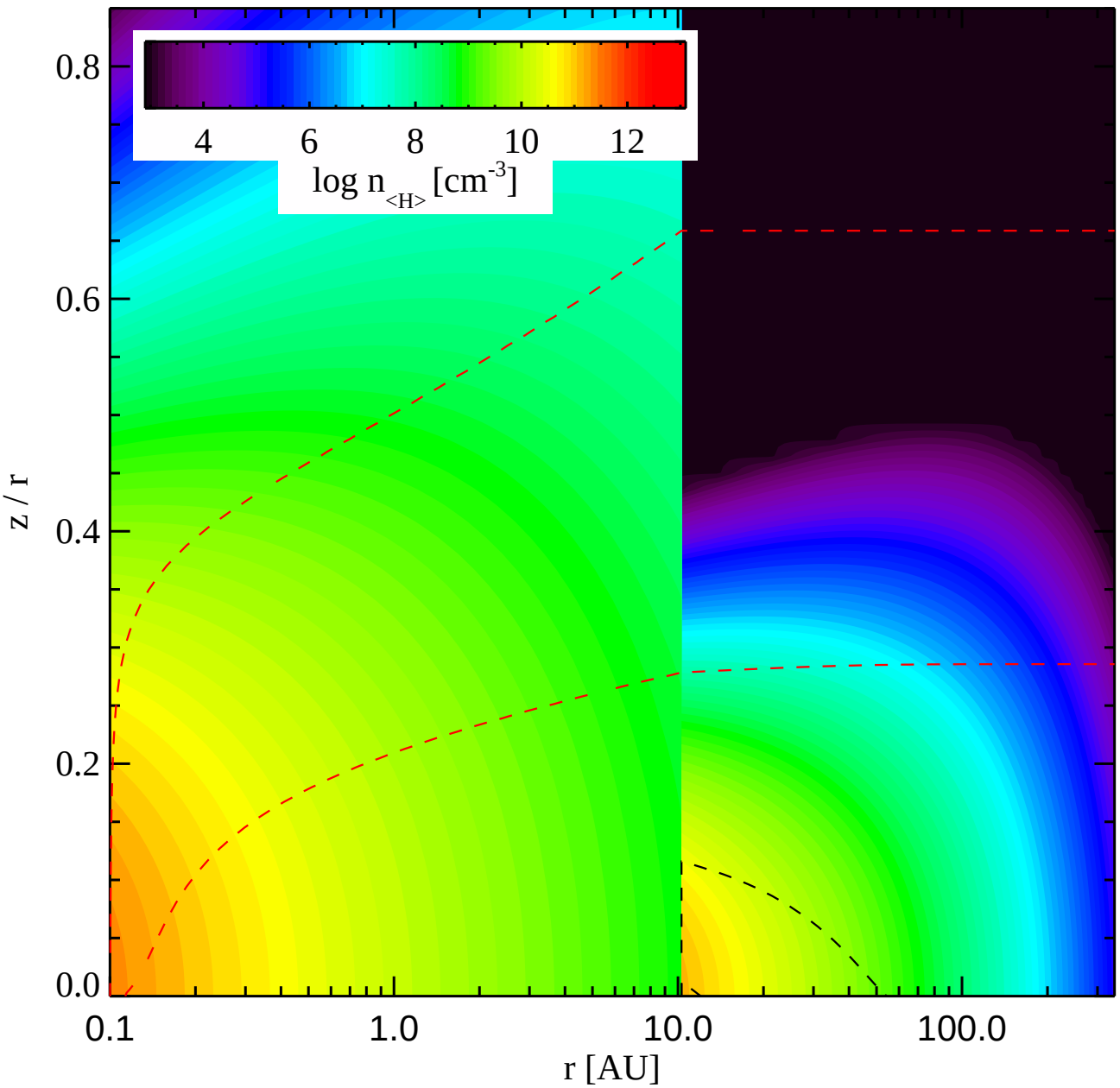
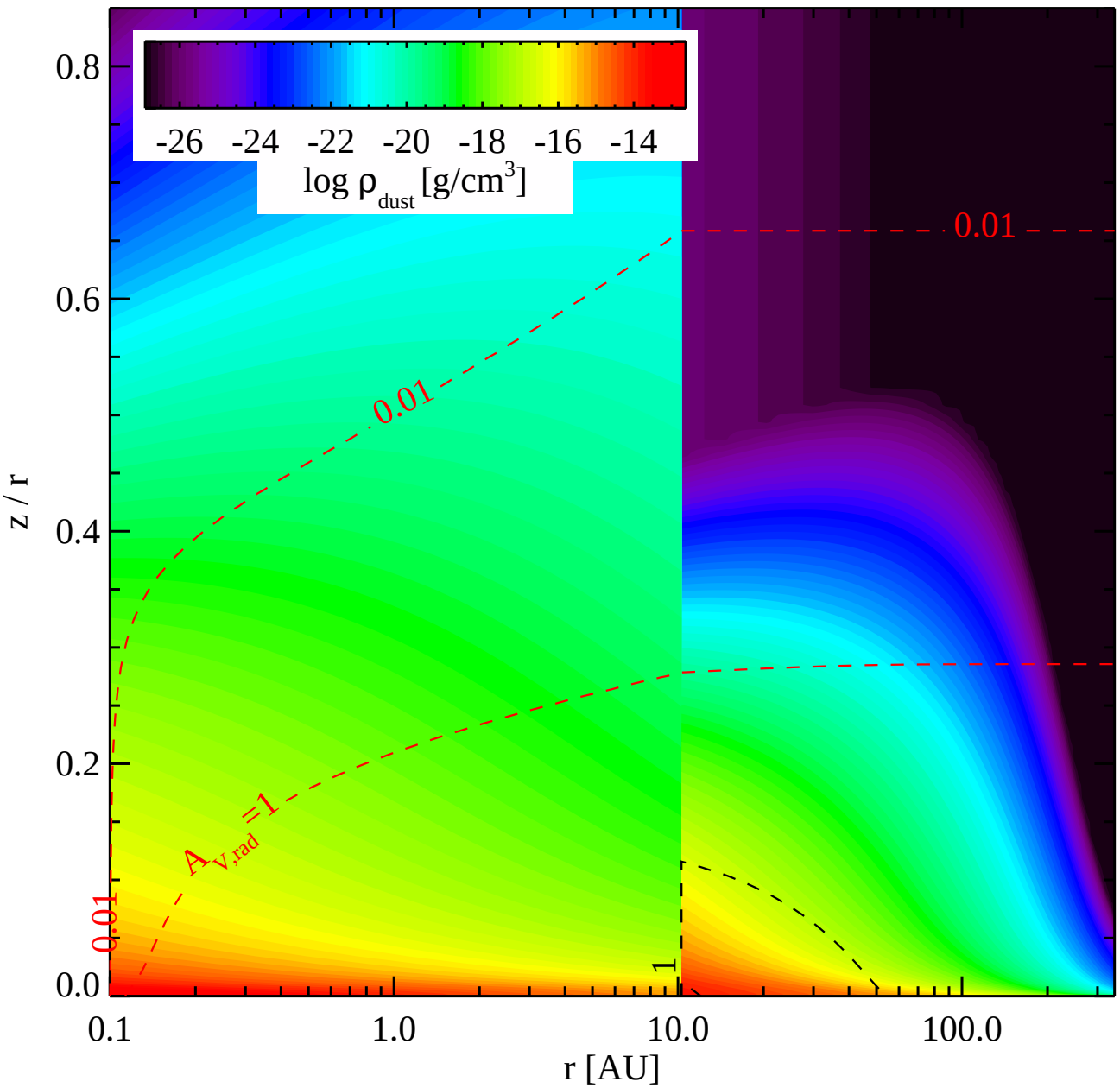
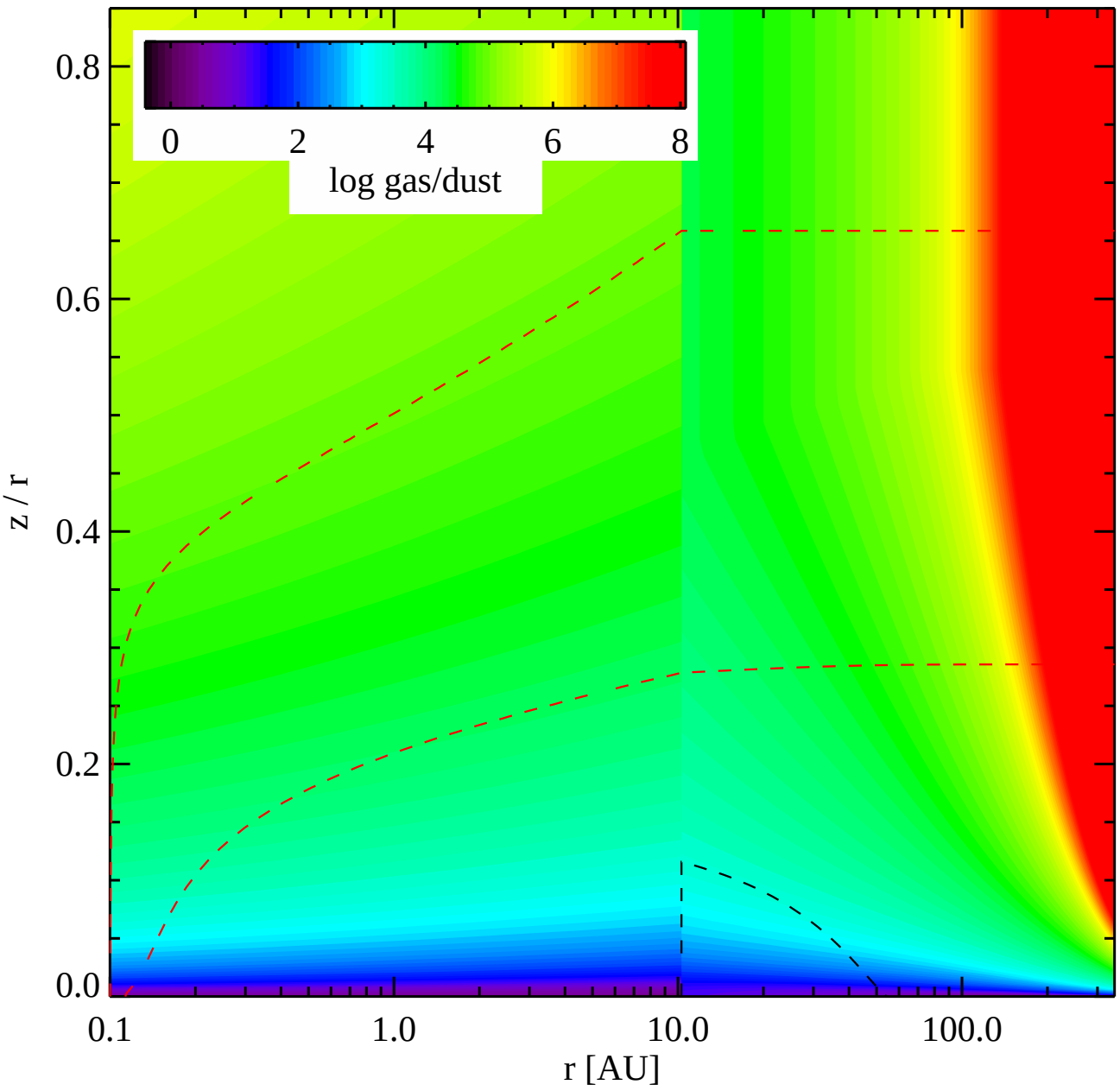
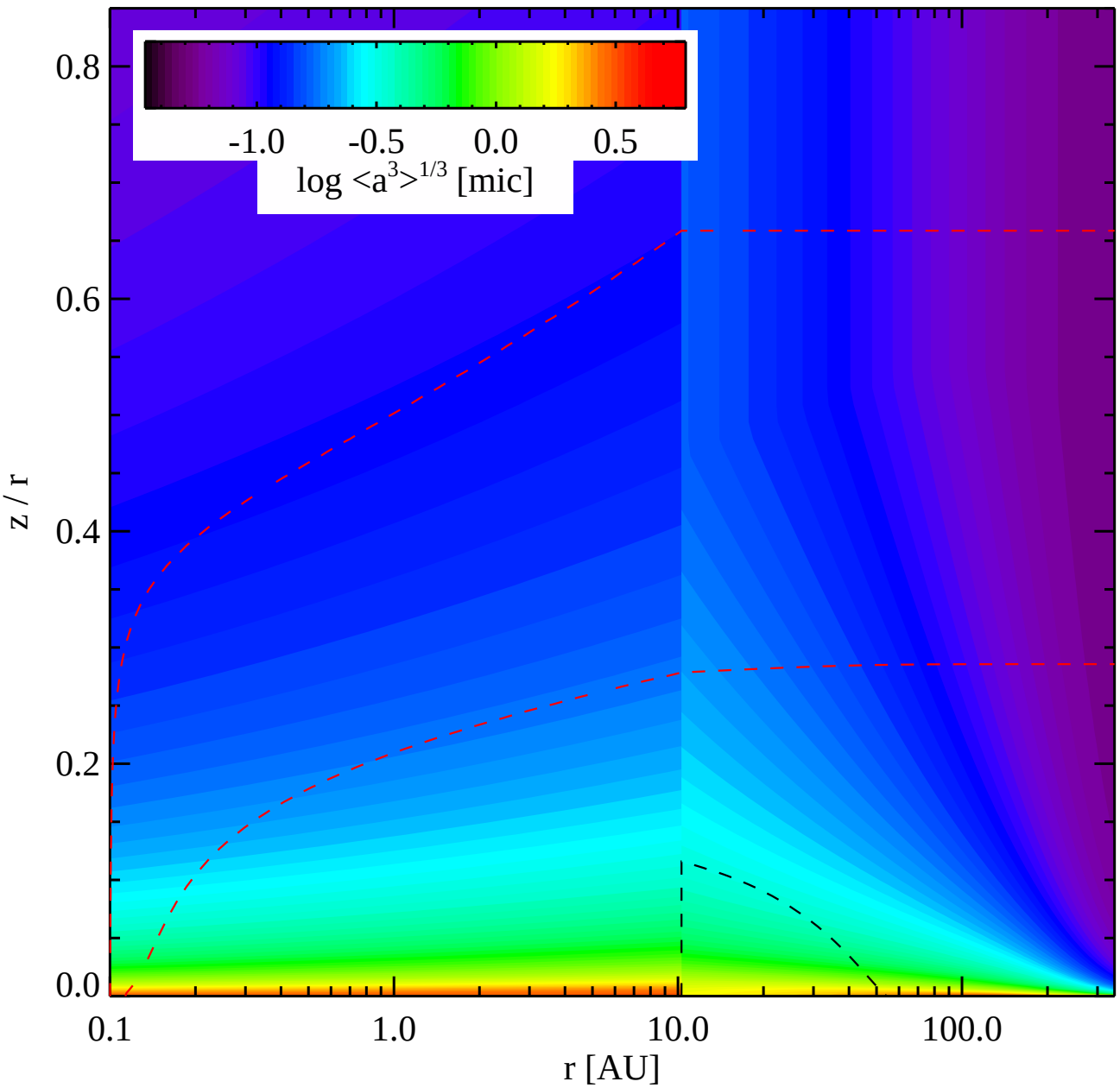
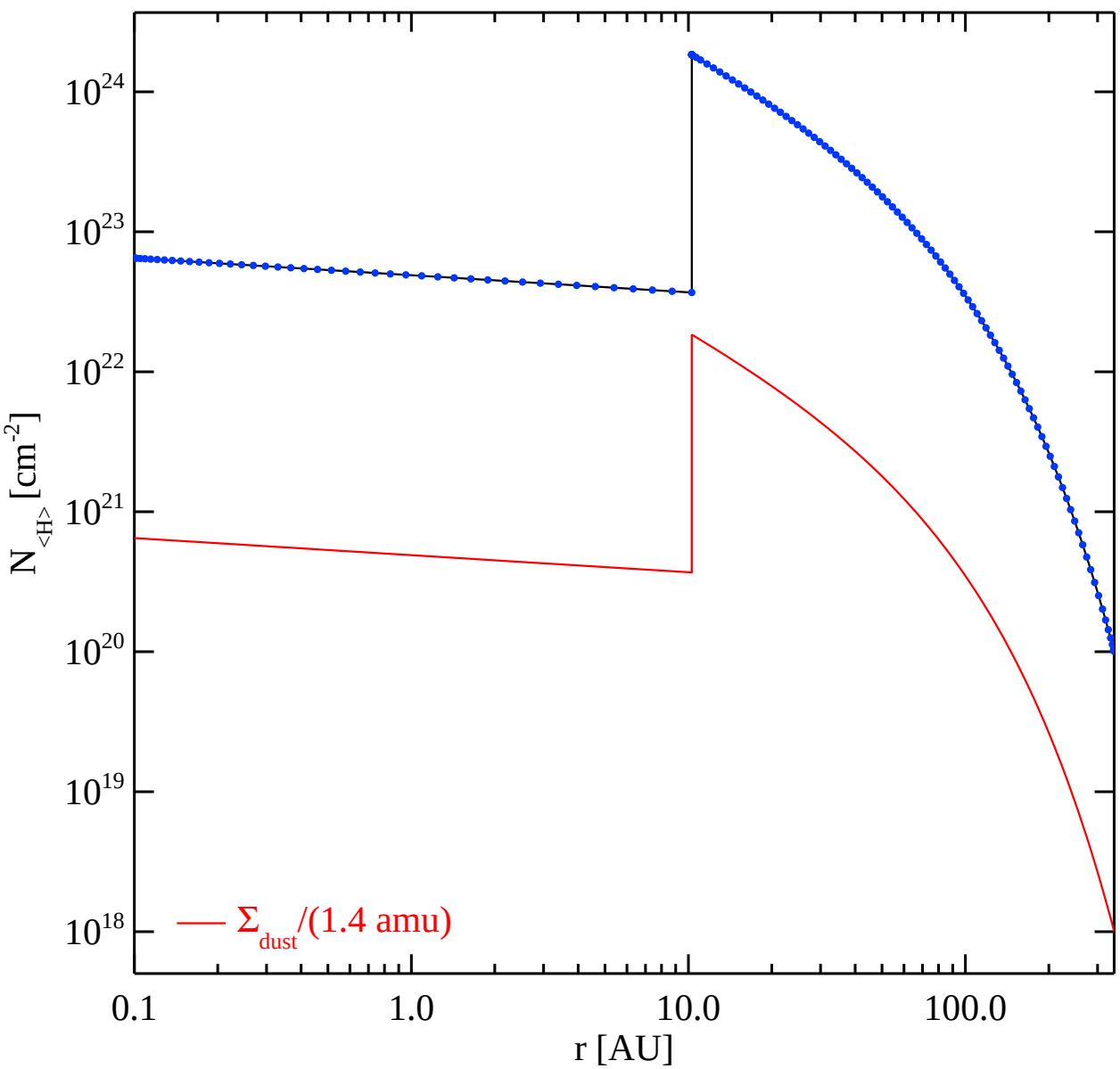
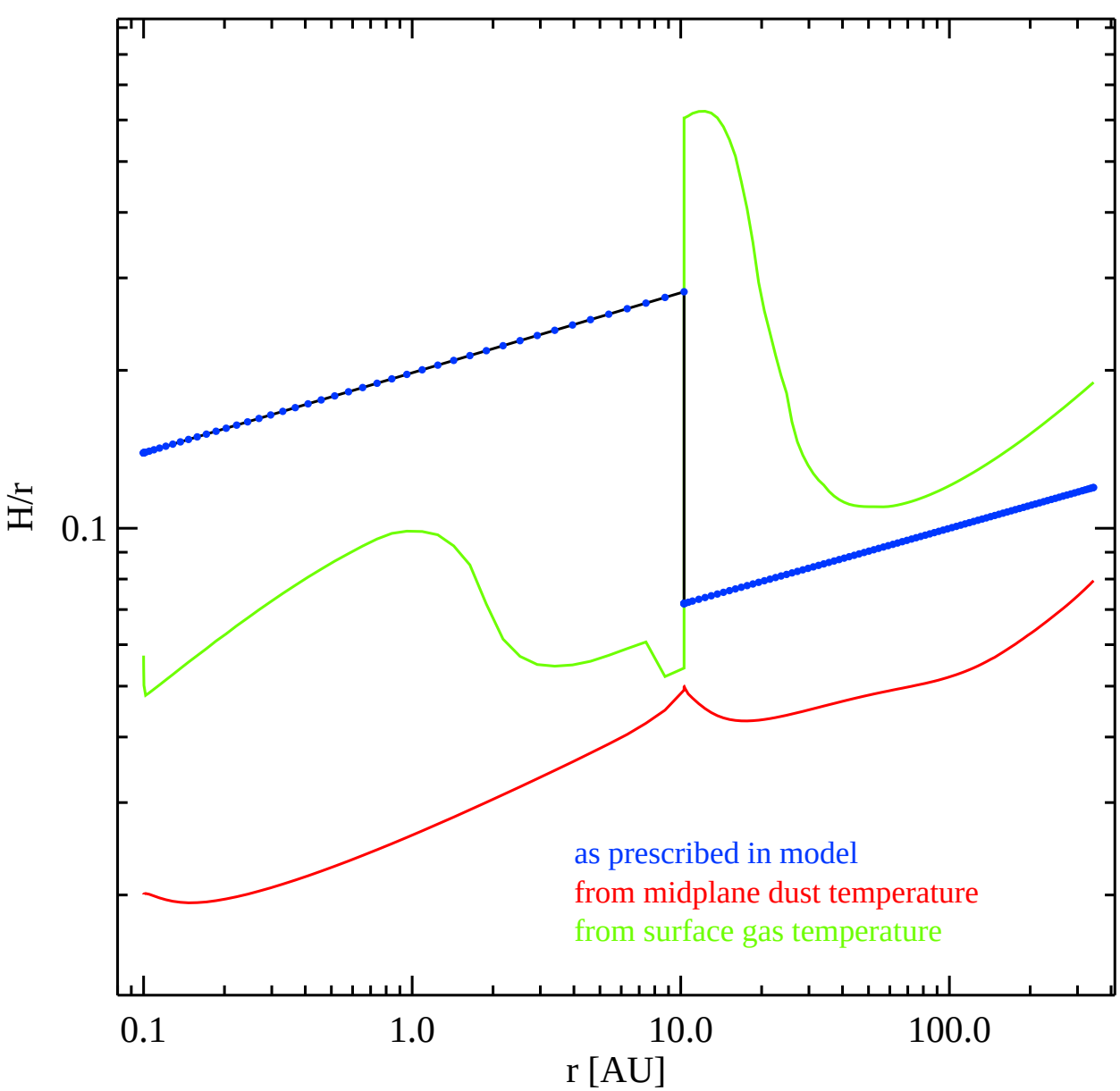

