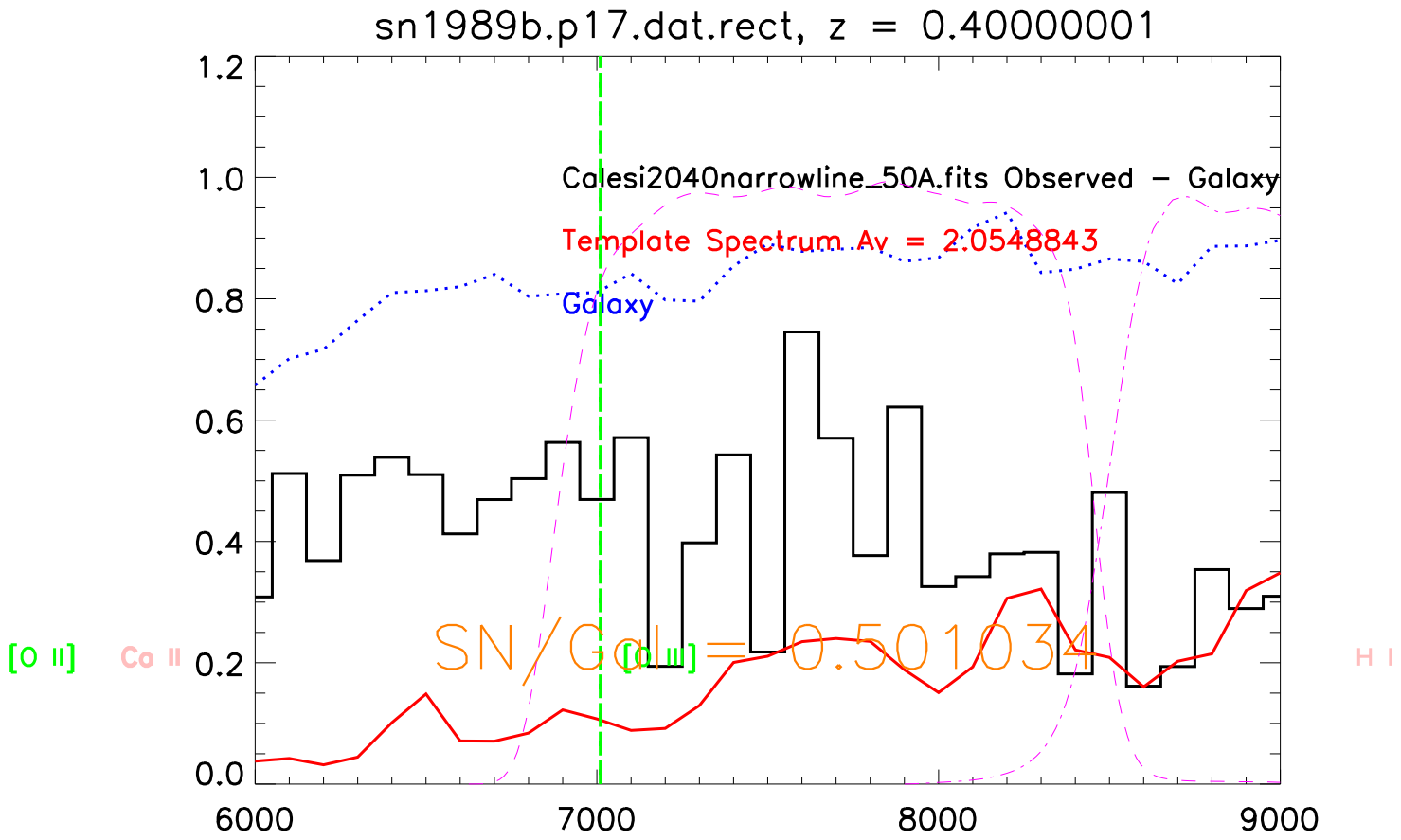

sn1992a.p07.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 4.5575260
Galaxy
SN/Gal = 0.421051
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

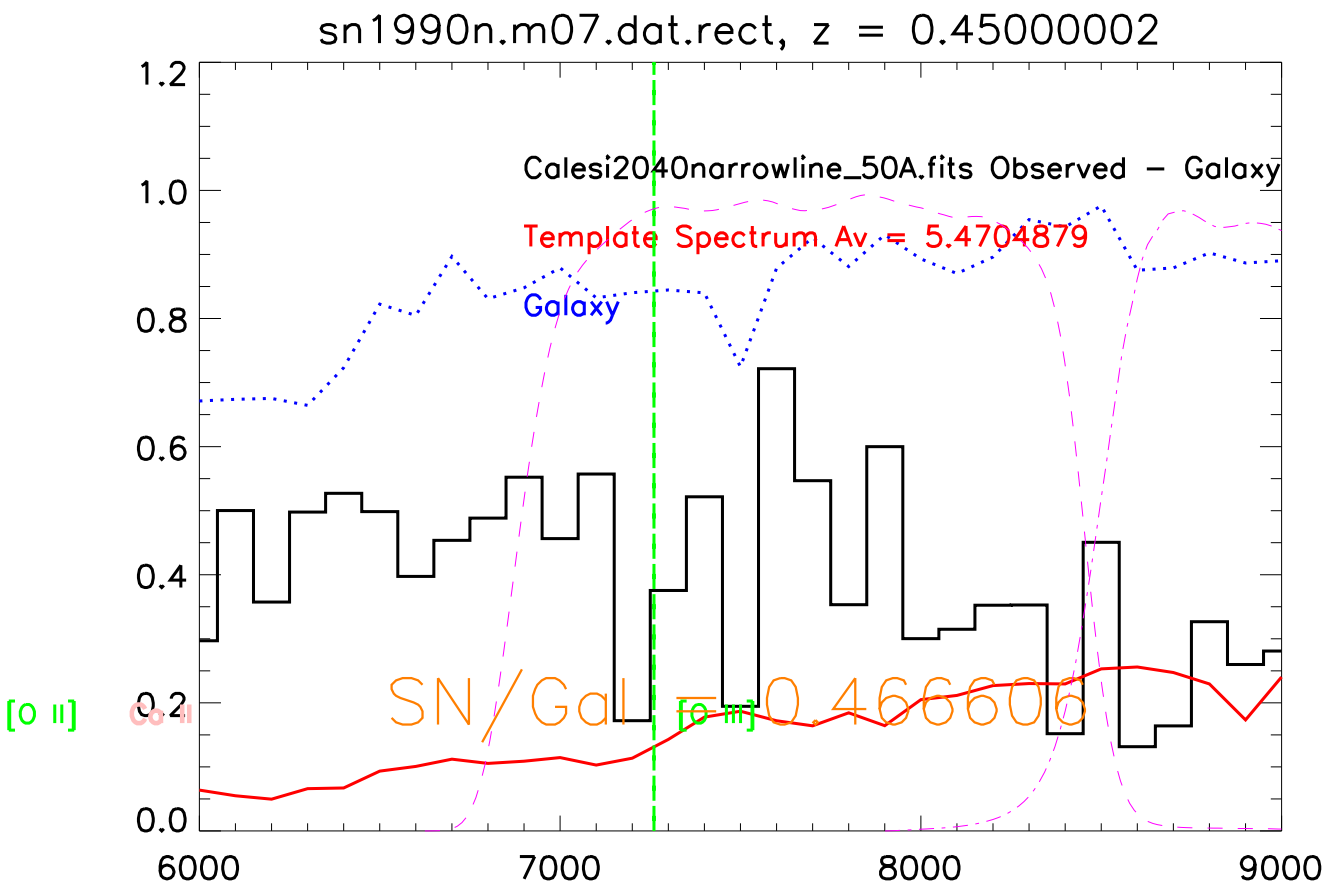

sn1981b.p17.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 5.3271380
Galaxy
SN/Gal=0.456145
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

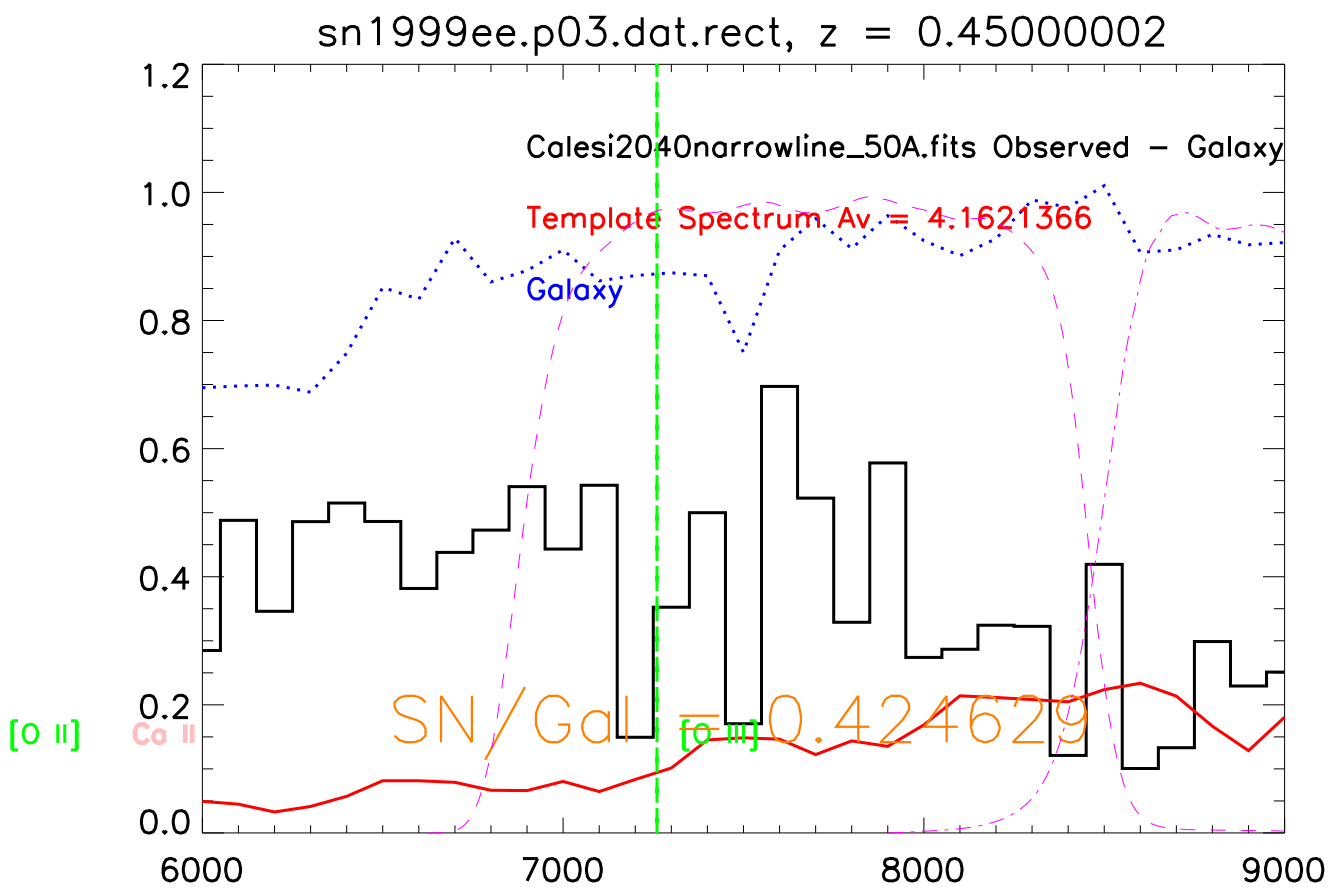

sn1989b.p13.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 2.6215082
Galaxy
SN/Gal=0.504299
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