4
6
8
10
12
log n<H> [cm-3]
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

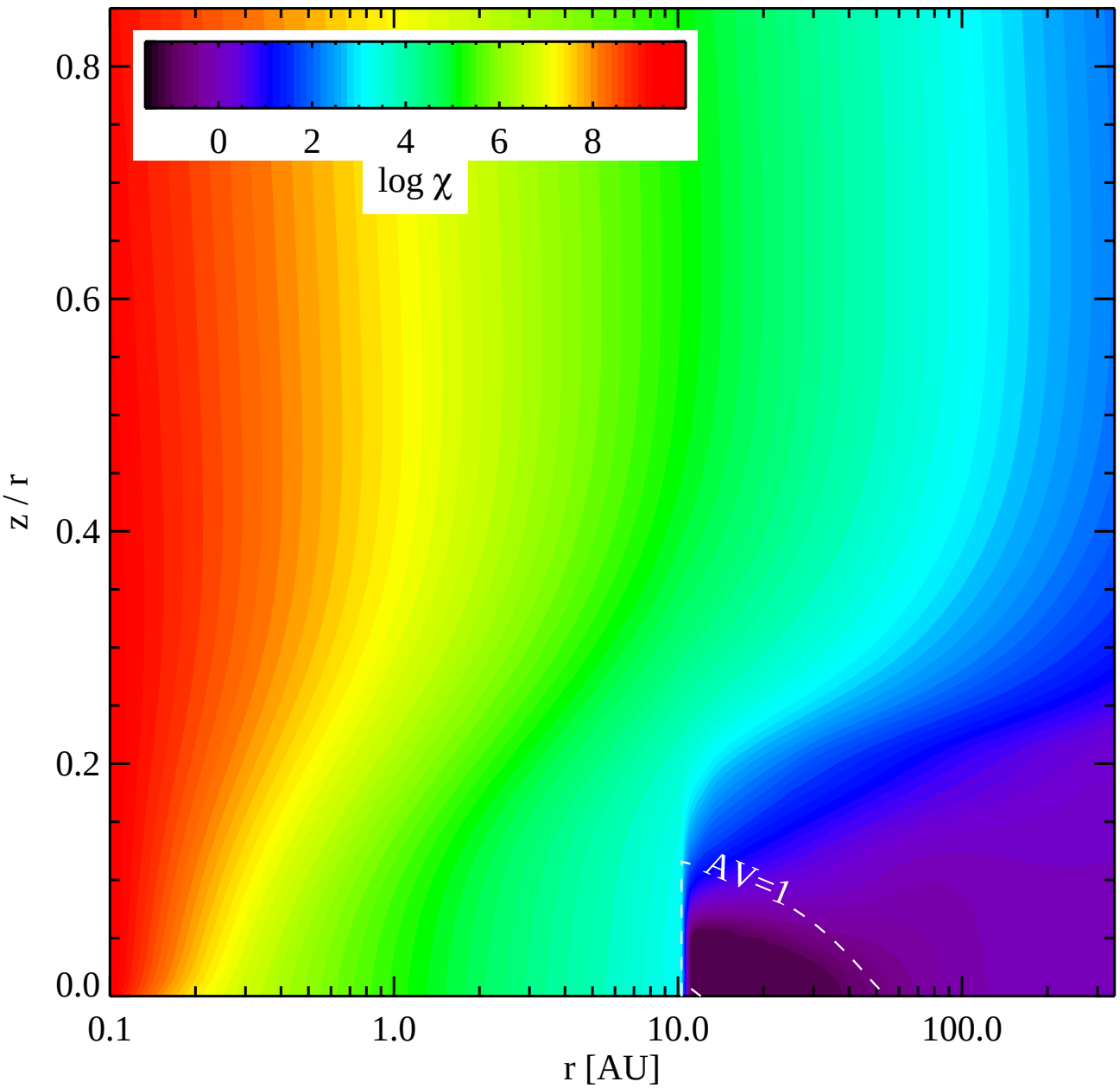

-26 -24 -22 -20 -18 -16 -14
log ρ dust [g/cm3]
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]
0.01
0.01
0.01
A V,rad =1
1

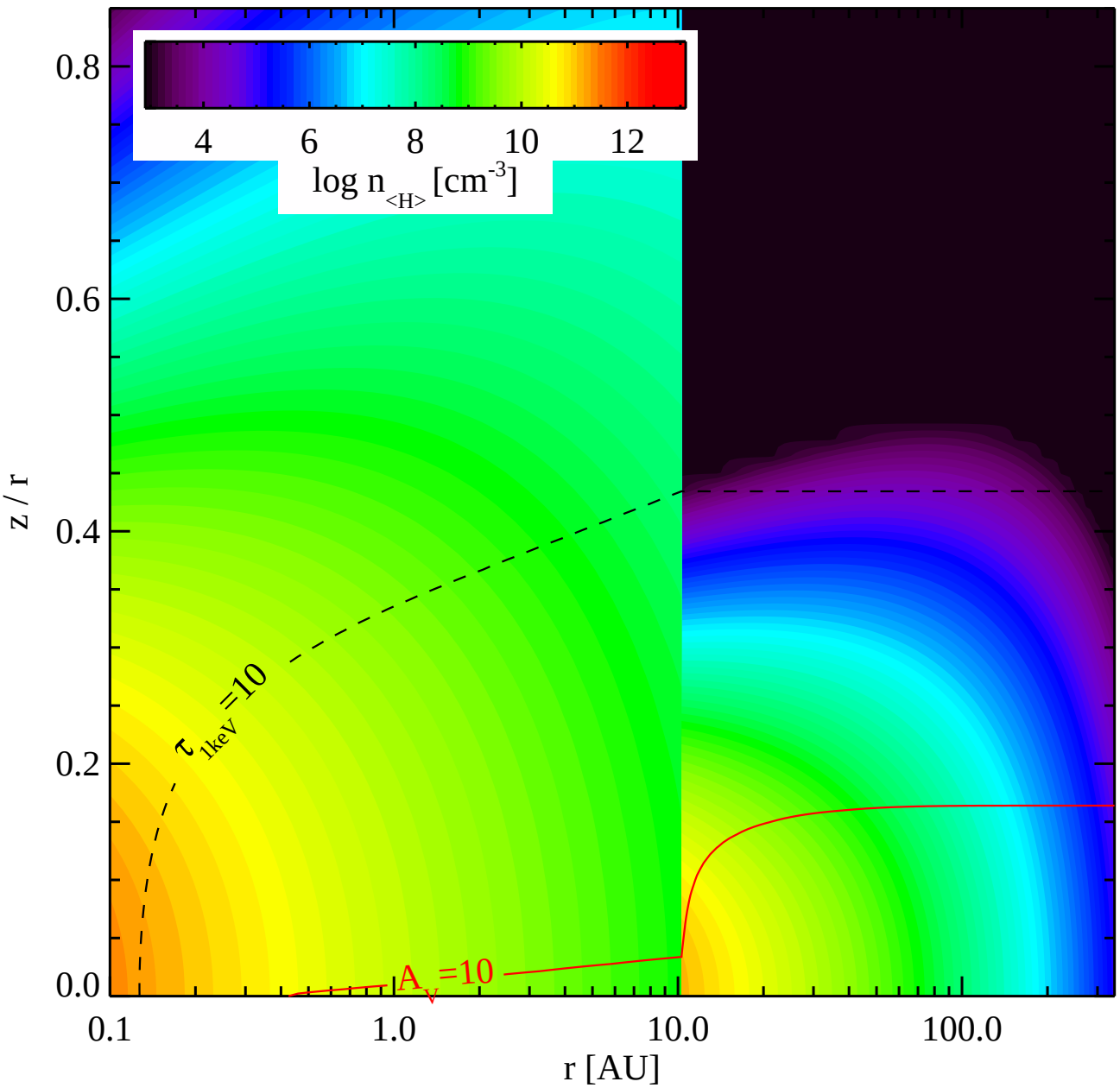

0
2
4
6
8
log gas/dust
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

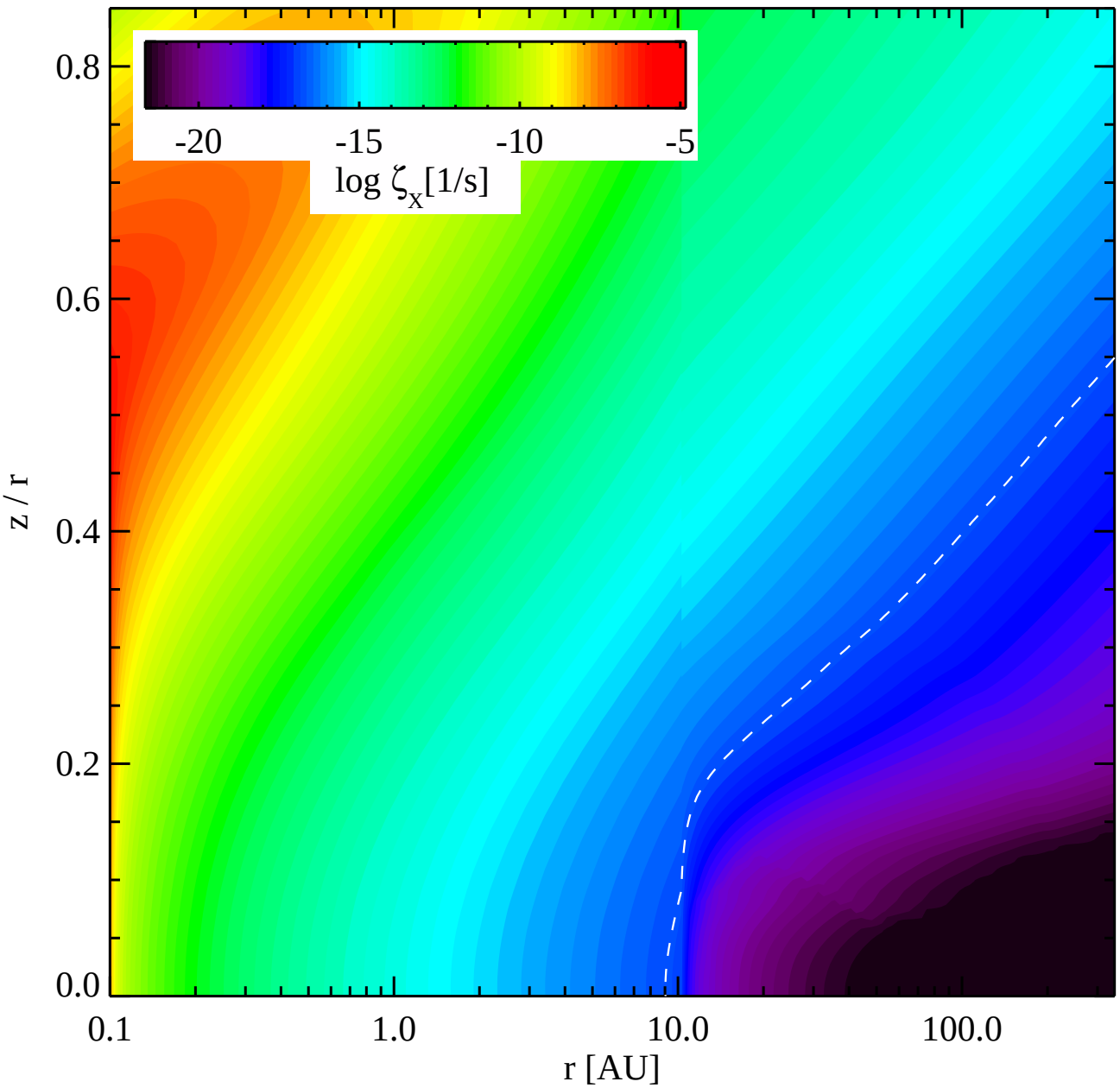

-1.0
-0.5
0.0
0.5
log <a^3>^1/3 [mic]
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

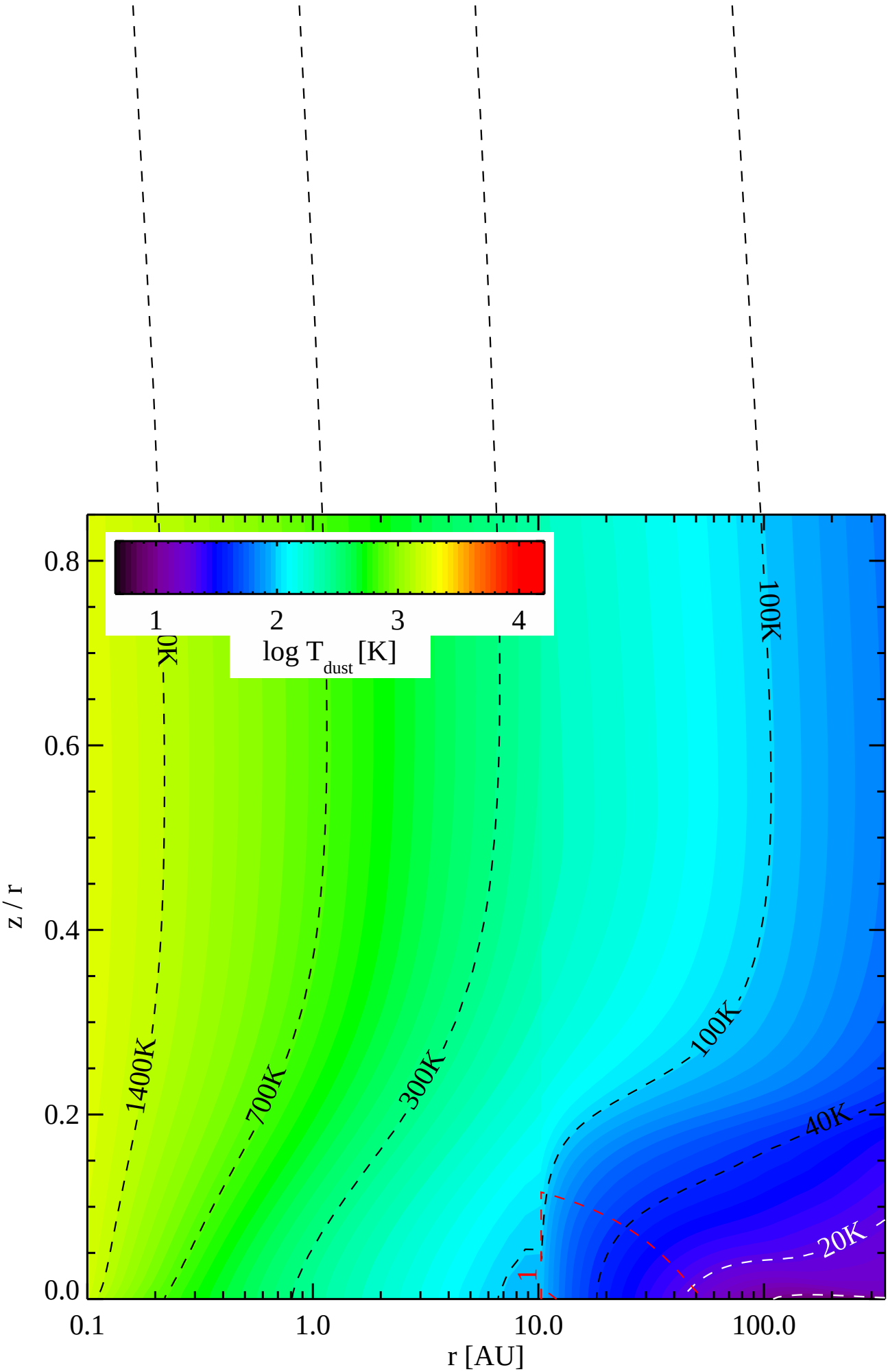

$10^{24}$
$10^{23}$
$10^{22}$
$10^{21}$
$10^{20}$
$10^{19}$
$10^{18}$
$N_{<H>}$ [cm$^{-2}$]
0.1
1.0
10.0
100.0
r [AU]
— $\Sigma_{dust}$/(1.4 amu)

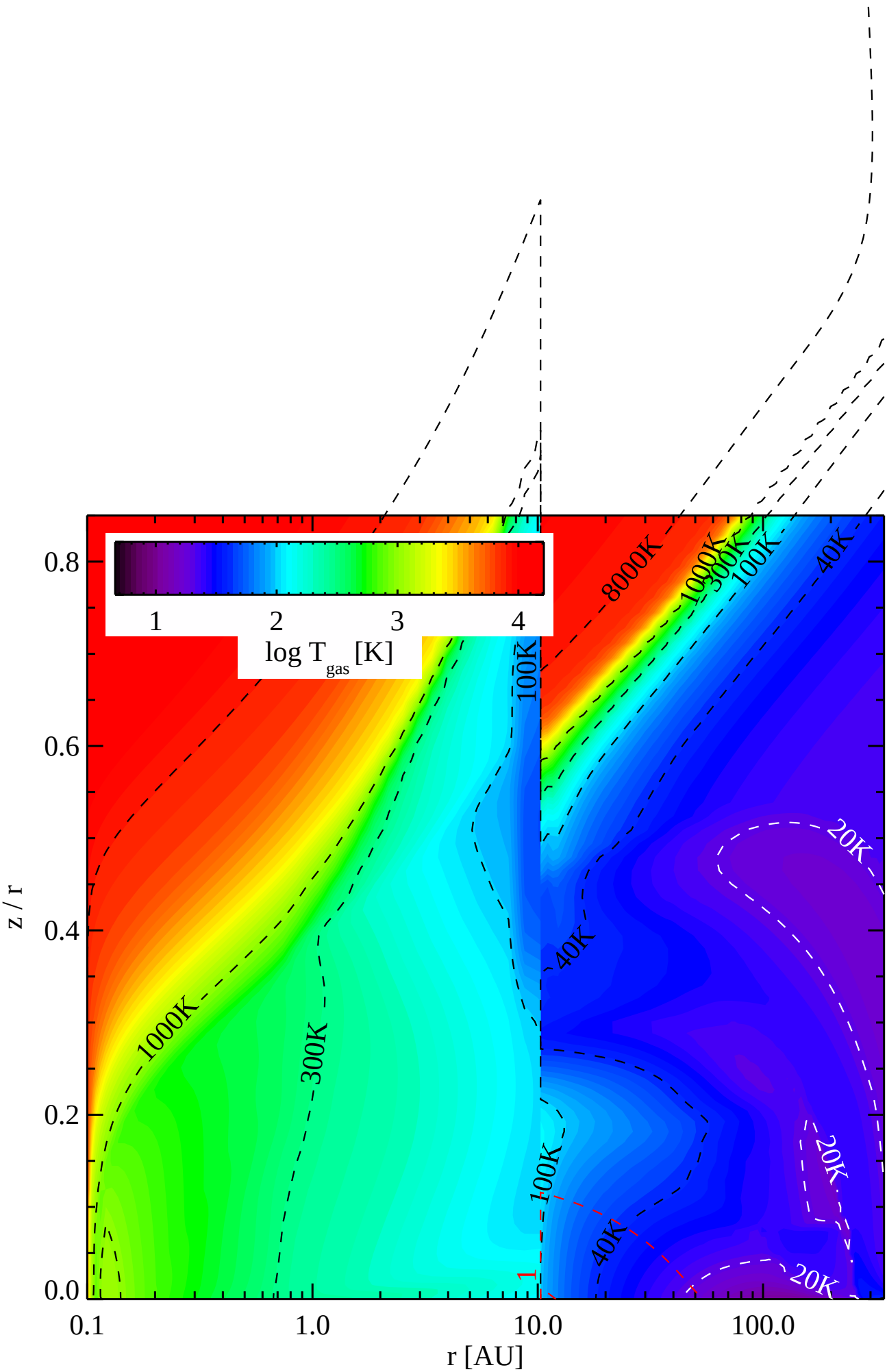

H/r
0.1
0.1
1.0
10.0
100.0
r [AU]
as prescribed in model
from midplane dust temperature
from surface gas temperature