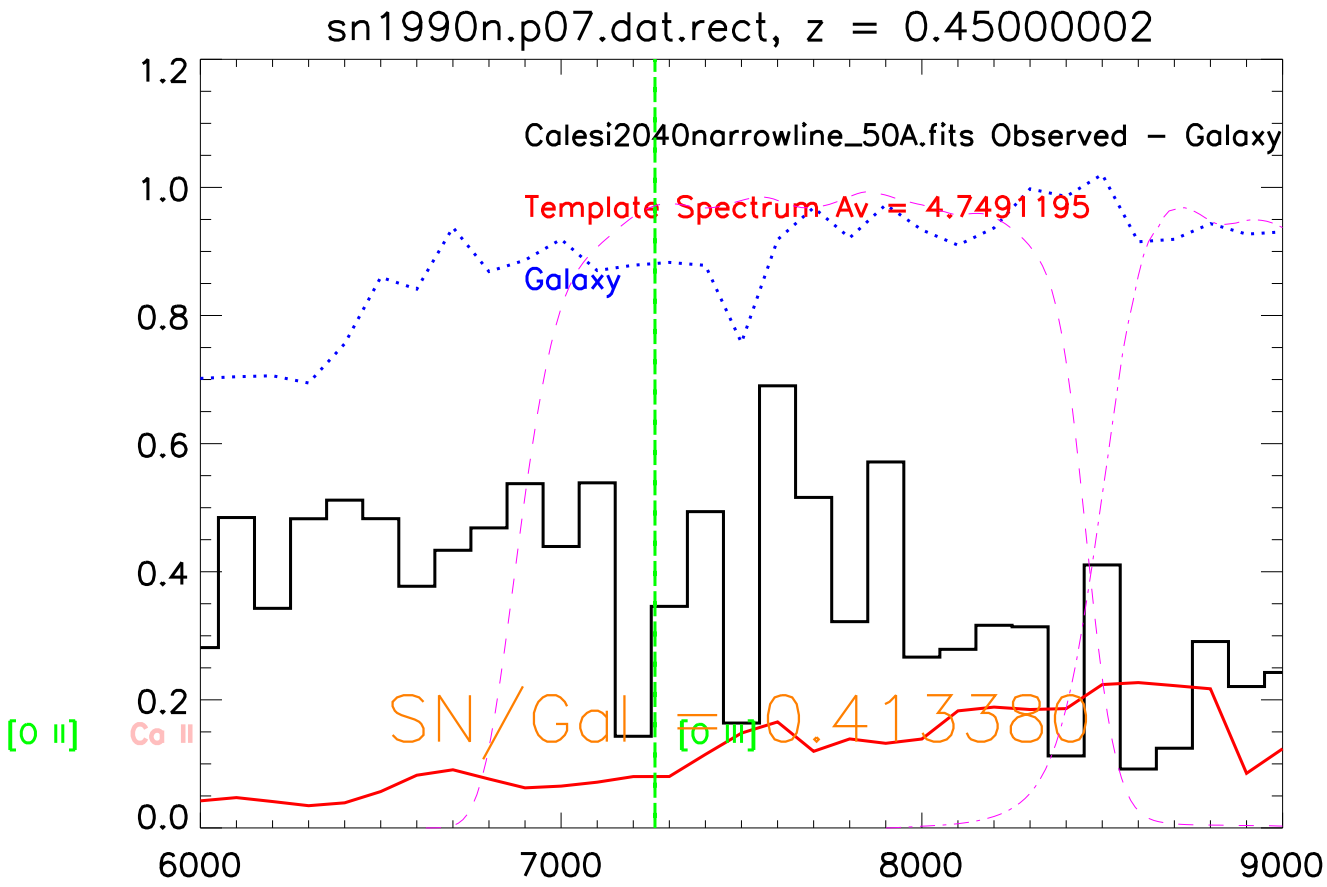

sn1996x.p07.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av. = 5.5197749
Galaxy
SN/Gal = 0.409726
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

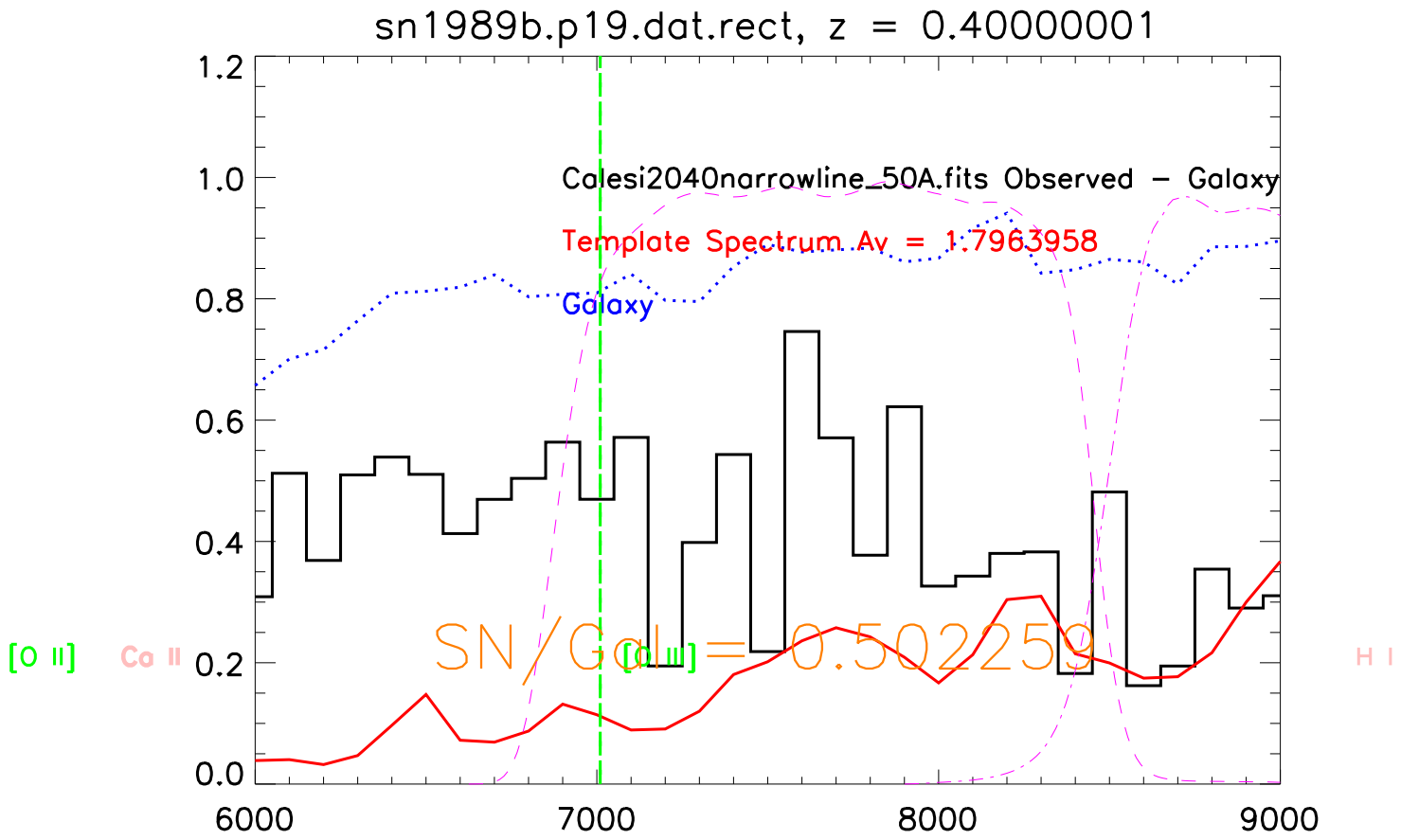

sn1999ee.p01.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av. = 4.2283313
Galaxy
SN/Gal = 0.437037
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

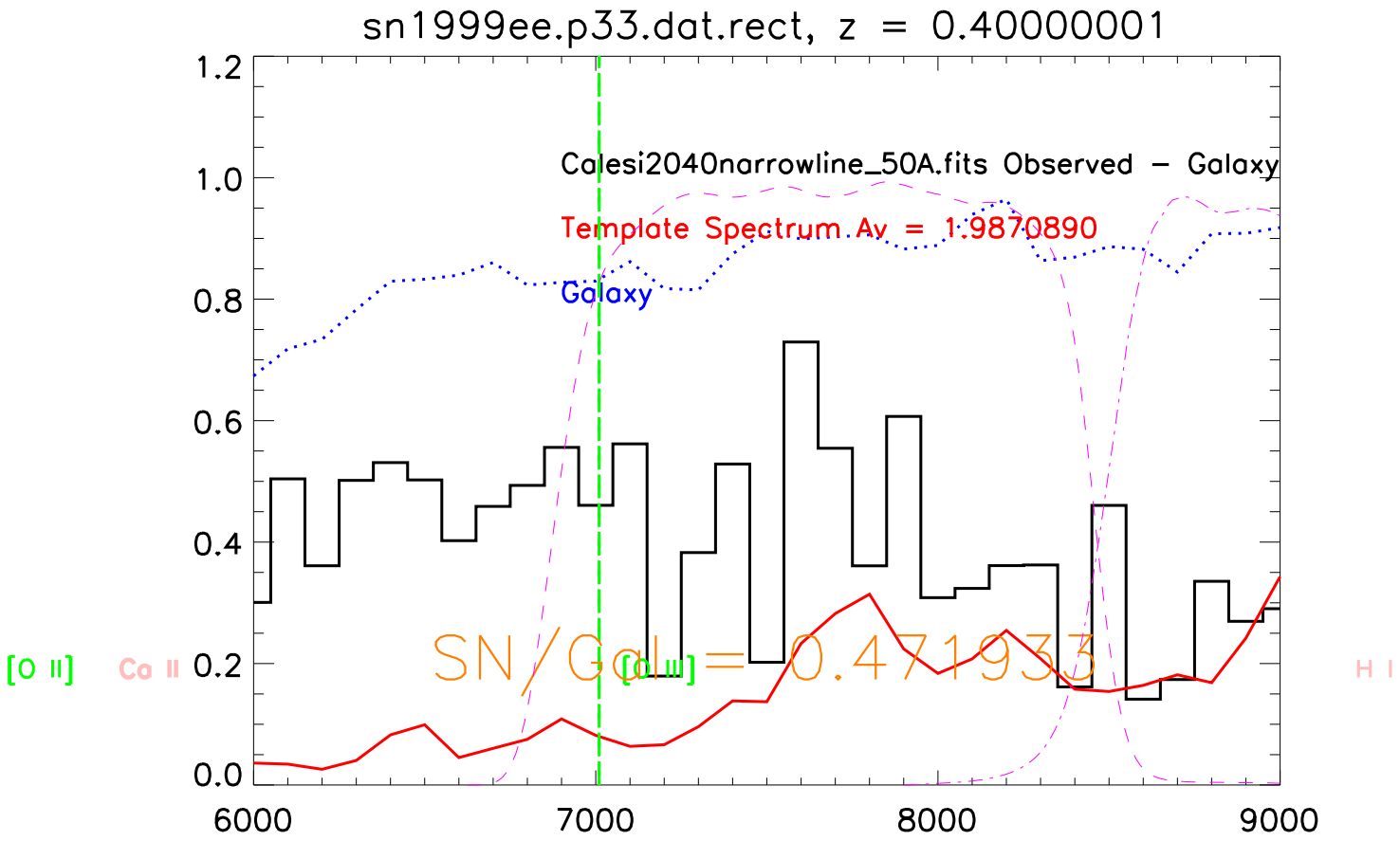

sn1989b.p17.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 2.0548843
Galaxy
SN/Gal=0.501034
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

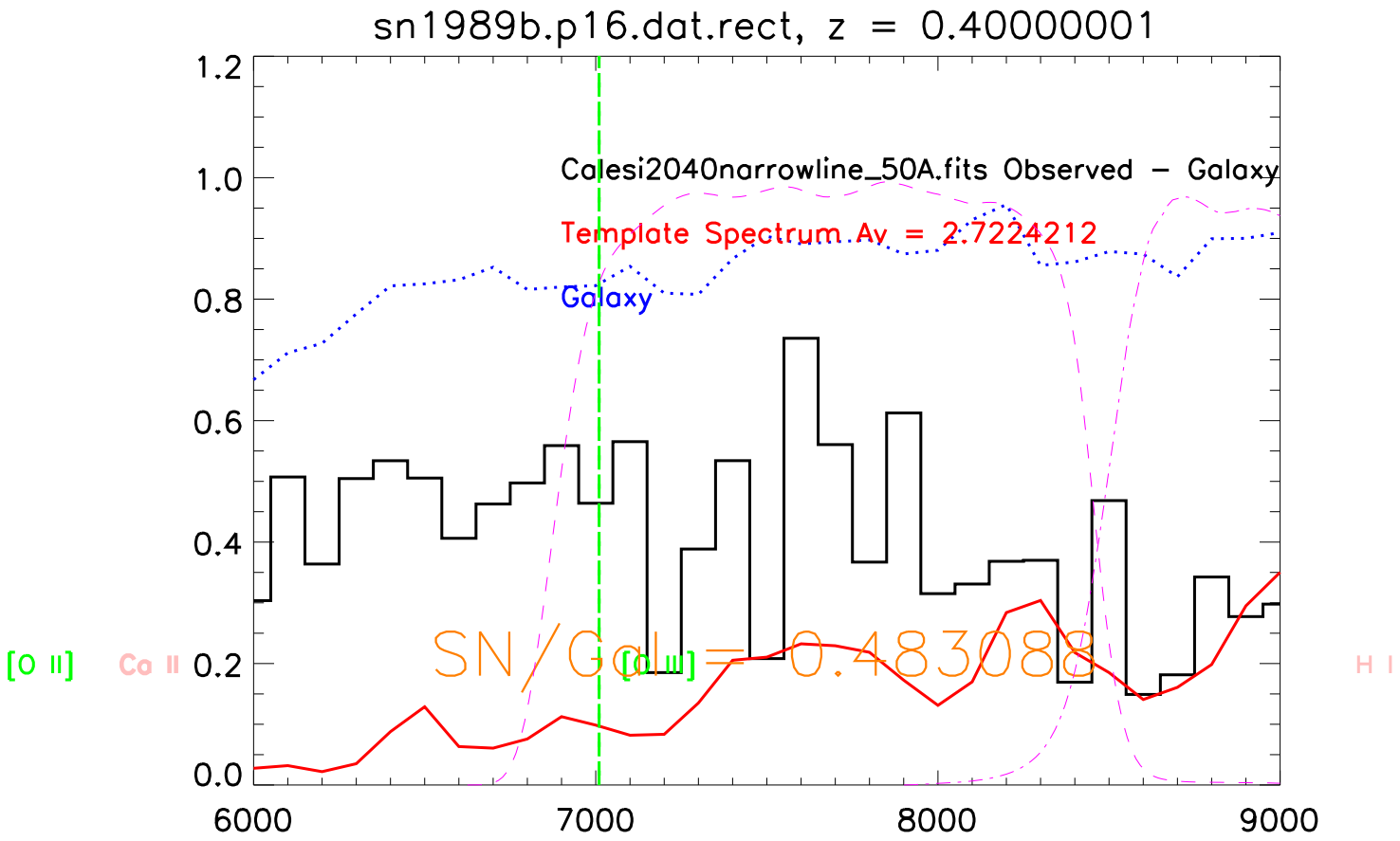

sn1990n.m07.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av. = 5.4704879
Galaxy
SN/Gal [O III] 0.466606
[O II]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