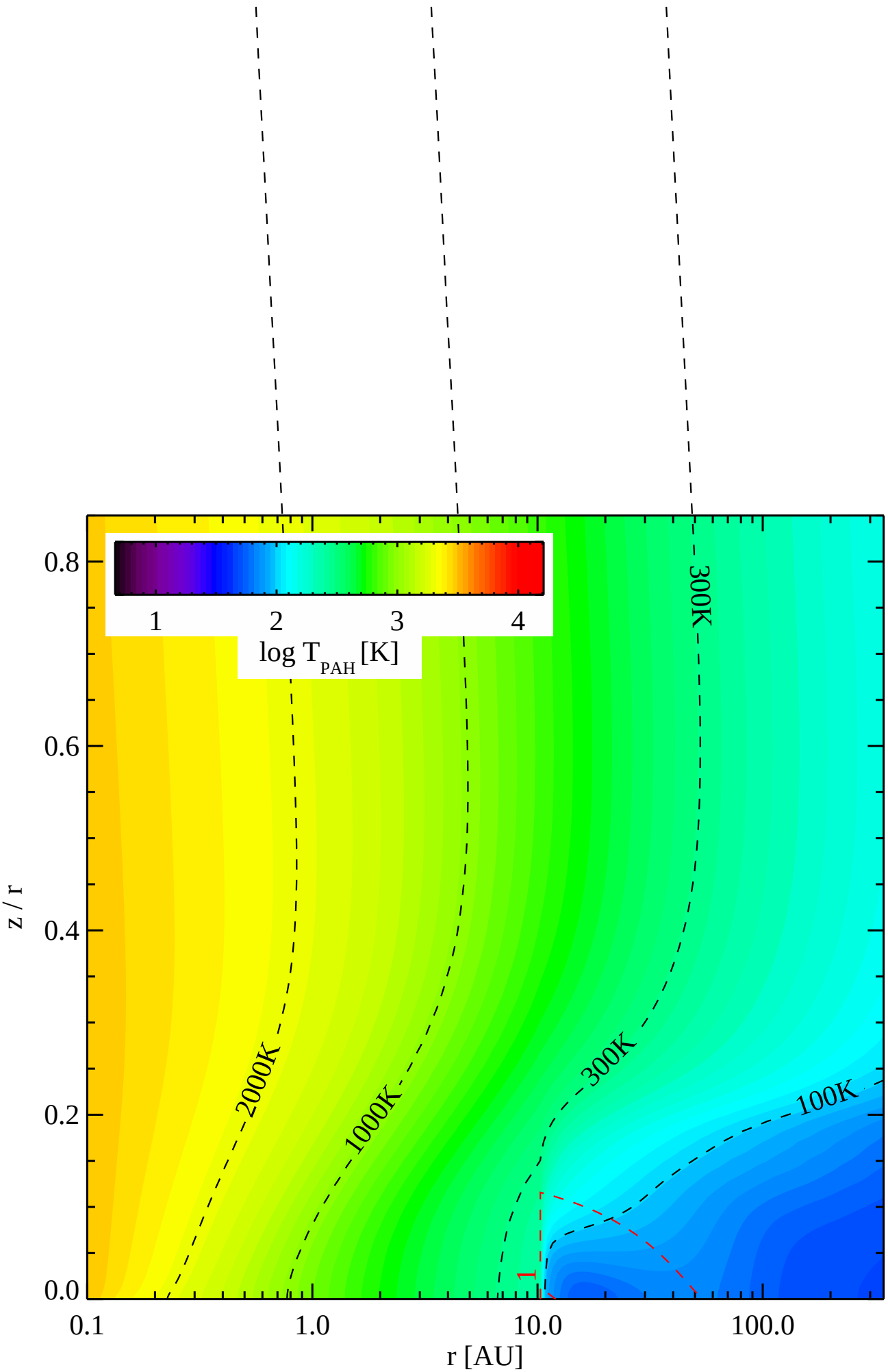

0
2
4
6
8
log χ
0.8
0.6
0.4
0.2
0.0
z / r
AV=1
0.1
1.0
10.0
100.0
r [AU]

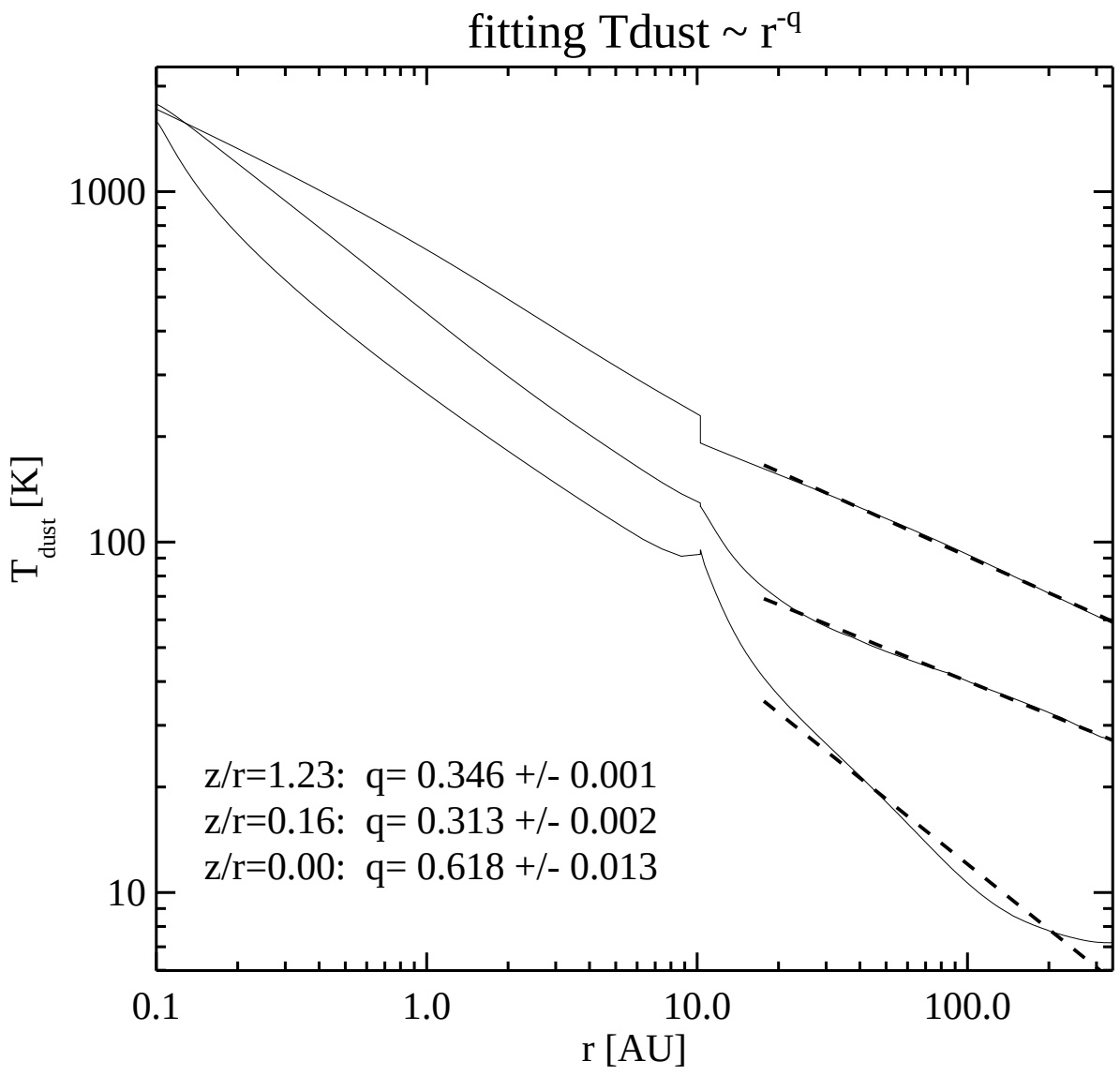

4
6
8
10
12
log n<H> [cm-3]
0.8
0.6
0.4
0.2
0.0
z / r
τ1keV=10
AV=10
0.1
1.0
10.0
100.0
r [AU]

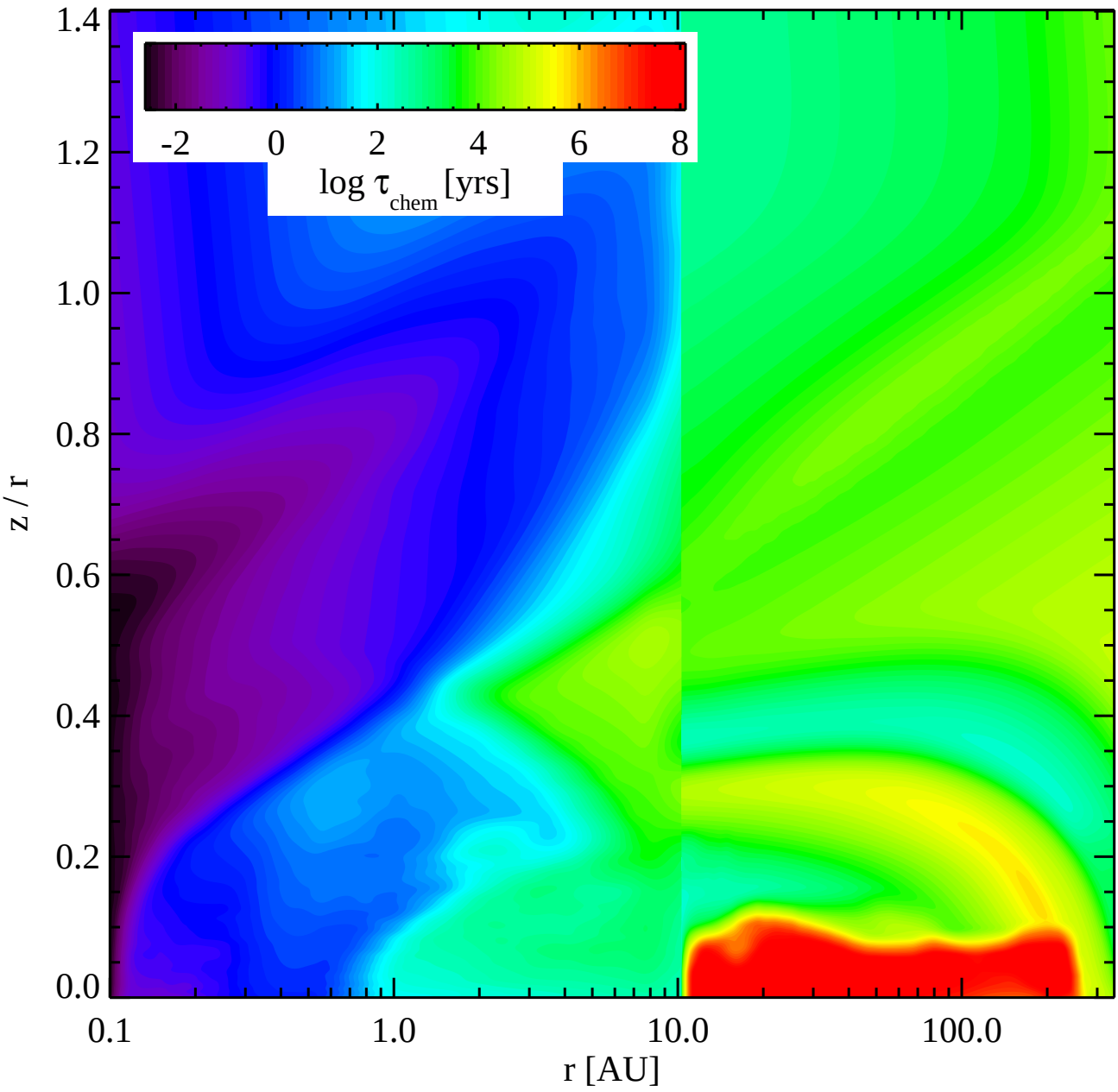

-20
-15
-10
-5
log ζ_X[1/s]
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

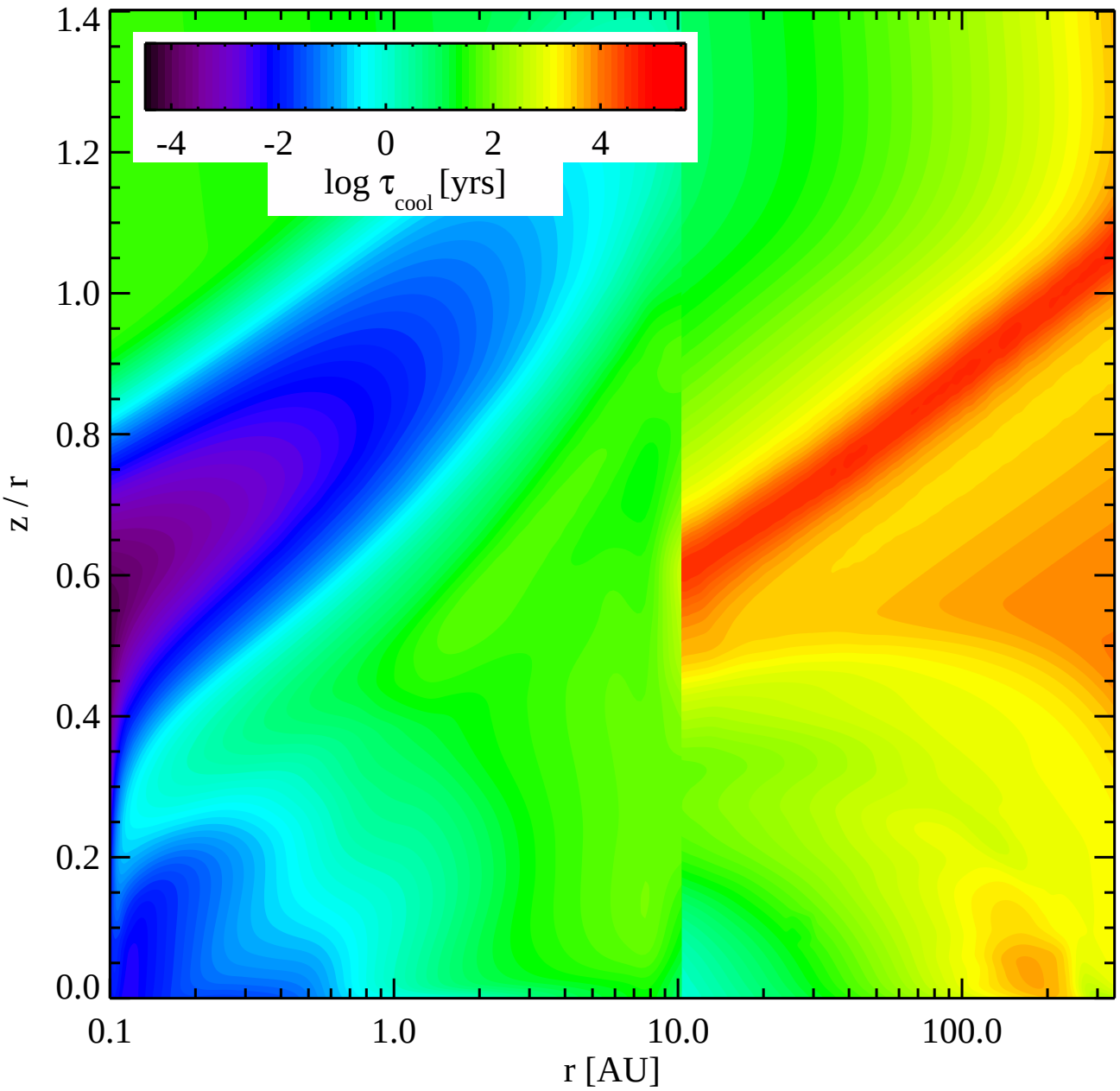

0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]
1
2
3
4
log T dust [K]
1400K
700K
300K
100K
100K
40K
20K
1