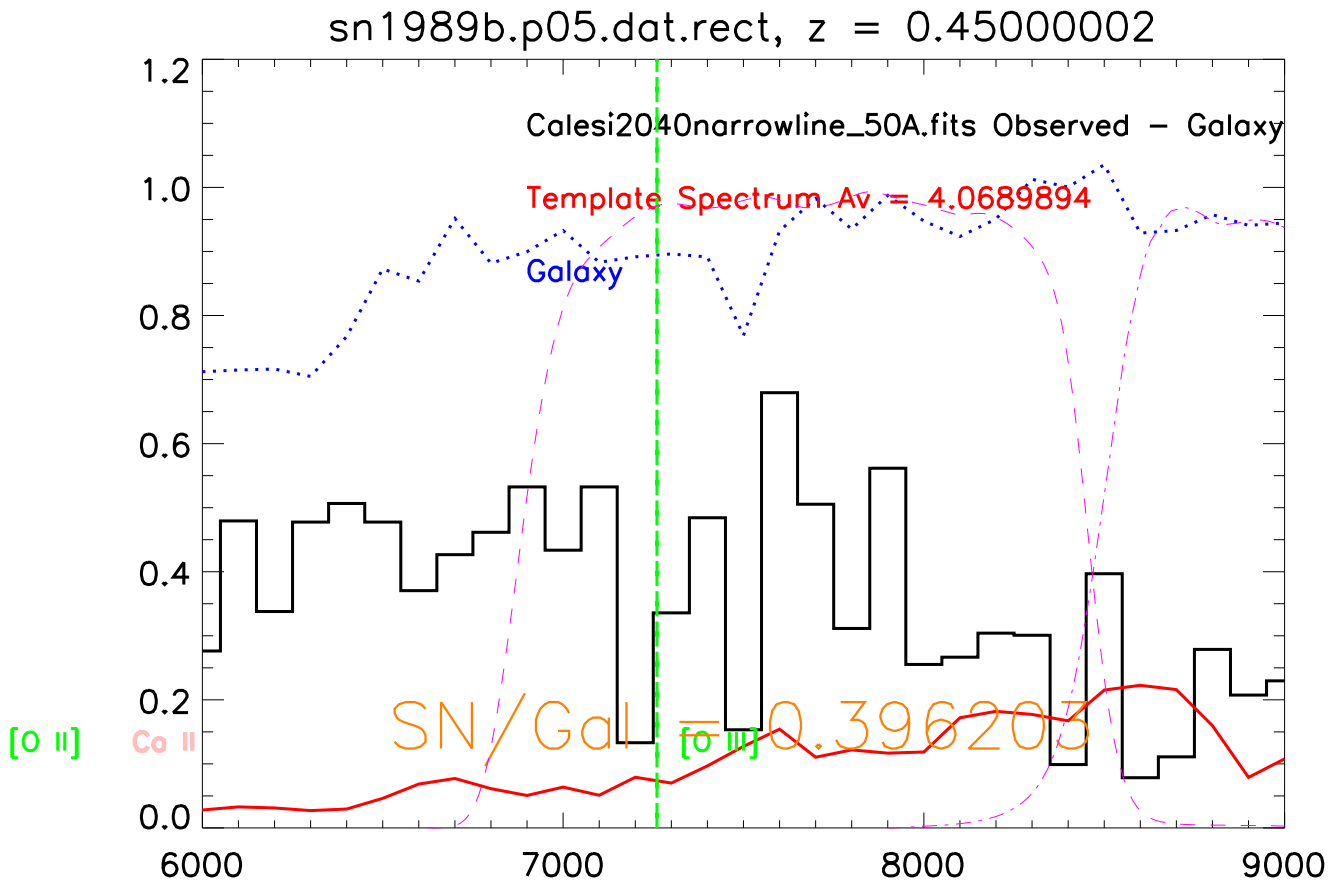

sn1999ee.p03.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 4.1621366
Galaxy
SN/Gal = 0.424629
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

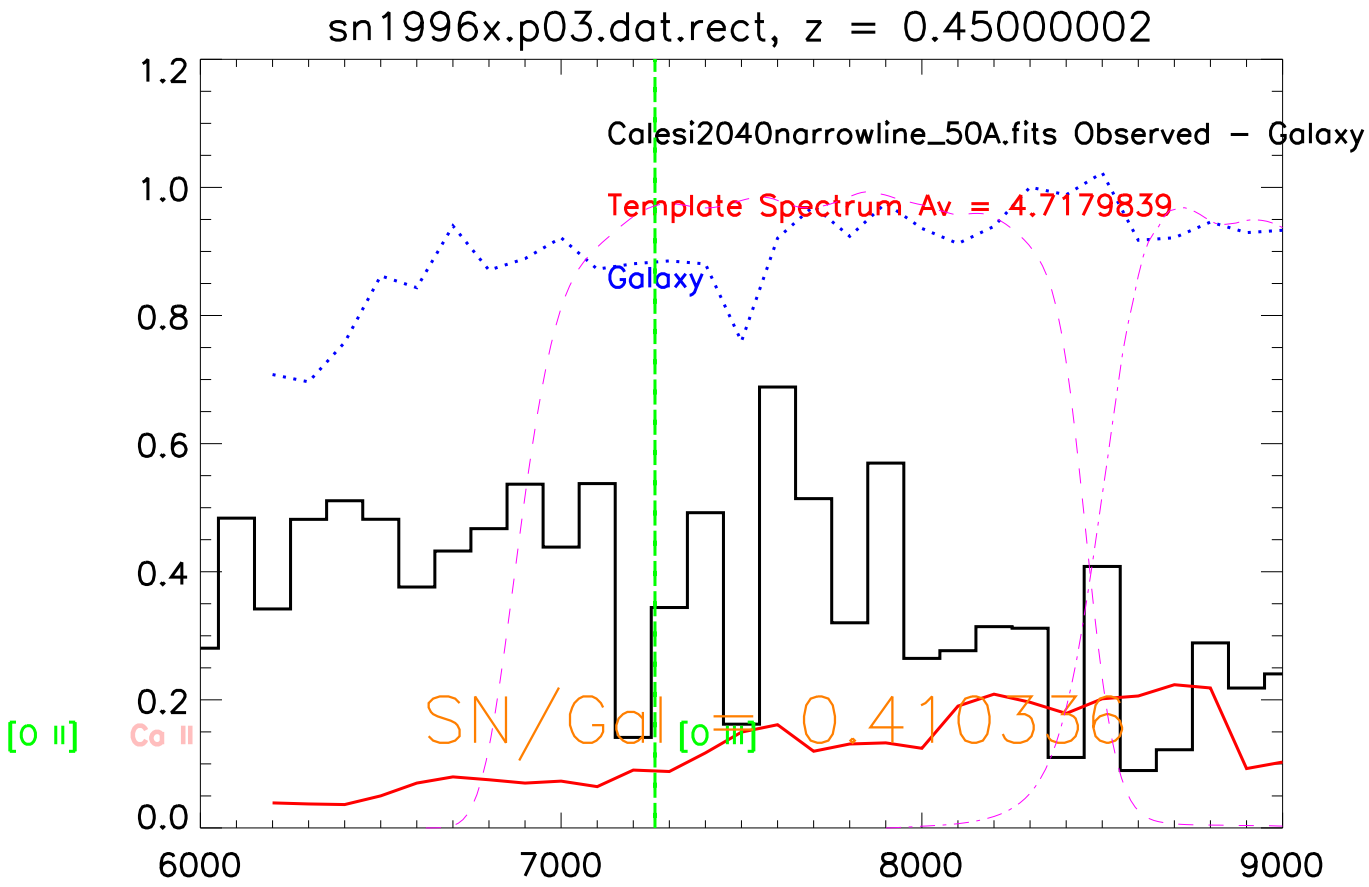

sn1990n.p07.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av. = 4.7491195
Galaxy
SN/Gal = 0.413380
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

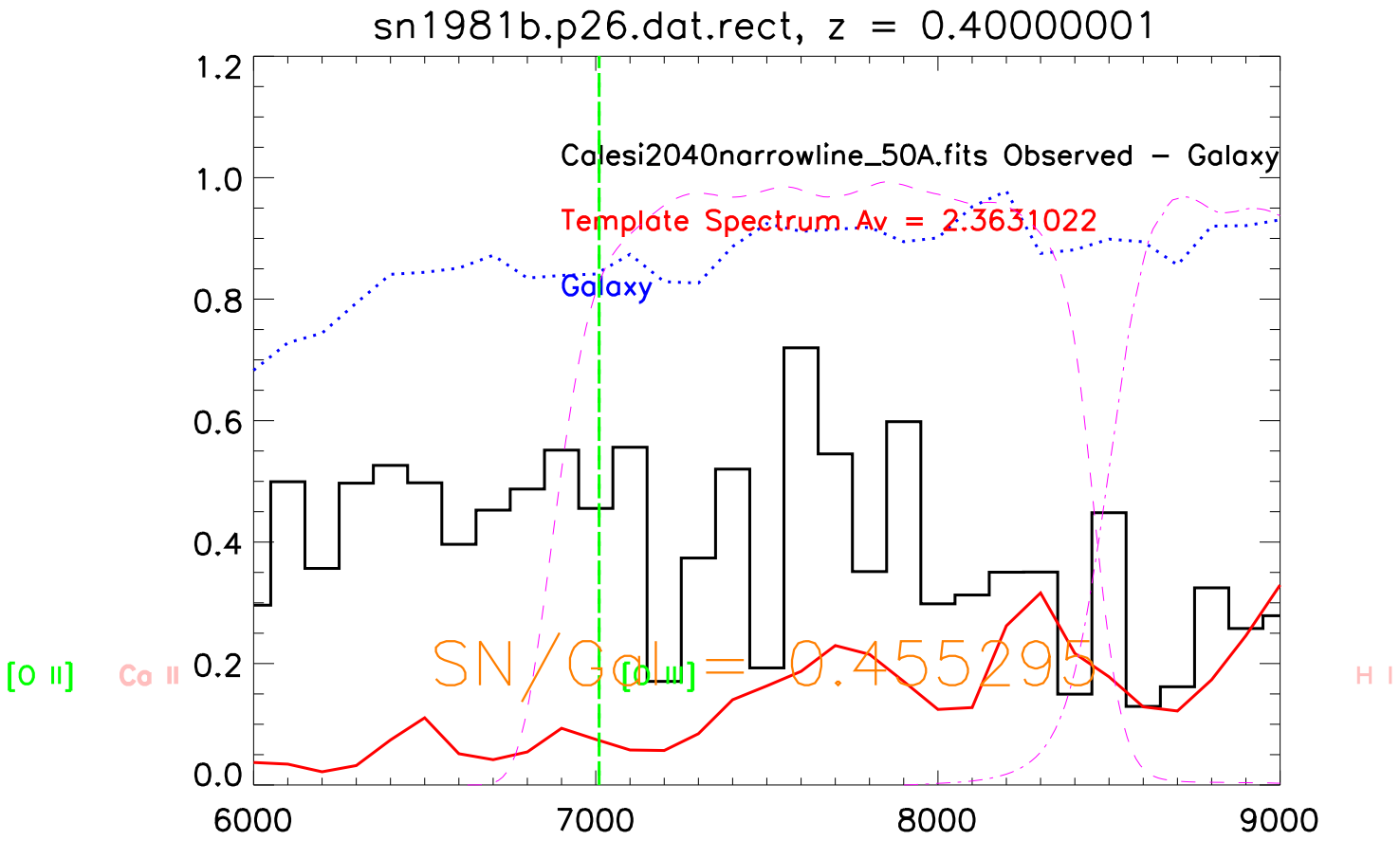

sn1989b.p19.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed − Galaxy
Template Spectrum Av = 1.7963958
Galaxy
SN/Gal = 0.502259
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