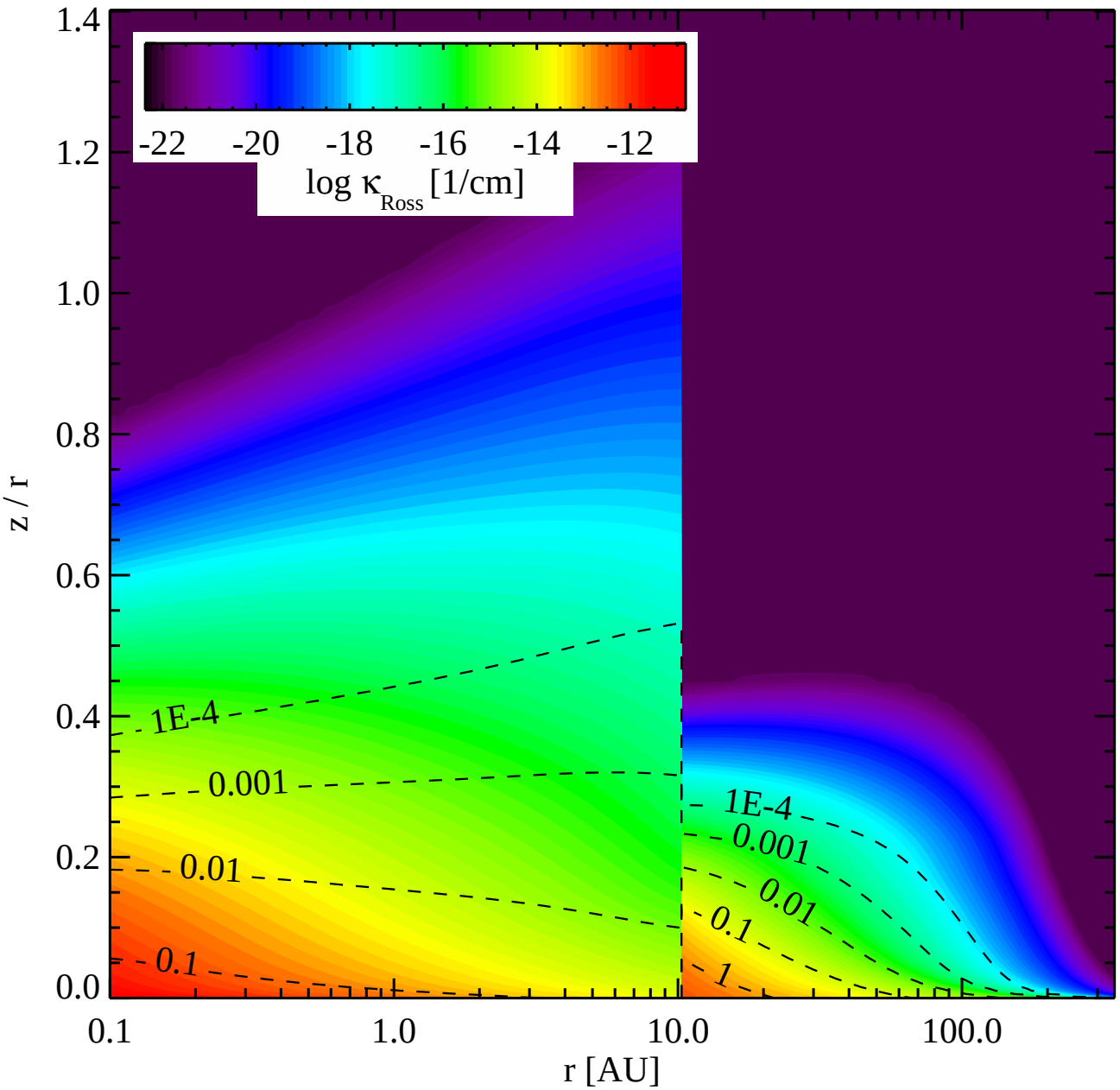

1
2
3
4
log T gas [K]
8000K
1000K
300K
100K
40K
100K
1000K
300K
40K
20K
100K
40K
20K
40K
20K
1
0.0
0.2
0.4
0.6
0.8
z / r
0.1
1.0
10.0
100.0
r [AU]

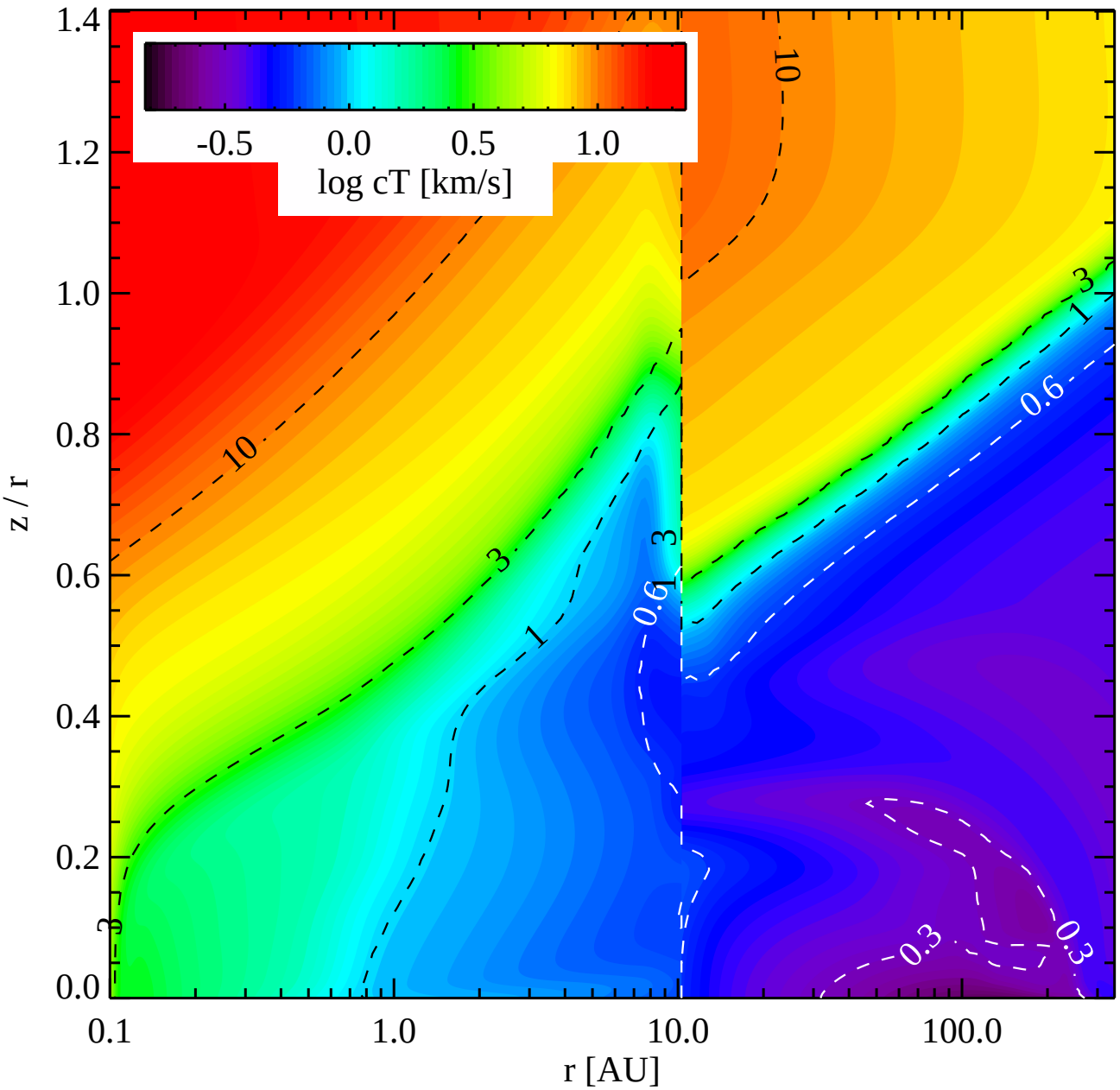

0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]
1
2
3
4
log T_PAH [K]
2000K
1000K
300K
300K
100K
1

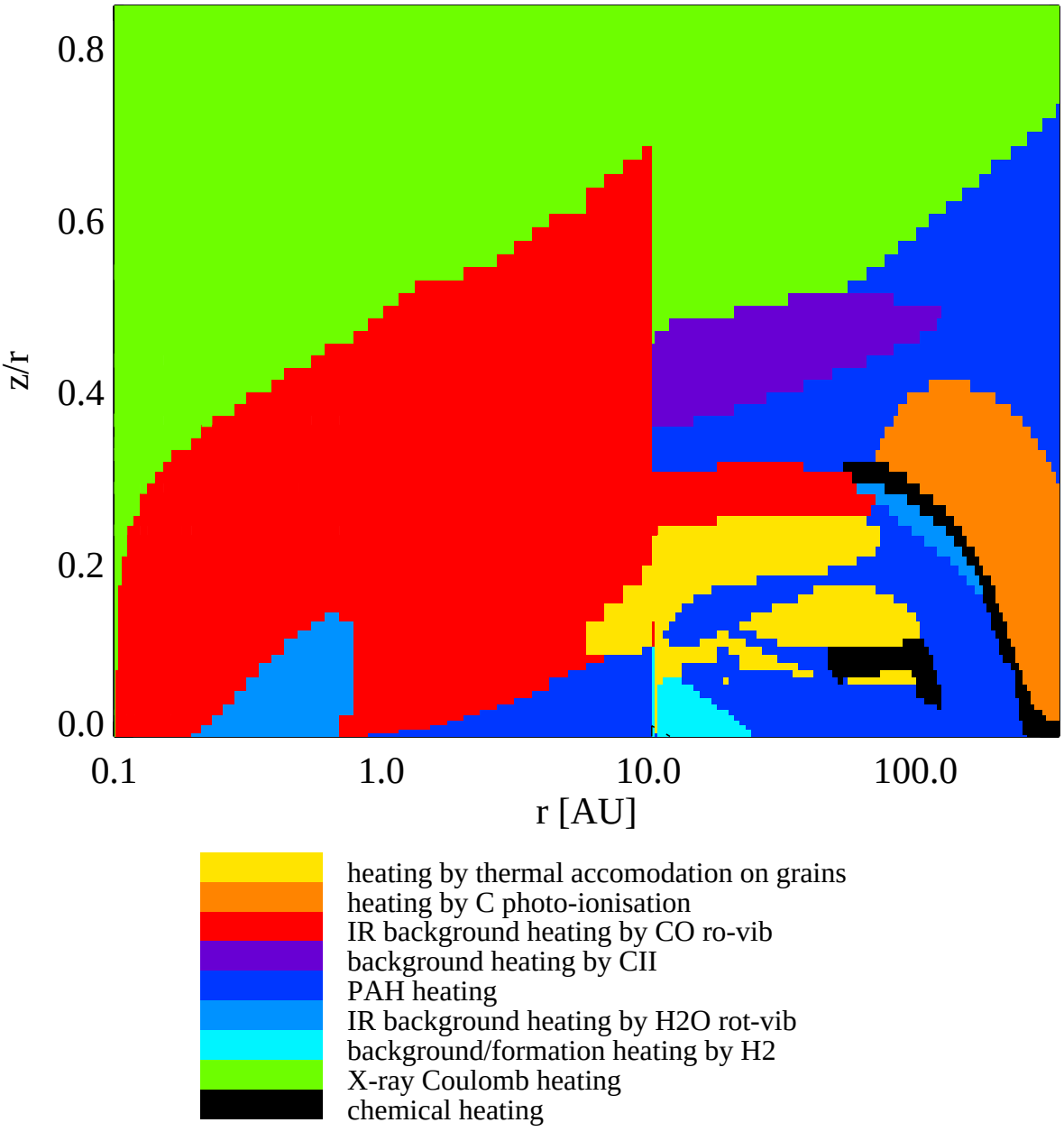

fitting Tdust ~ r^-q
1000
100
10
T dust [K]
0.1
1.0
10.0
100.0
r [AU]
z/r=1.23: q= 0.346 +/- 0.001
z/r=0.16: q= 0.313 +/- 0.002
z/r=0.00: q= 0.618 +/- 0.013