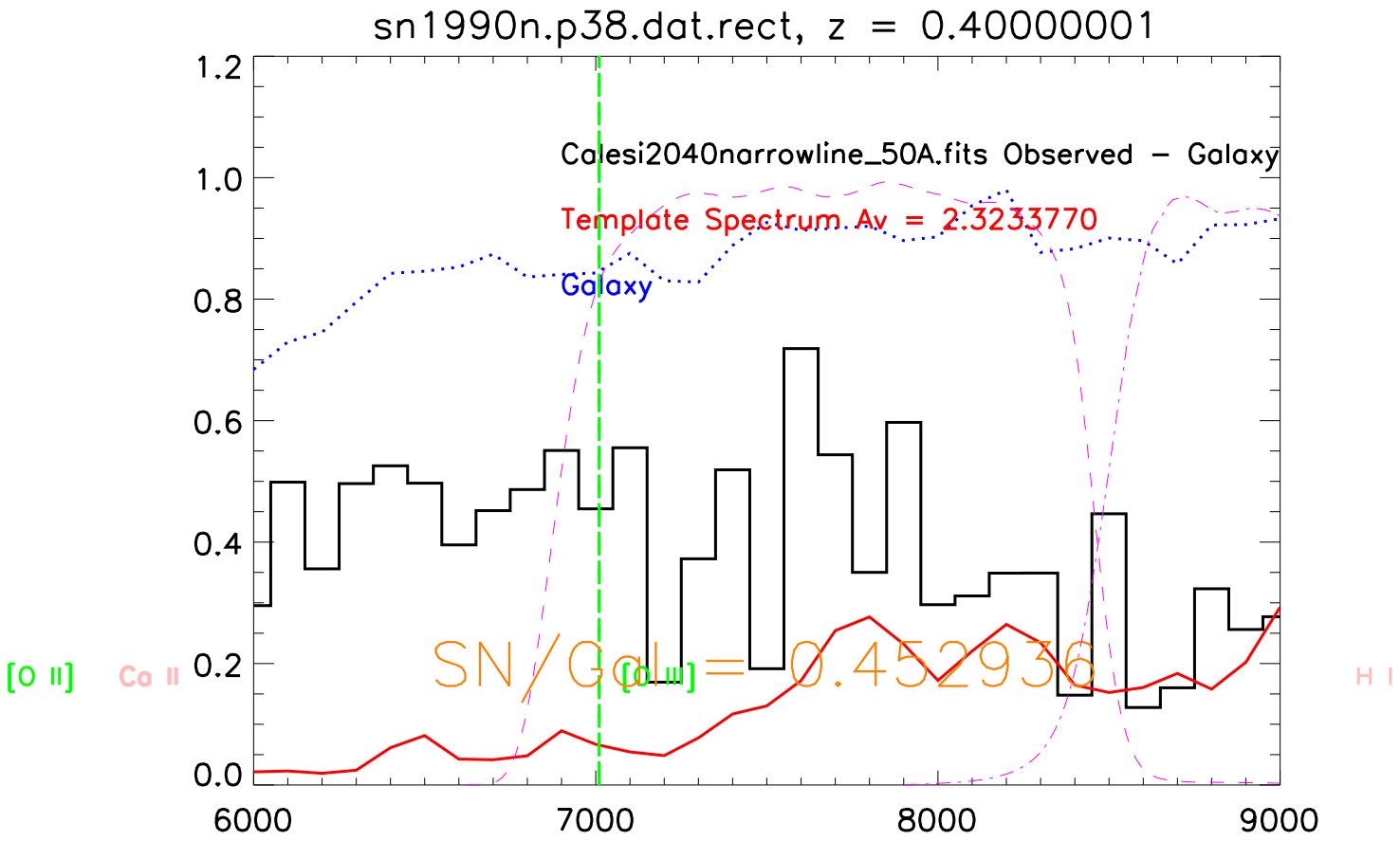

sn1999ee.p33.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 1.9870890
Galaxy
SN/Gal=0.471933
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

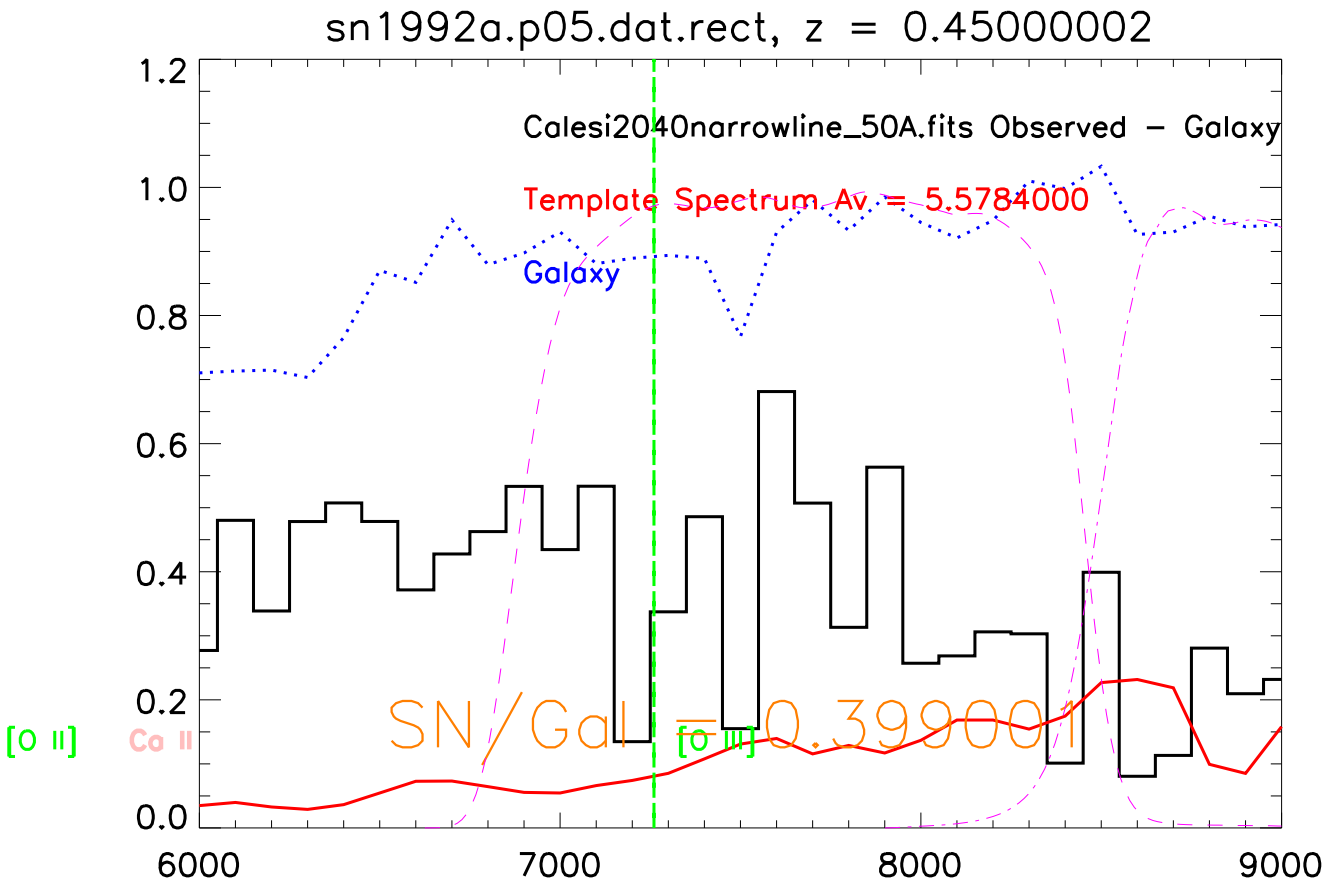

sn1989b.p16.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 2.7224212
Galaxy
SN/Gal=0.483088
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

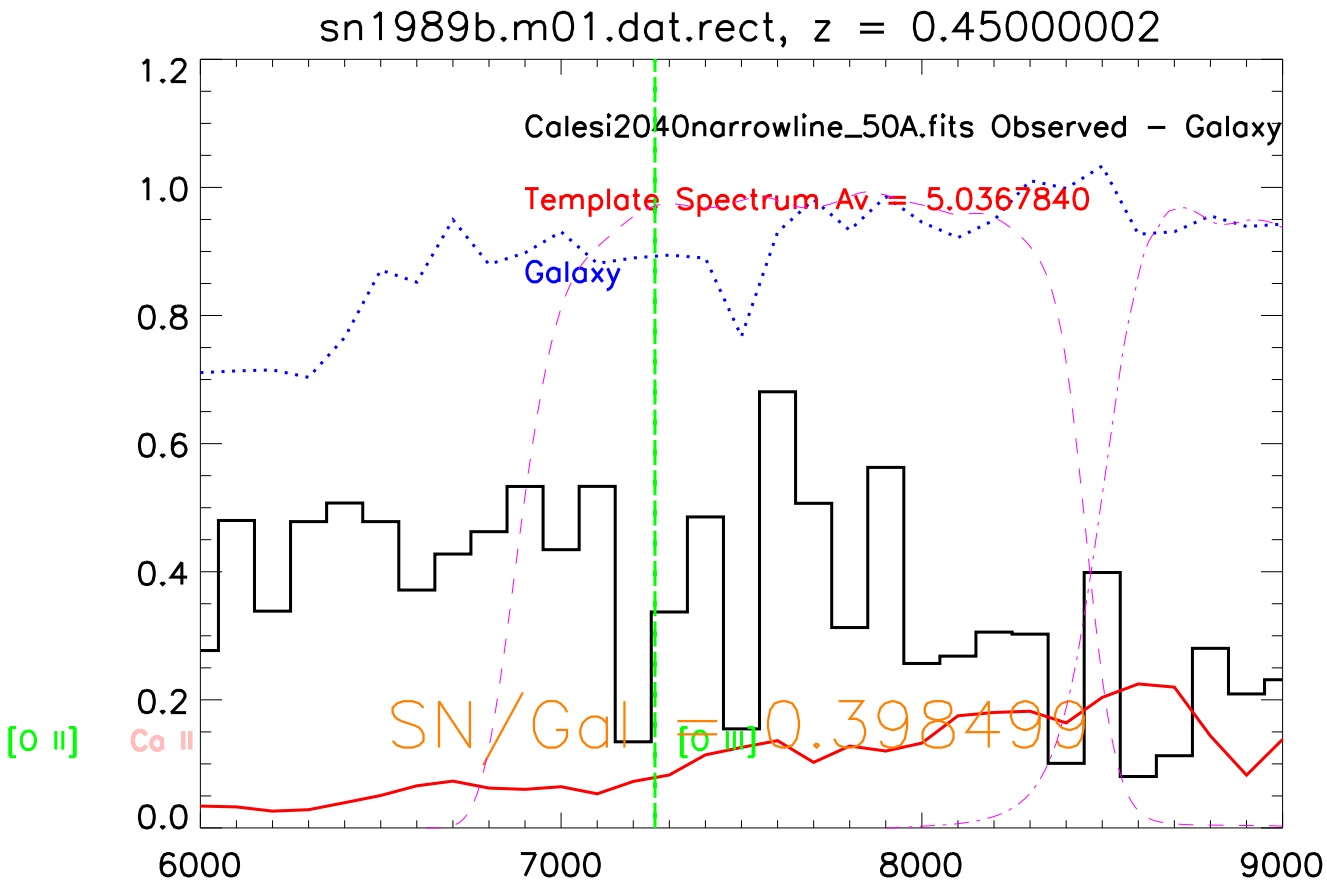

sn1989b.p05.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 4.0689894
Galaxy
SN/Gal = 0.396205
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

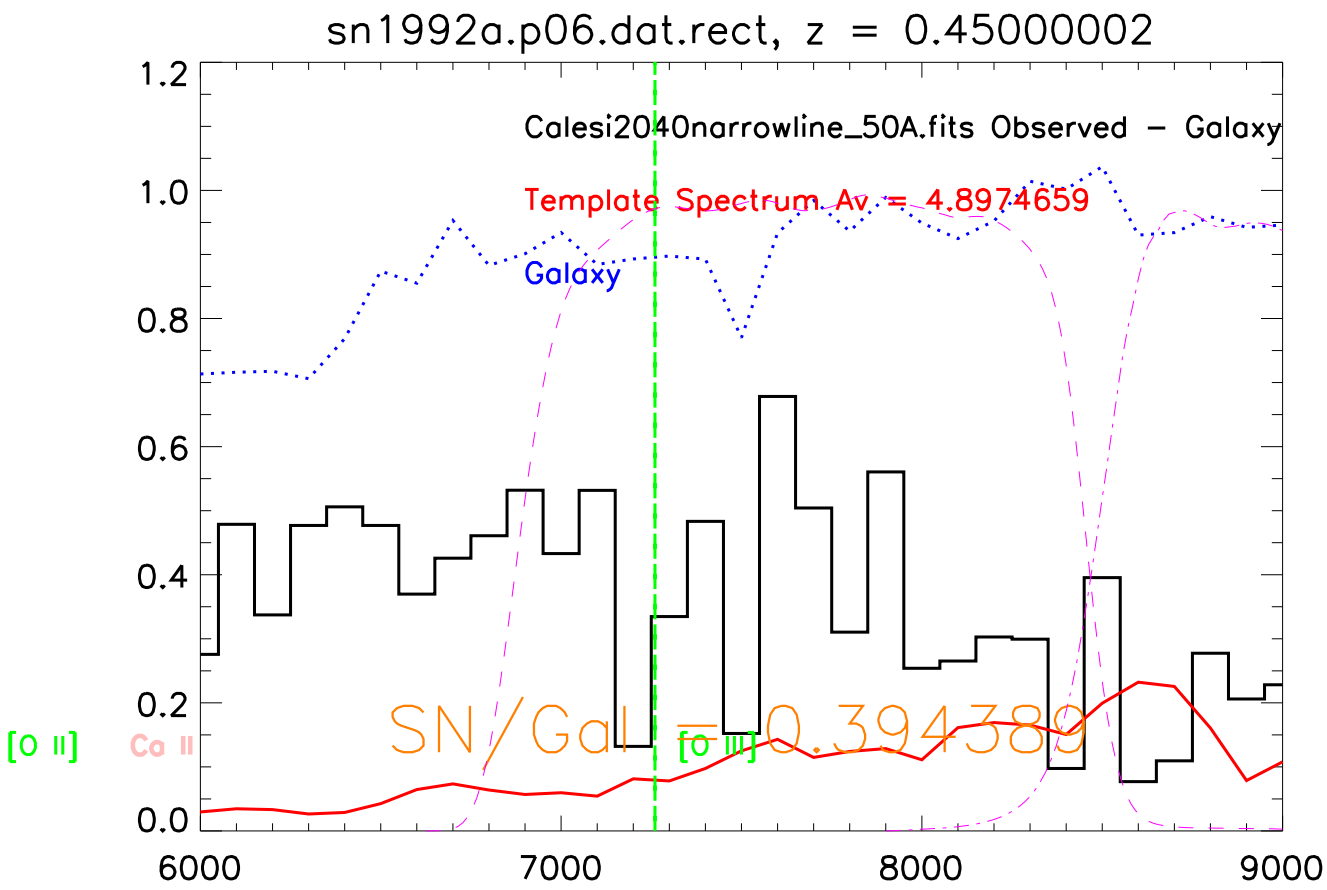

sn1996x.p03.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 4.7179839
Galaxy
SN/Gal = 0.410356
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

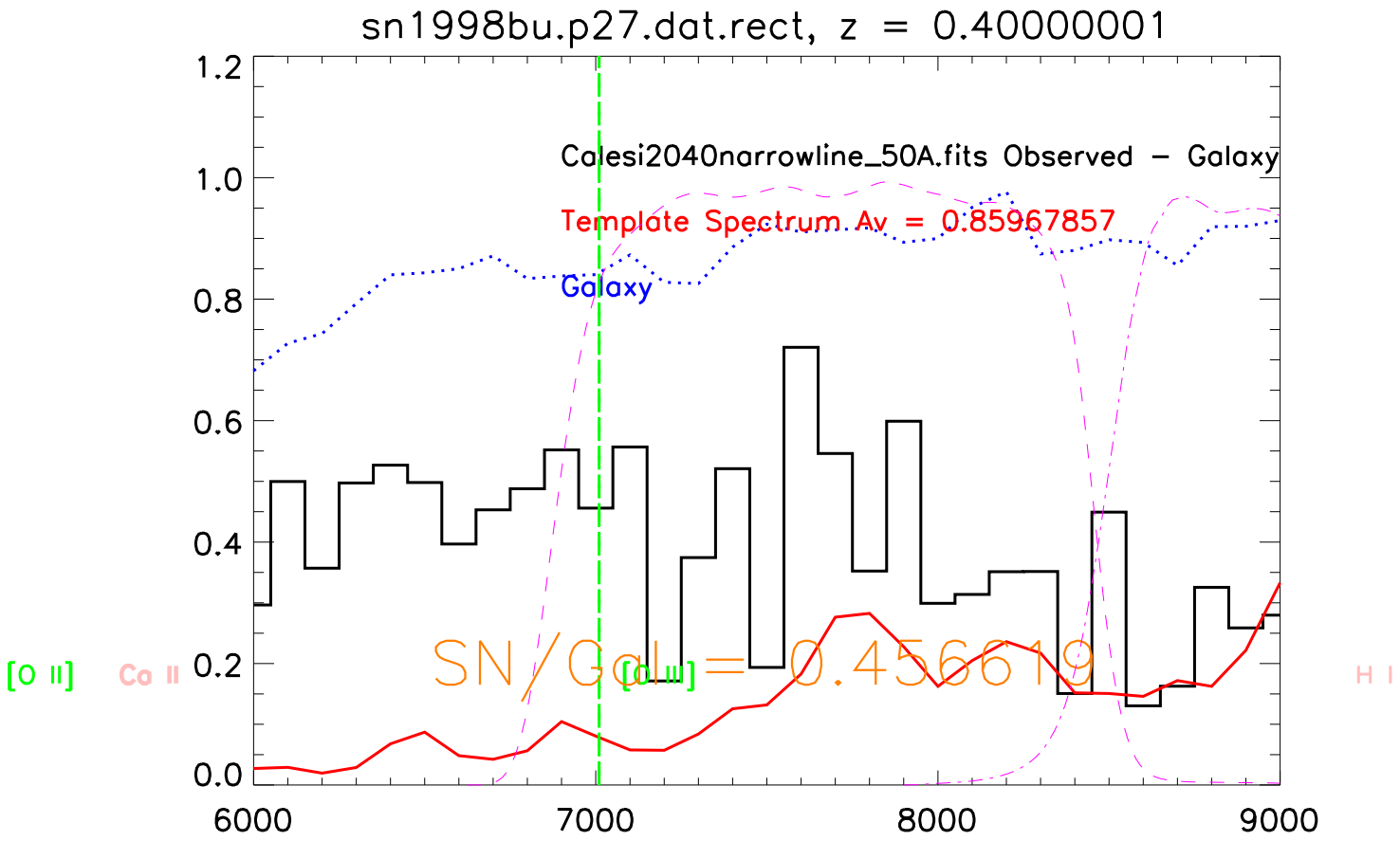

sn1981b.p26.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 2.3631022
Galaxy
SN/Gdl=0.455295
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

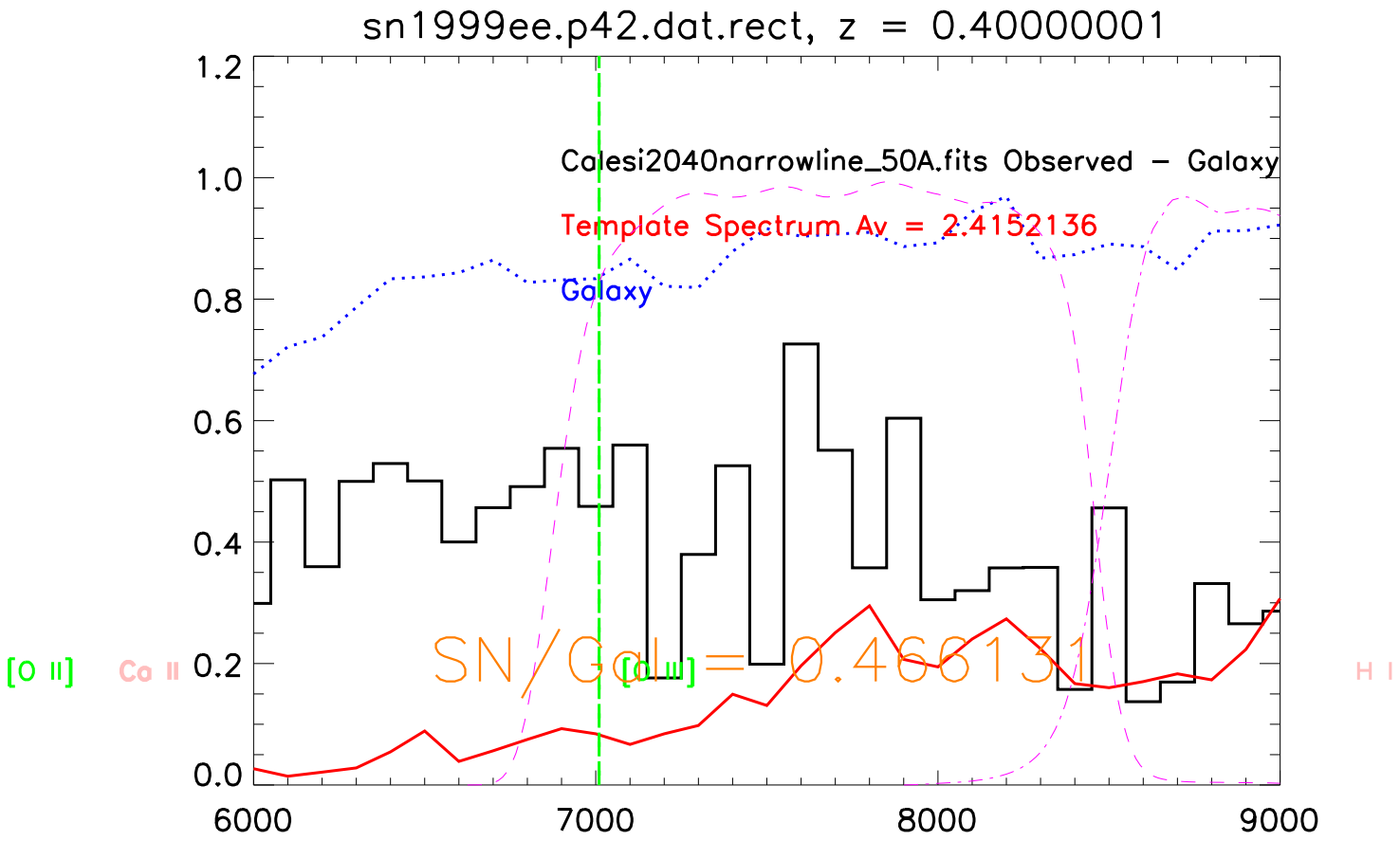

sn1990n.p38.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 2.3233770
Galaxy
SN/Gal=0.452936
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