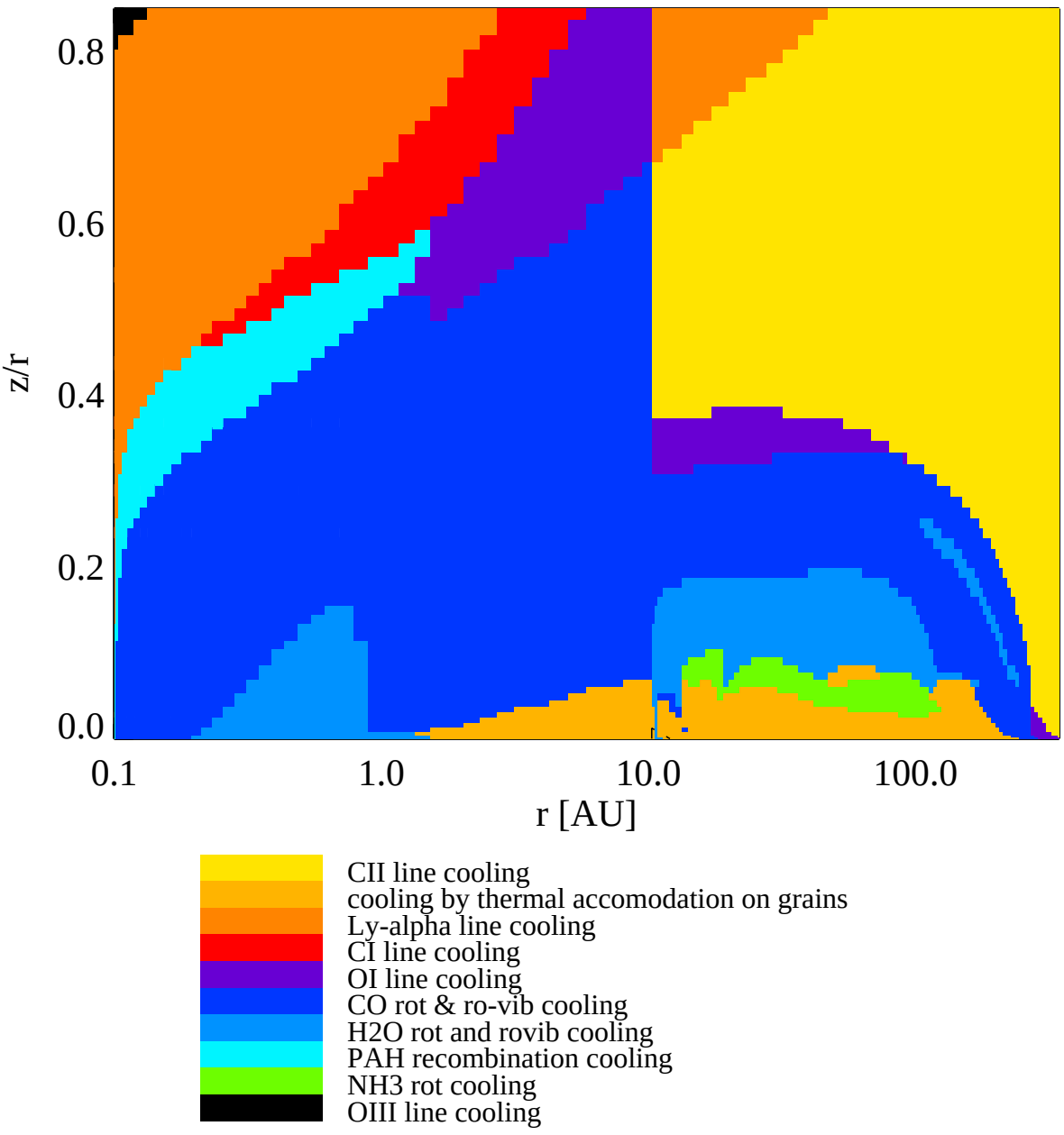

-2
0
2
4
6
8
log τ chem [yrs]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

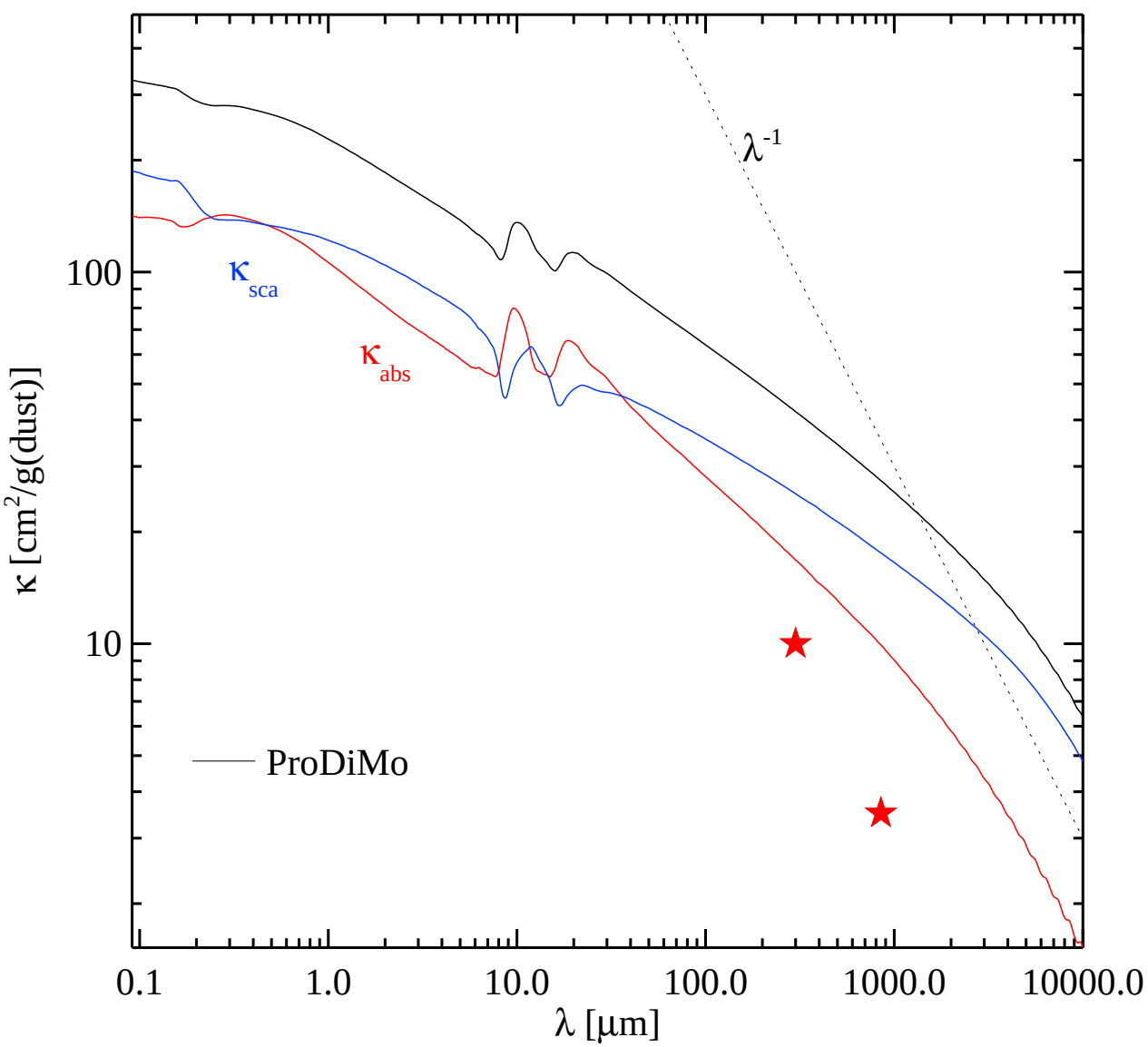

-4
-2
0
2
4
log τ cool [yrs]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

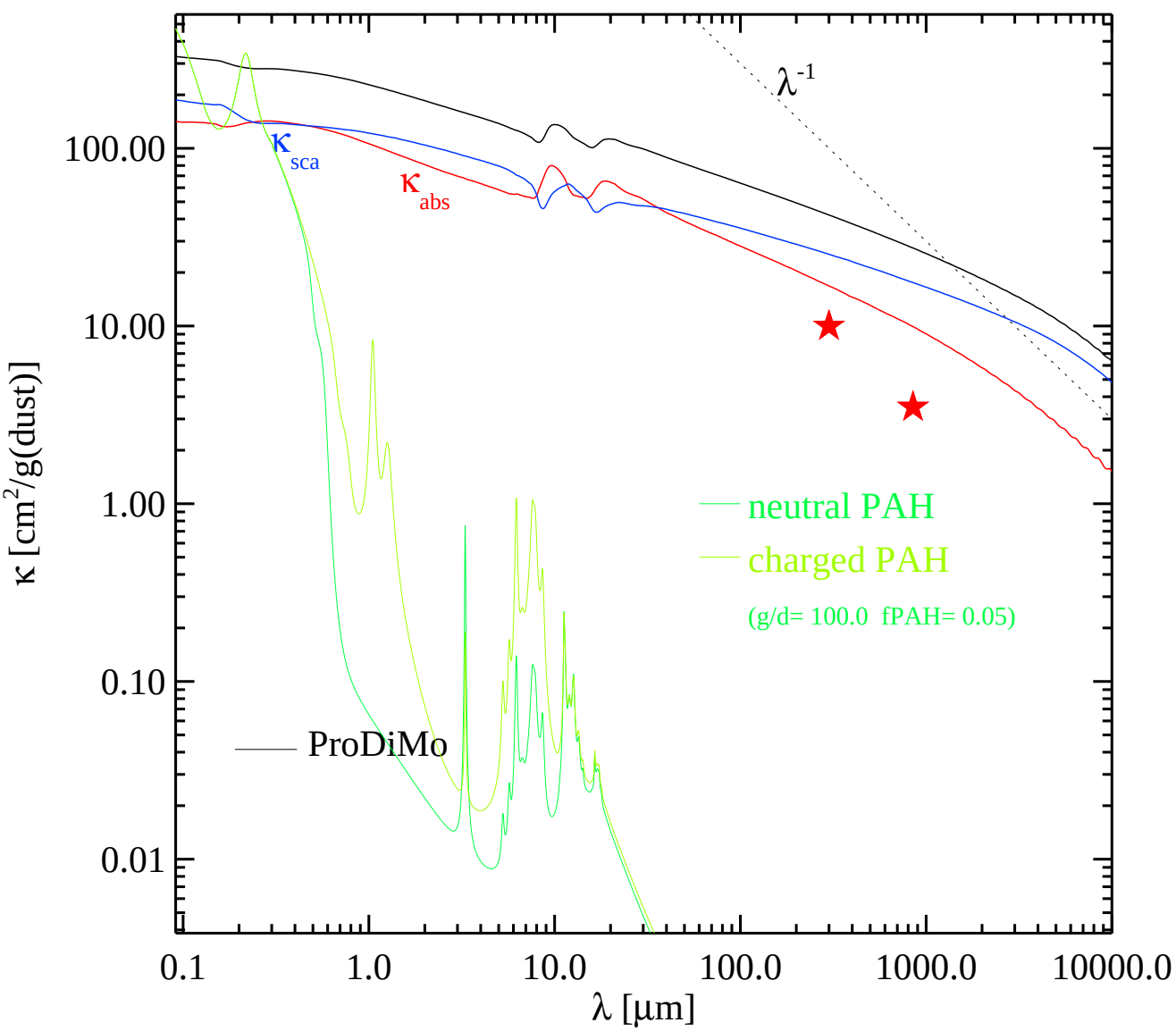

-22
-20
-18
-16
-14
-12
log κ Ross [1/cm]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
z / r
1E-4
0.001
0.01
0.1
1E-4
0.001
0.01
0.1
1
0.1
1.0
10.0
100.0
r [AU]

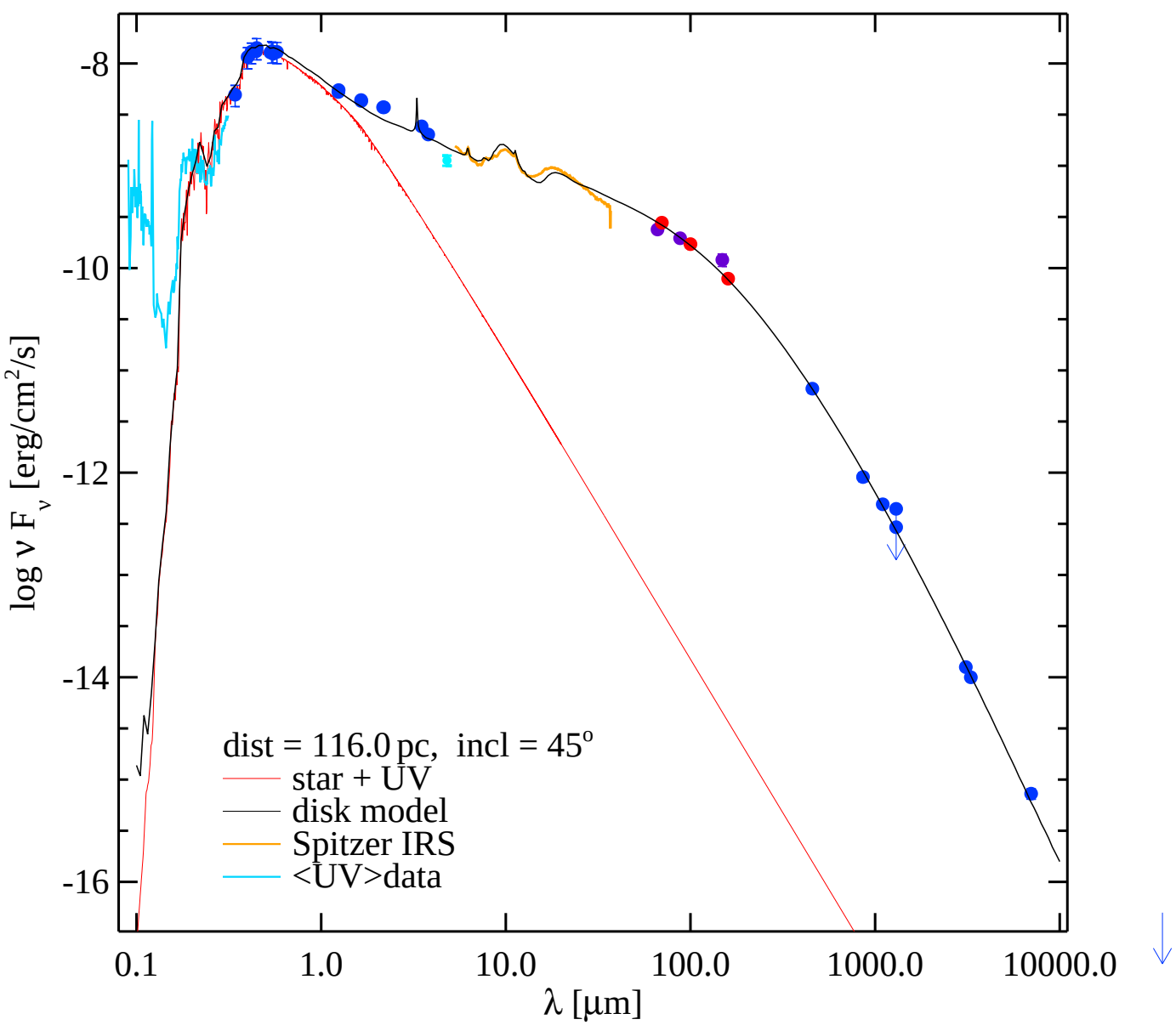

-0.5
0.0
0.5
1.0
log cT [km/s]
10
3
1
0.6
0.3
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