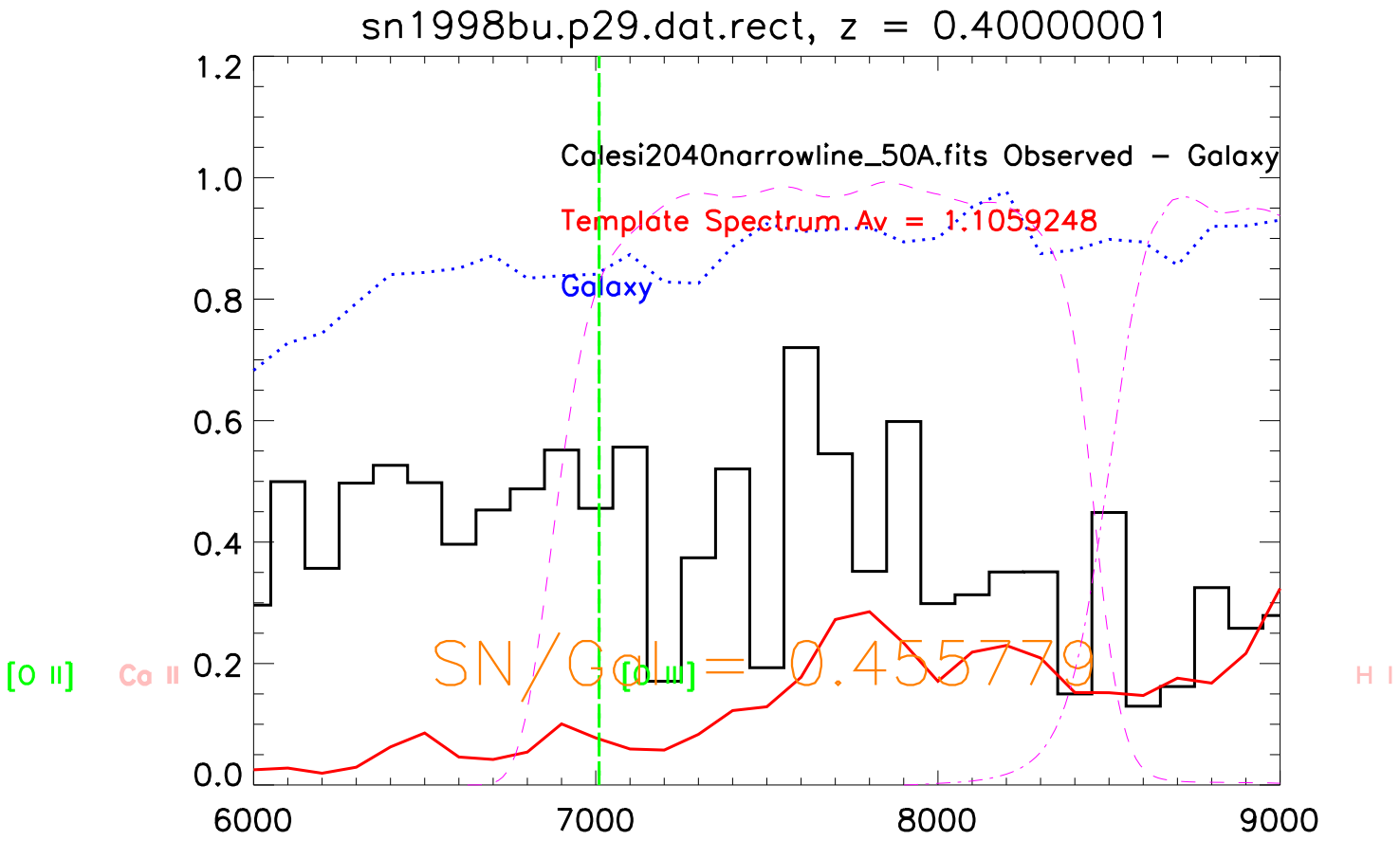

sn1992a.p05.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed − Galaxy
Template Spectrum Av = 5.5784000
Galaxy
SN/Gal = 0.399001
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

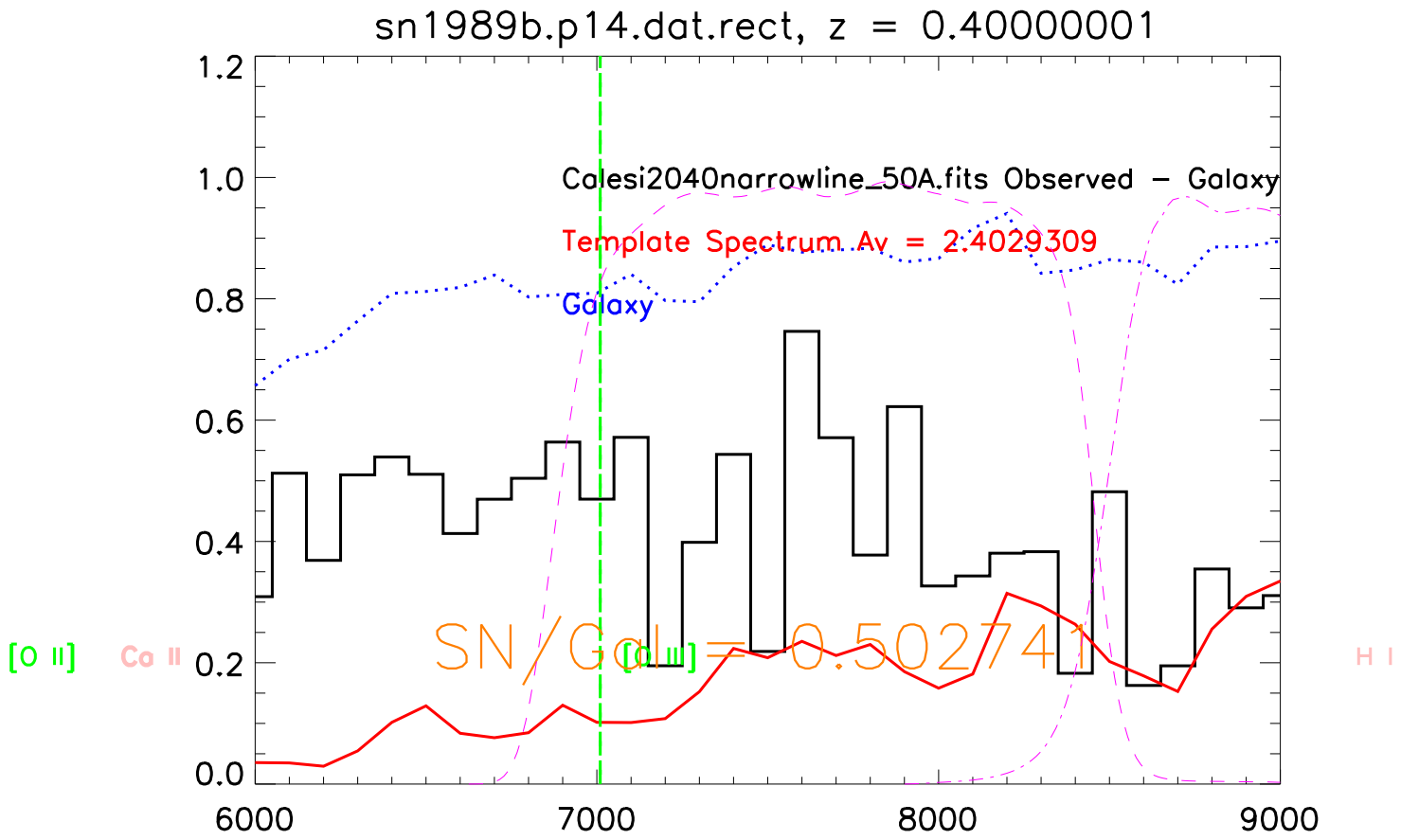

sn1989b.m01.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed − Galaxy
Template Spectrum Av = 5.0367840
Galaxy
SN/Gal = 0.398499
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1992a.p06.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed − Galaxy
Template Spectrum Av = 4.8974659
Galaxy
SN/Gal = 0.394389
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1998bu.p27.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 0.85967857
Galaxy
SN/Gdl=0.456619
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1999ee.p42.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 2.4152136
Galaxy
SN/Gal = 0.466131
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1998bu.p29.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 1.1059248
Galaxy
SN/Gal=0.455779
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1989b.p14.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 2.4029309
Galaxy
SN/Gal=0.502741
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
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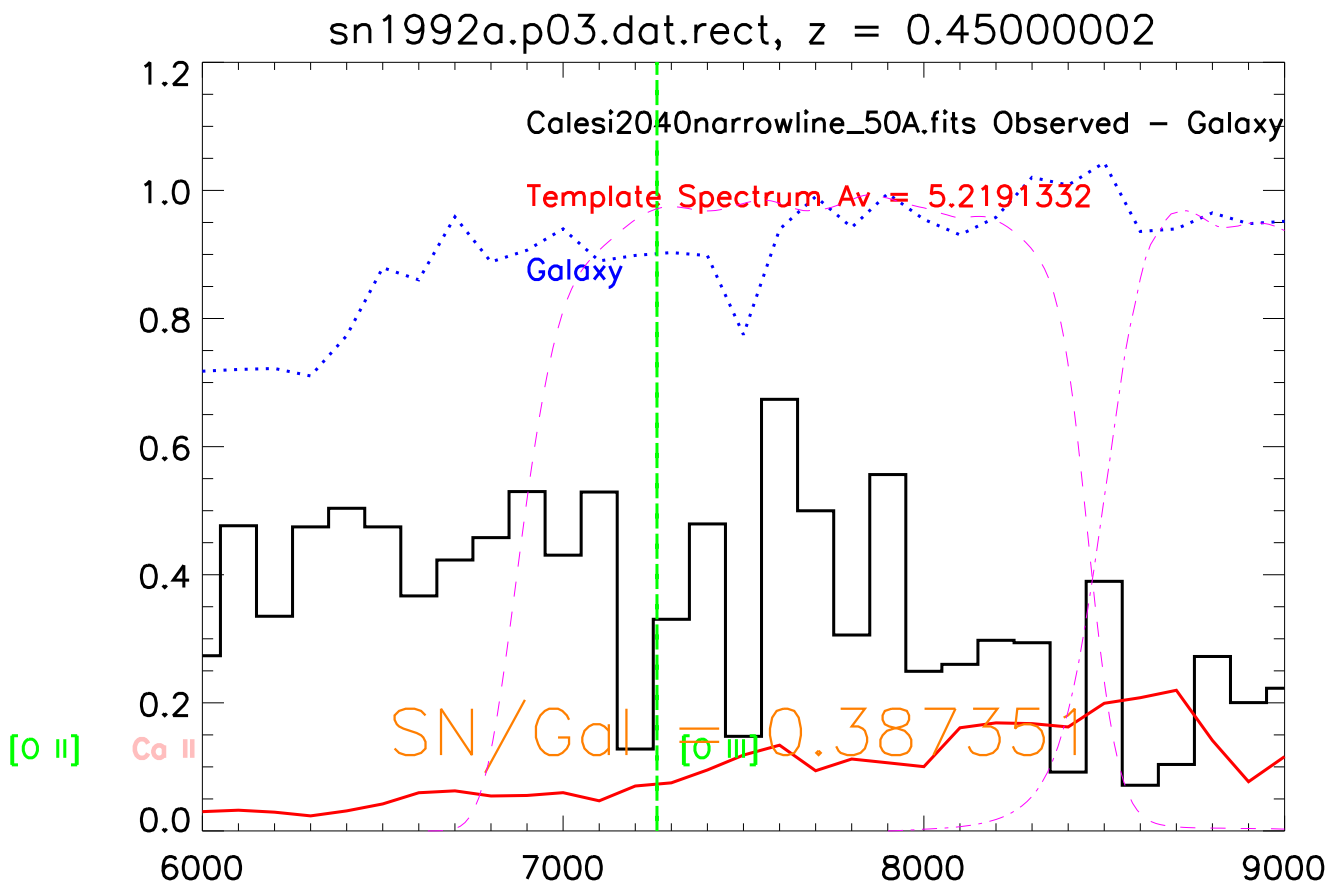
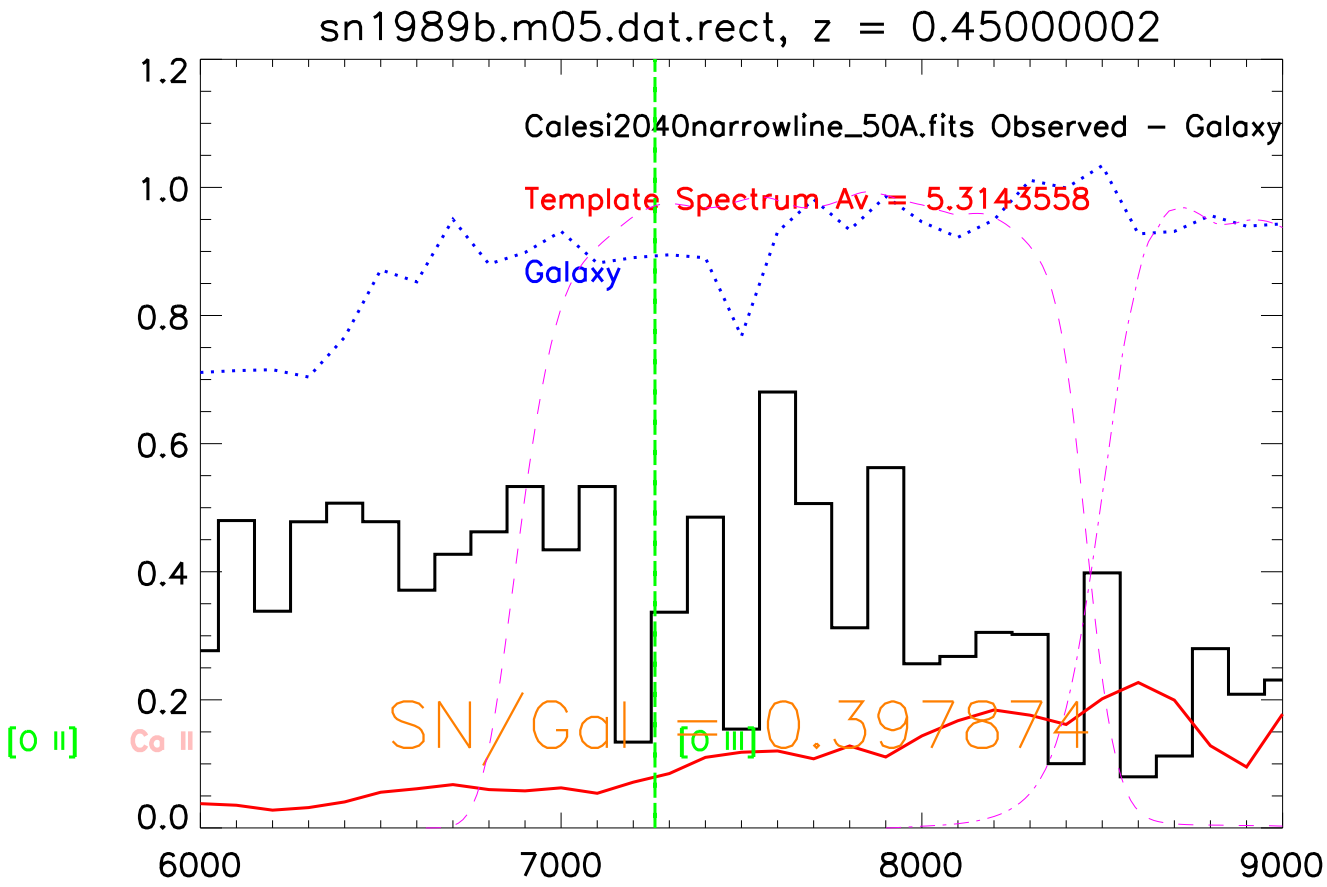
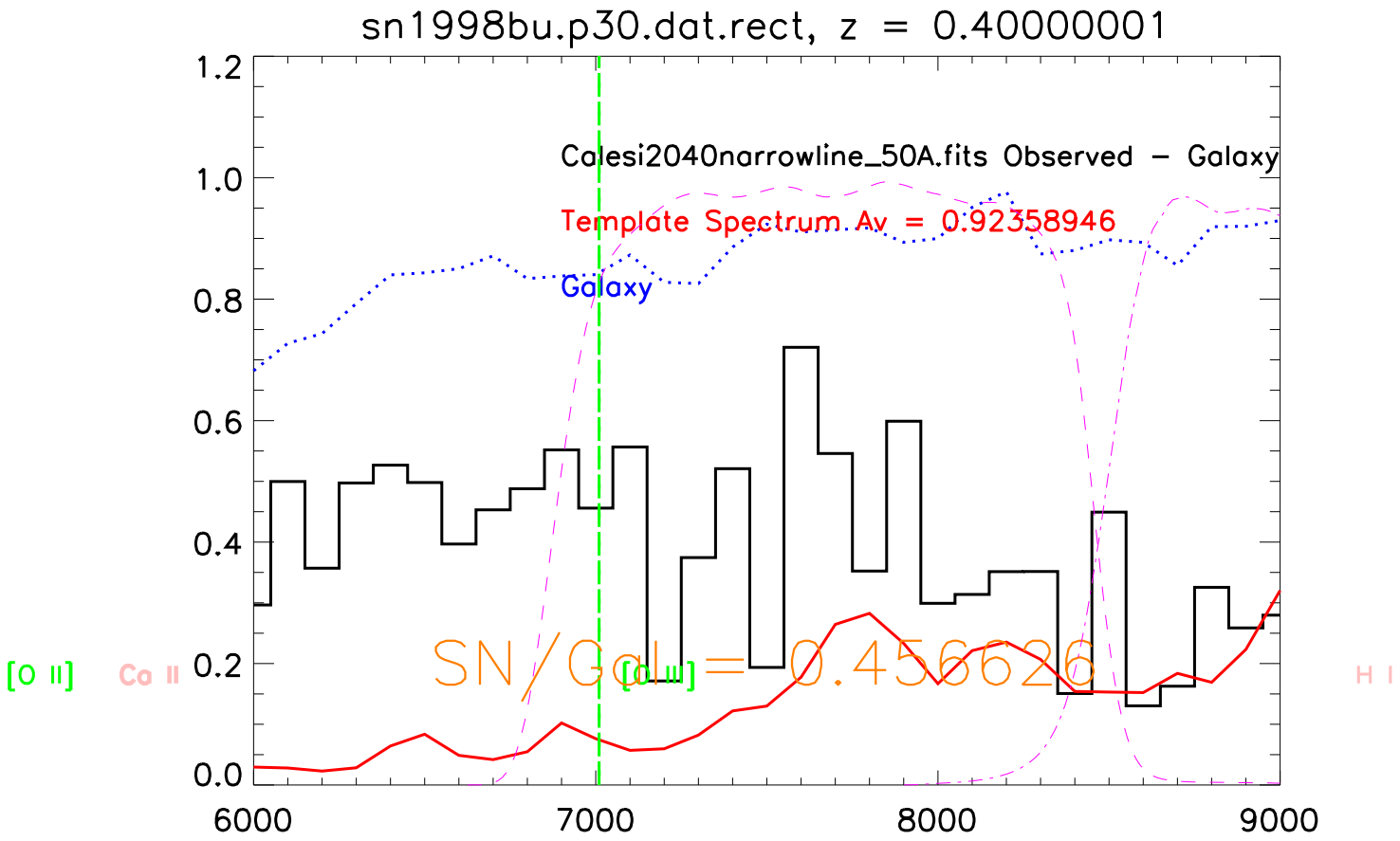
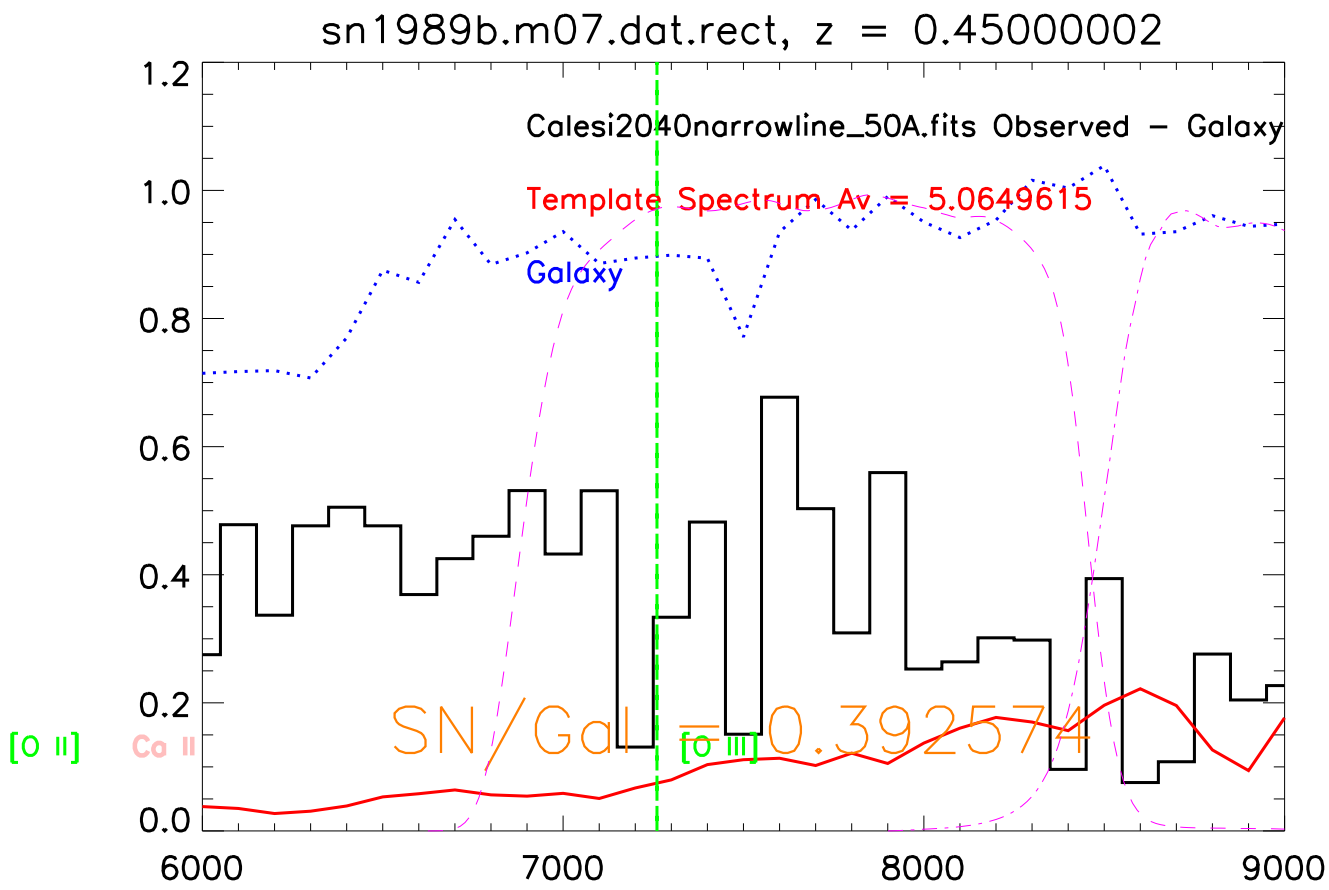
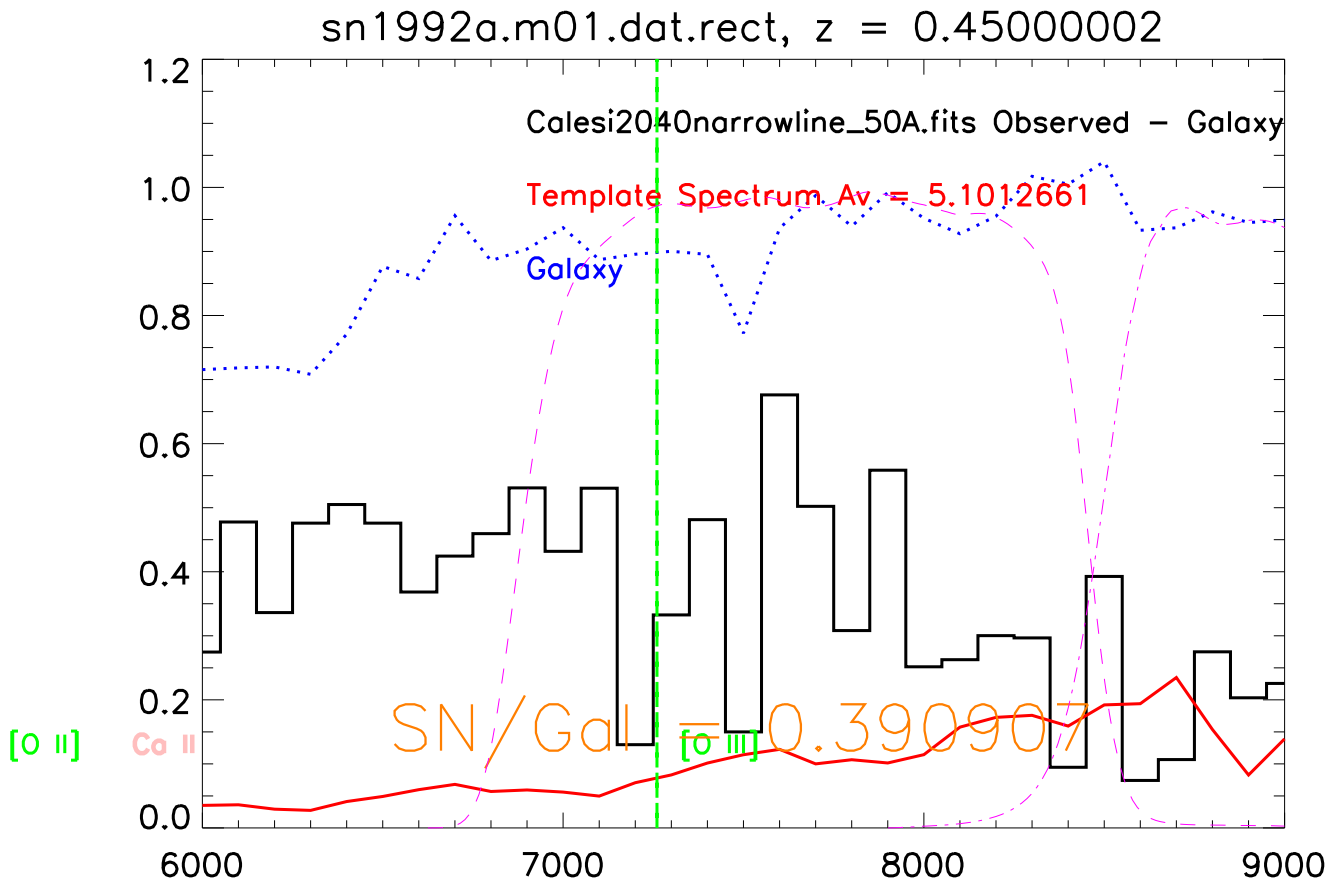
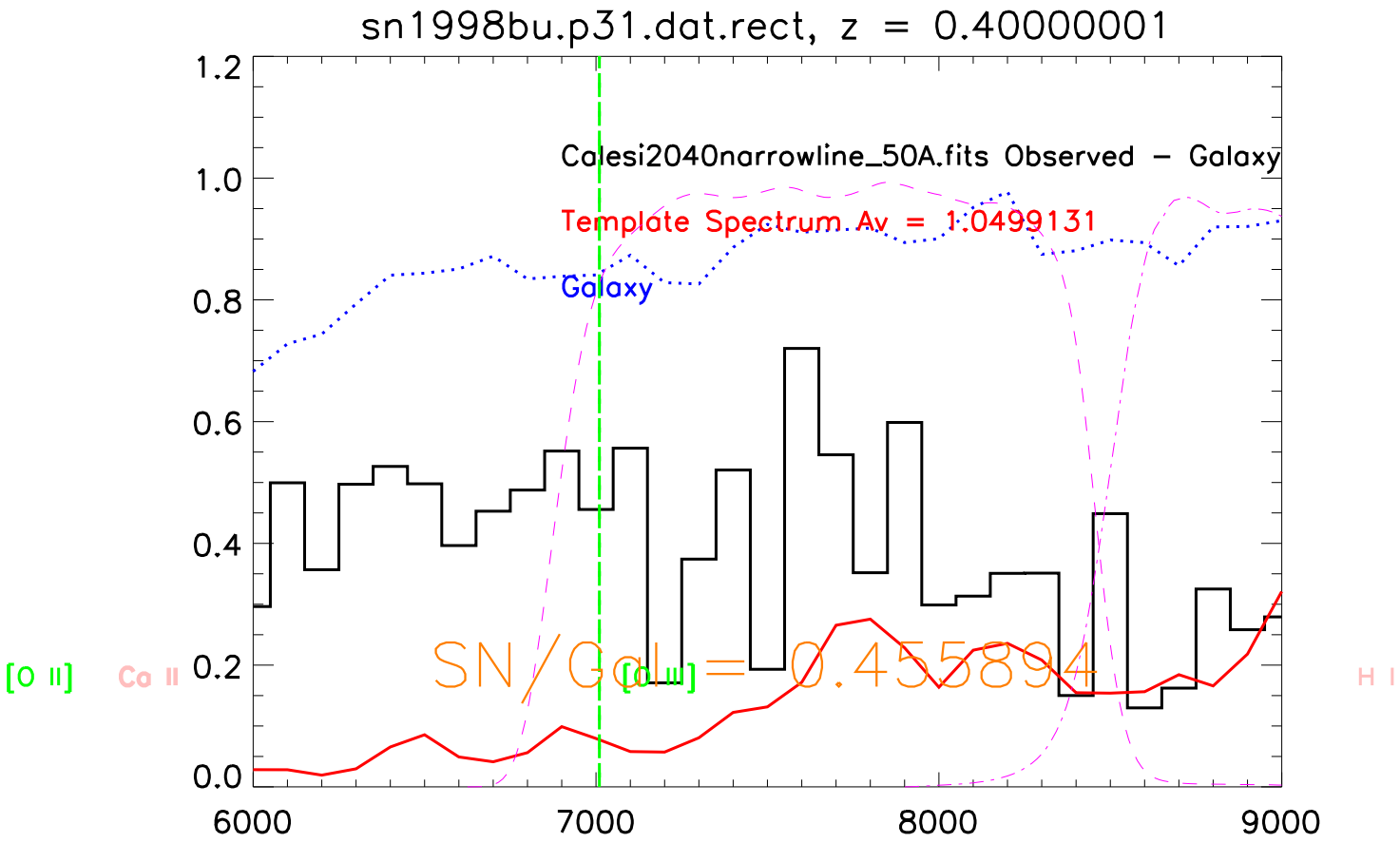