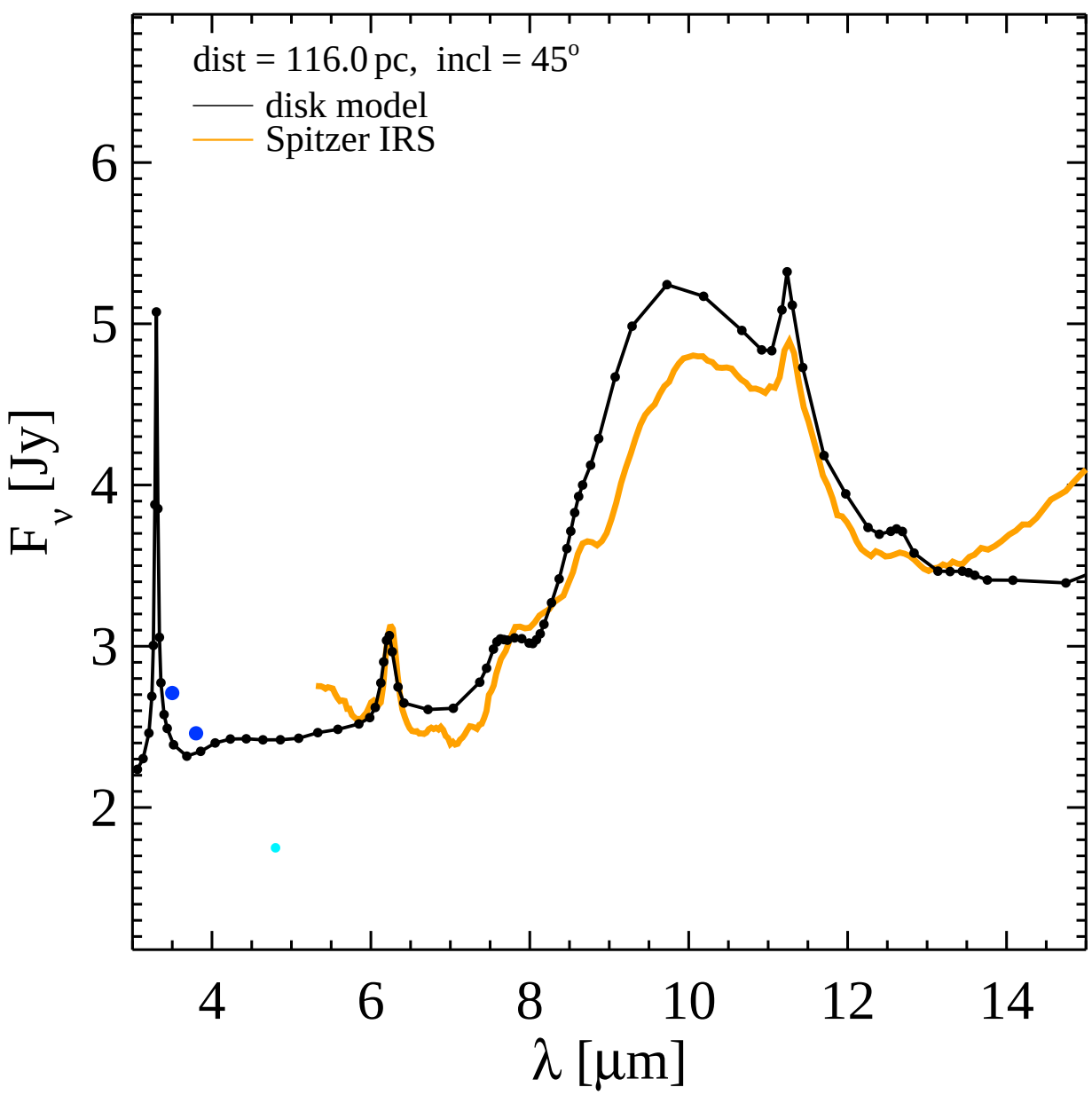

0.8
0.6
0.4
0.2
0.0
z/r
0.1
1.0
10.0
100.0
r [AU]
heating by thermal accomodation on grains
heating by C photo-ionisation
IR background heating by CO ro-vib
background heating by CII
PAH heating
IR background heating by H2O rot-vib
background/formation heating by H2
X-ray Coulomb heating
chemical heating

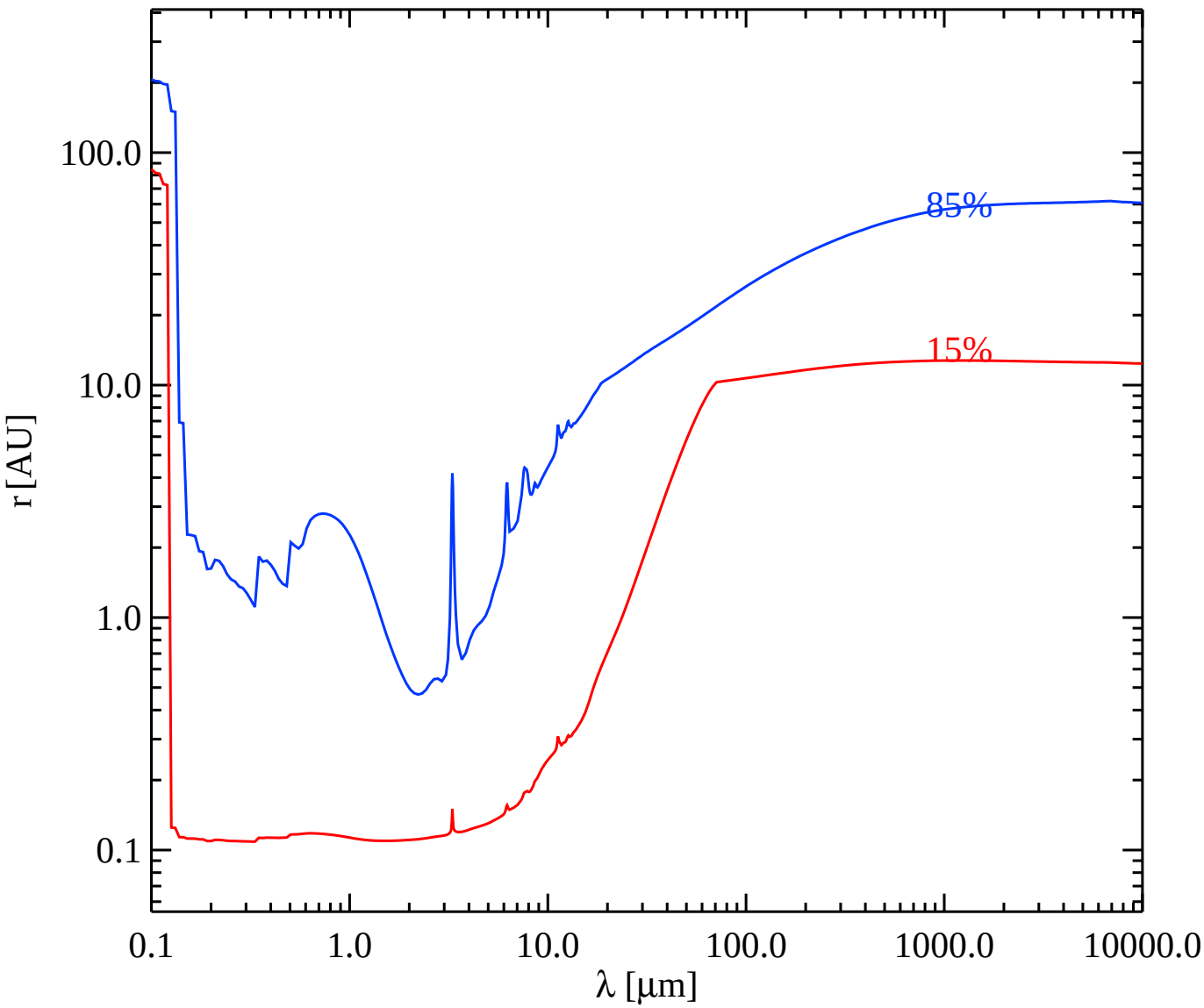

0.8
0.6
0.4
0.2
0.0
z/r
0.1
1.0
10.0
100.0
r [AU]
CII line cooling
cooling by thermal accomodation on grains
Ly-alpha line cooling
CI line cooling
OI line cooling
CO rot & ro-vib cooling
H2O rot and rovib cooling
PAH recombination cooling
NH3 rot cooling
OIII line cooling

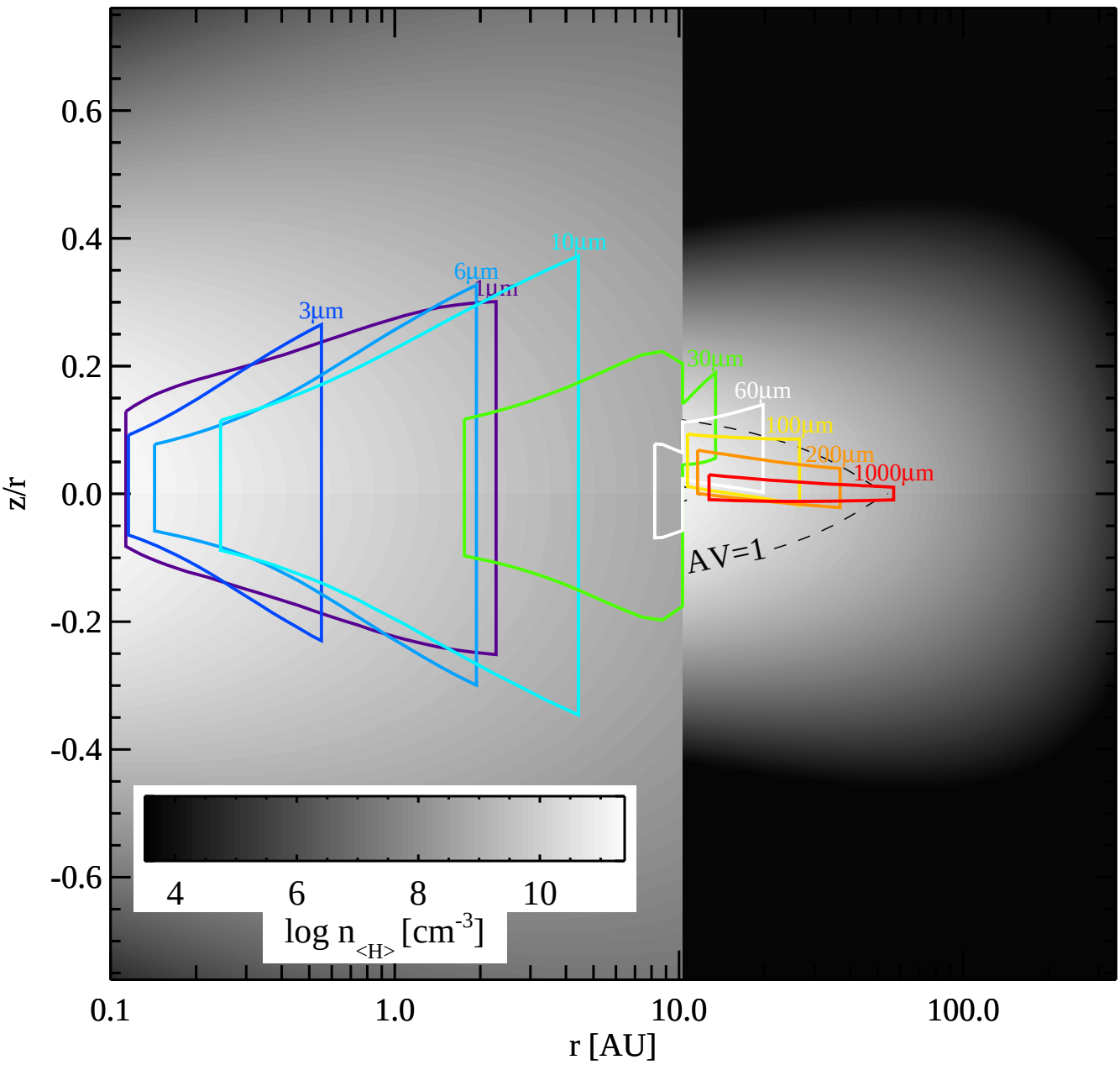

λ^-1
κ sca
κ abs
100
10
ProDiMo
κ [cm²/g(dust)]
0.1
1.0
10.0
100.0
1000.0
10000.0
λ [μm]