sn1992a.p03.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 5.2191332
Galaxy
SN/Gal = 0.387351
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

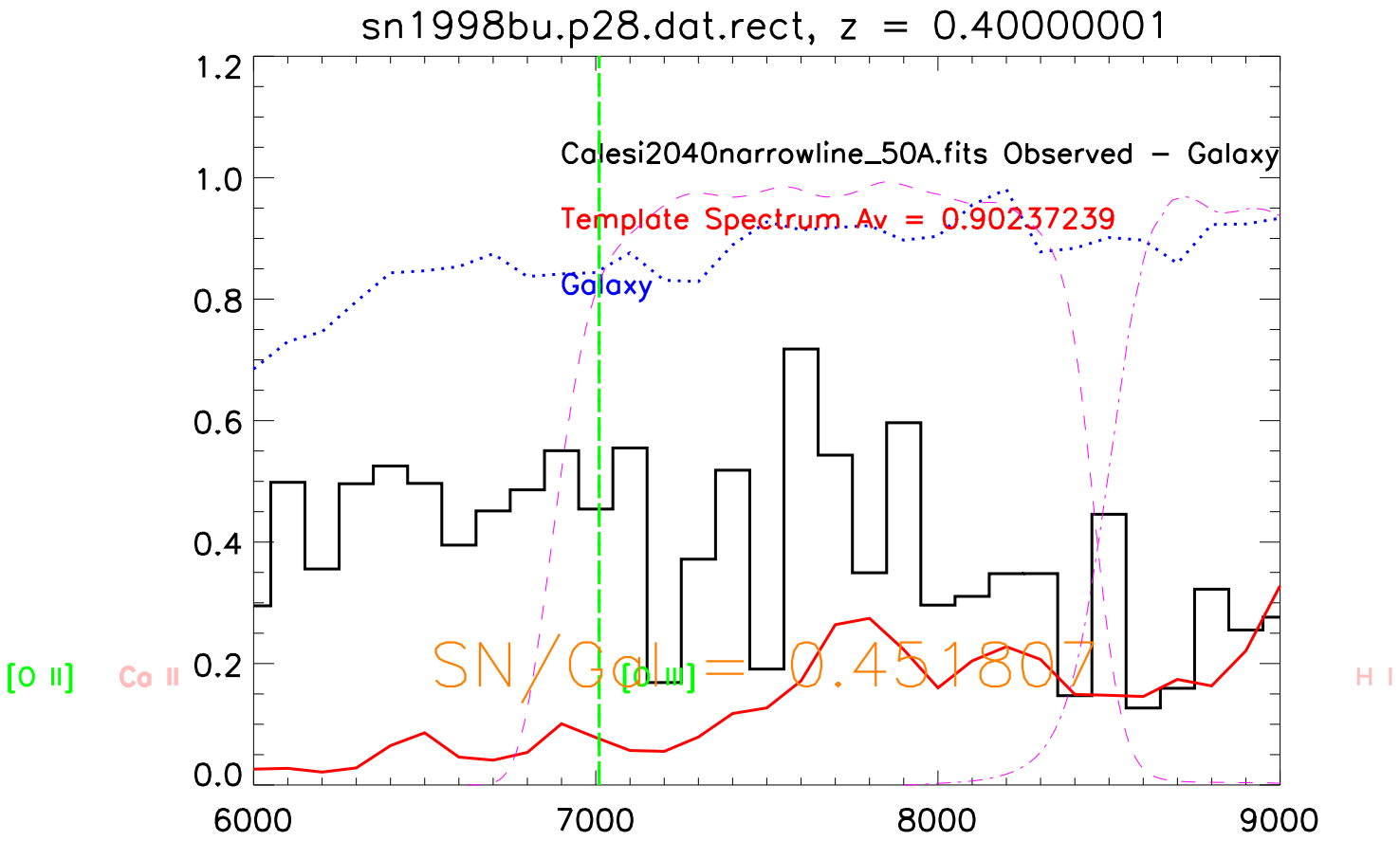

sn1989b.m05.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed − Galaxy
Template Spectrum Av = 5.3143558
Galaxy
SN/Gal = 0.397874
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000

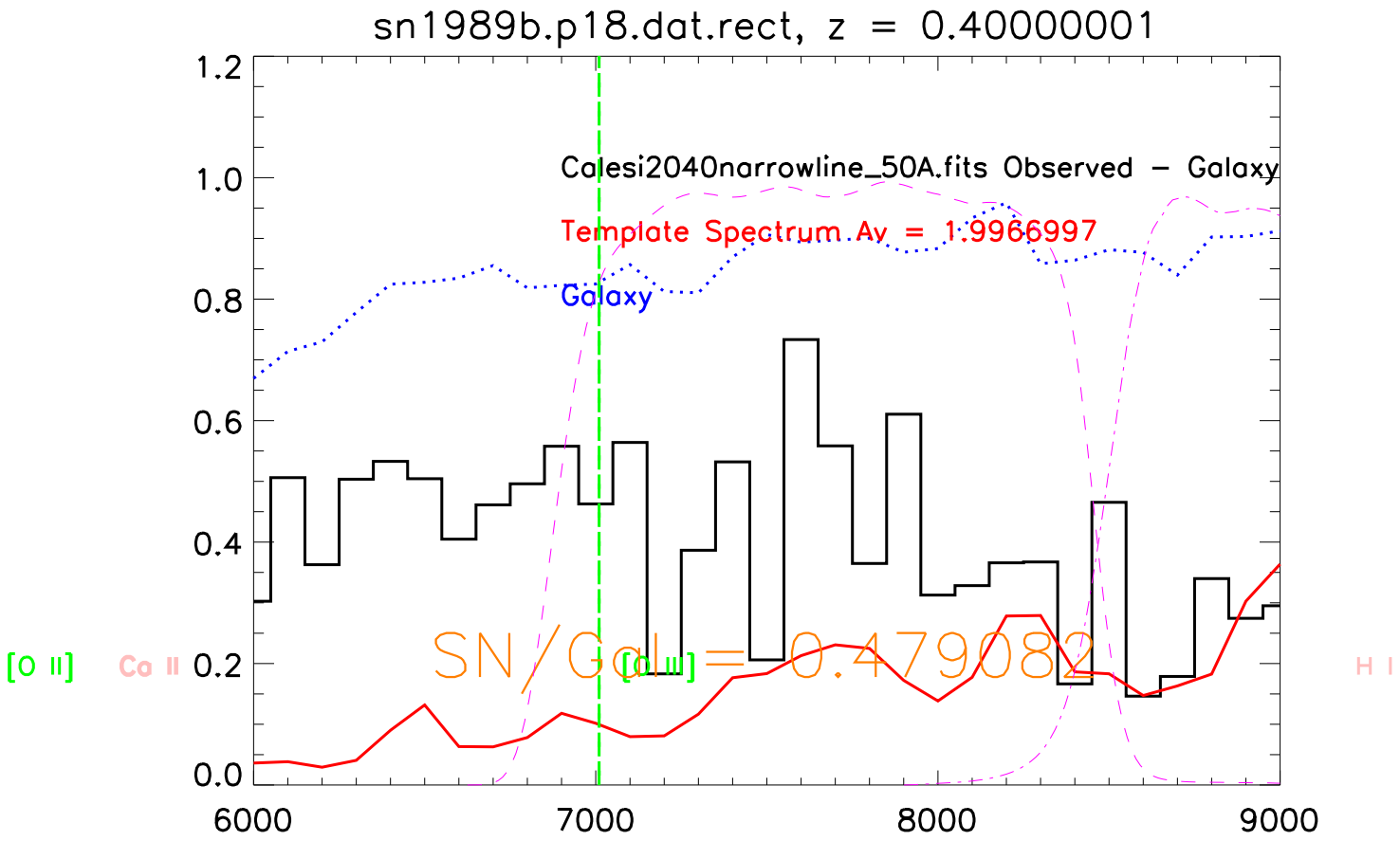

sn1998bu.p30.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 0.92358946
Galaxy
SN/Gal = 0.456626
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1989b.m07.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed − Galaxy
Template Spectrum Av = 5.0649615
Galaxy
SN/Gal = 0.392574
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1992a.m01.dat.rect, z = 0.45000002
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 5.1012661
Galaxy
SN/Gal = 0.390907
[O II]
Ca II
[O III]
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1998bu.p31.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 1.0499131
Galaxy
SN/Gal=0.455894
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1998bu.p28.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum Av = 0.90237239
Galaxy
SN/Gal=0.451807
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000


sn1989b.p18.dat.rect, z = 0.40000001
Calesi2040narrowline_50A.fits Observed – Galaxy
Template Spectrum.Av = 1.9966997
Galaxy
SN/Gal=0.479082
[O II]
Ca II
[O III]
H I
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6000
7000
8000
9000