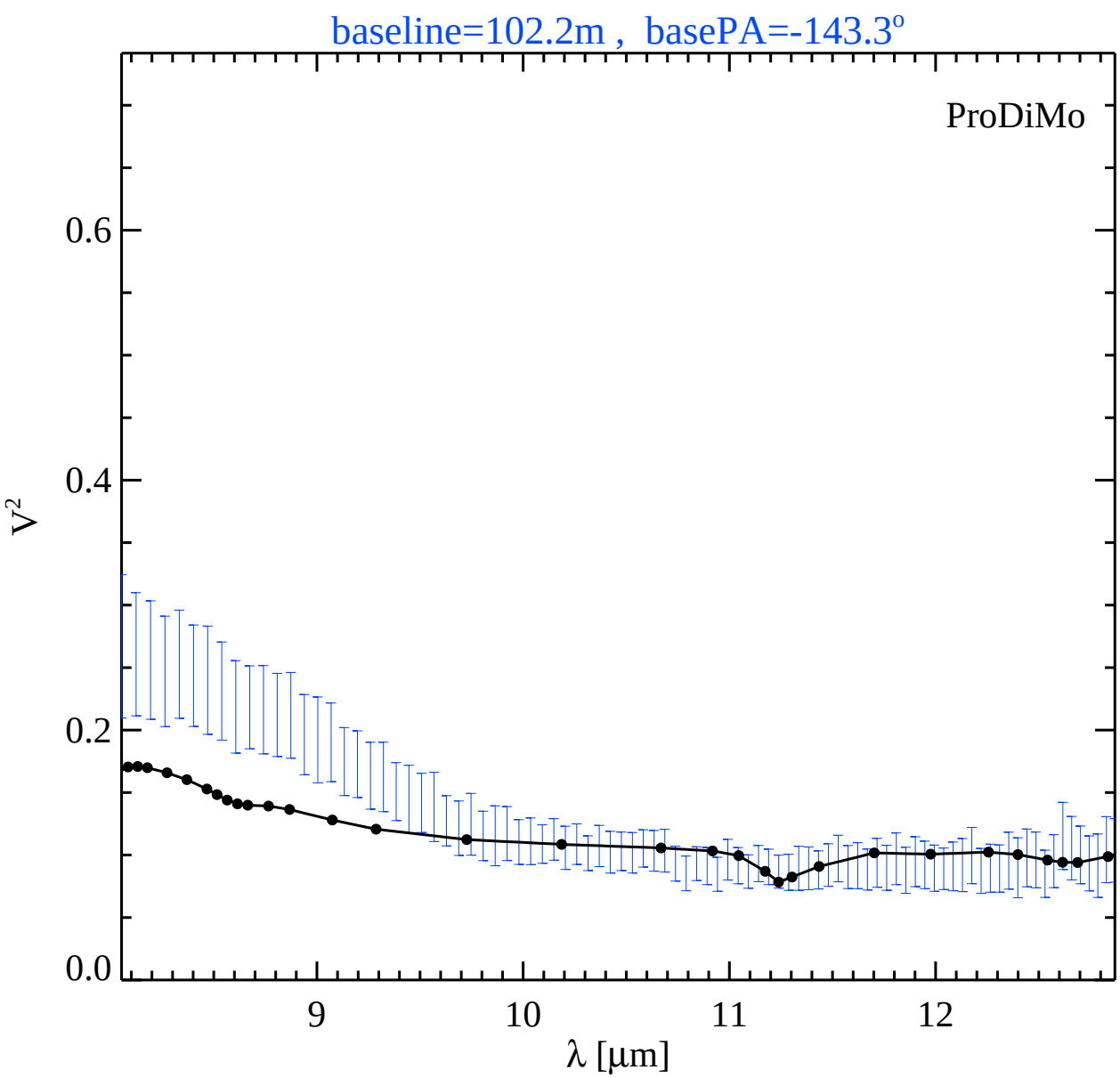

λ^-1
κ sca
κ abs
neutral PAH
charged PAH
(g/d= 100.0 fPAH= 0.05)
ProDiMo
100.00
10.00
1.00
0.10
0.01
κ [cm²/g(dust)]
0.1
1.0
10.0
100.0
1000.0
10000.0
λ [μm]

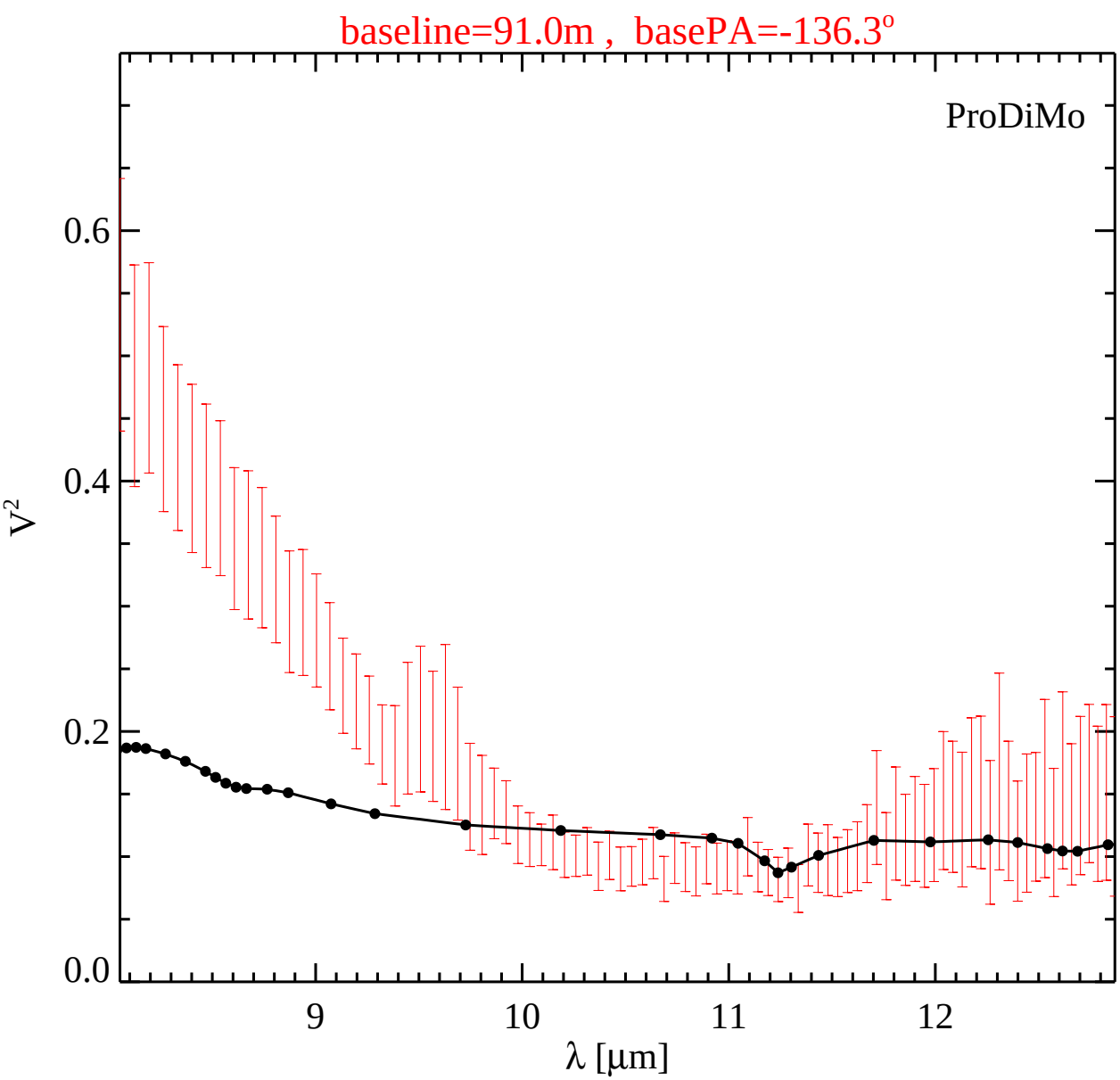

-8
-10
-12
-14
-16
log ν F_ν [erg/cm²/s]
0.1
1.0
10.0
100.0
1000.0
10000.0
λ [μm]
dist = 116.0 pc, incl = 45°
star + UV
disk model
Spitzer IRS
<UV>data

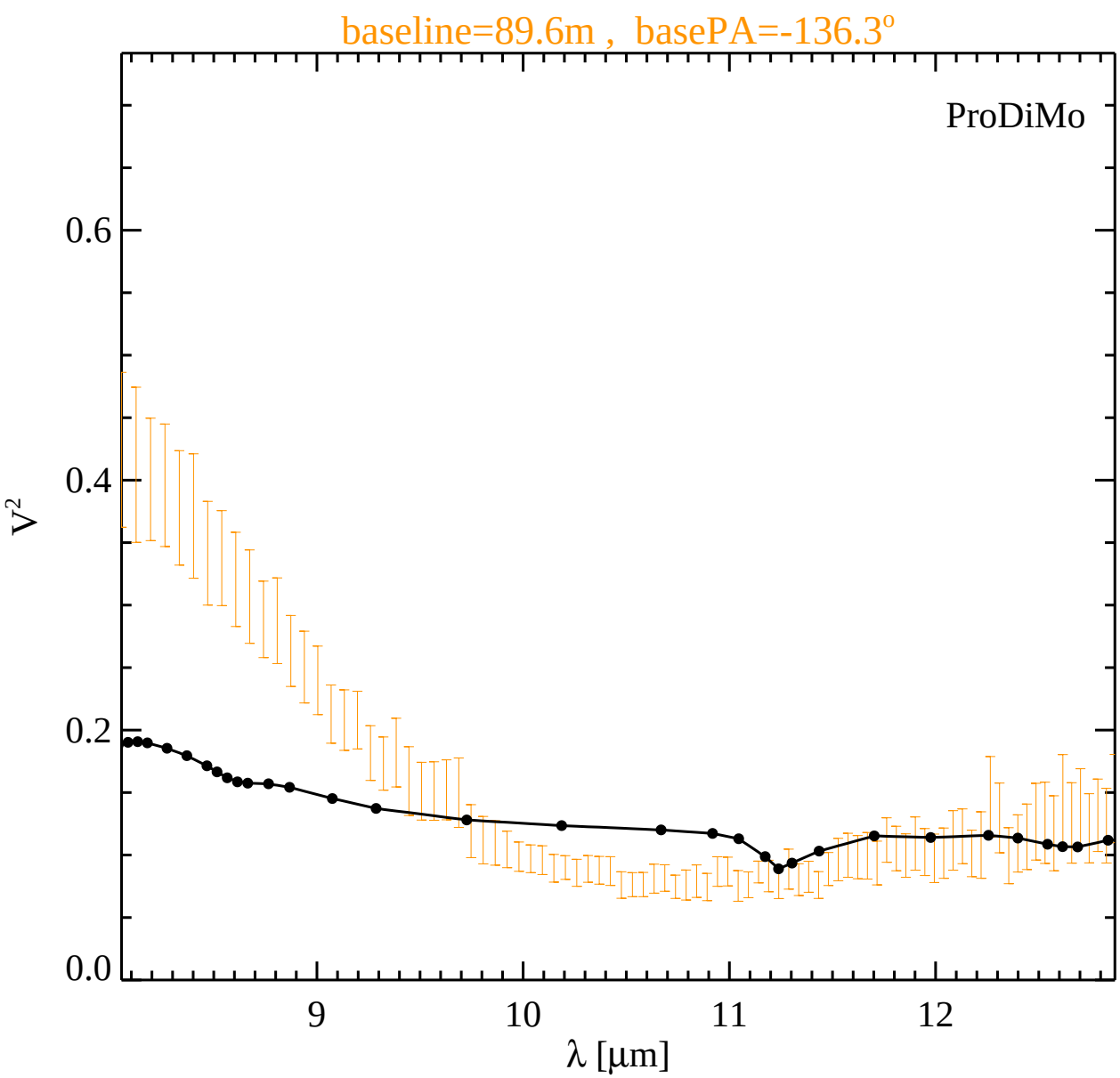

dist = 116.0 pc, incl = 45°
disk model
Spitzer IRS
F_ν [Jy]
λ [μm]
2
3
4
5
6
4
6
8
10
12
14

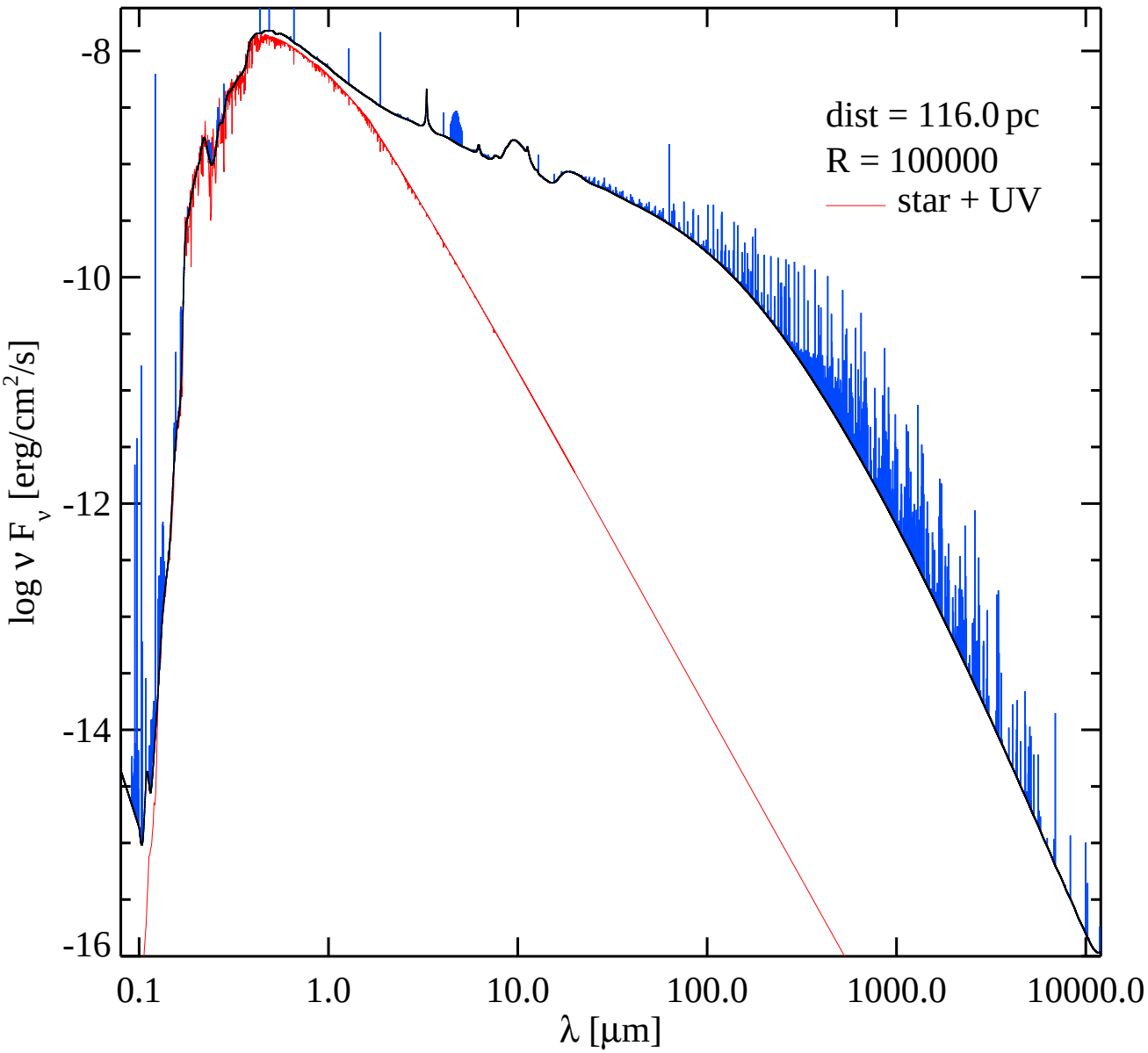

100.0
10.0
1.0
0.1
r [AU]
85%
15%
0.1
1.0
10.0
100.0
1000.0
10000.0
λ [μm]

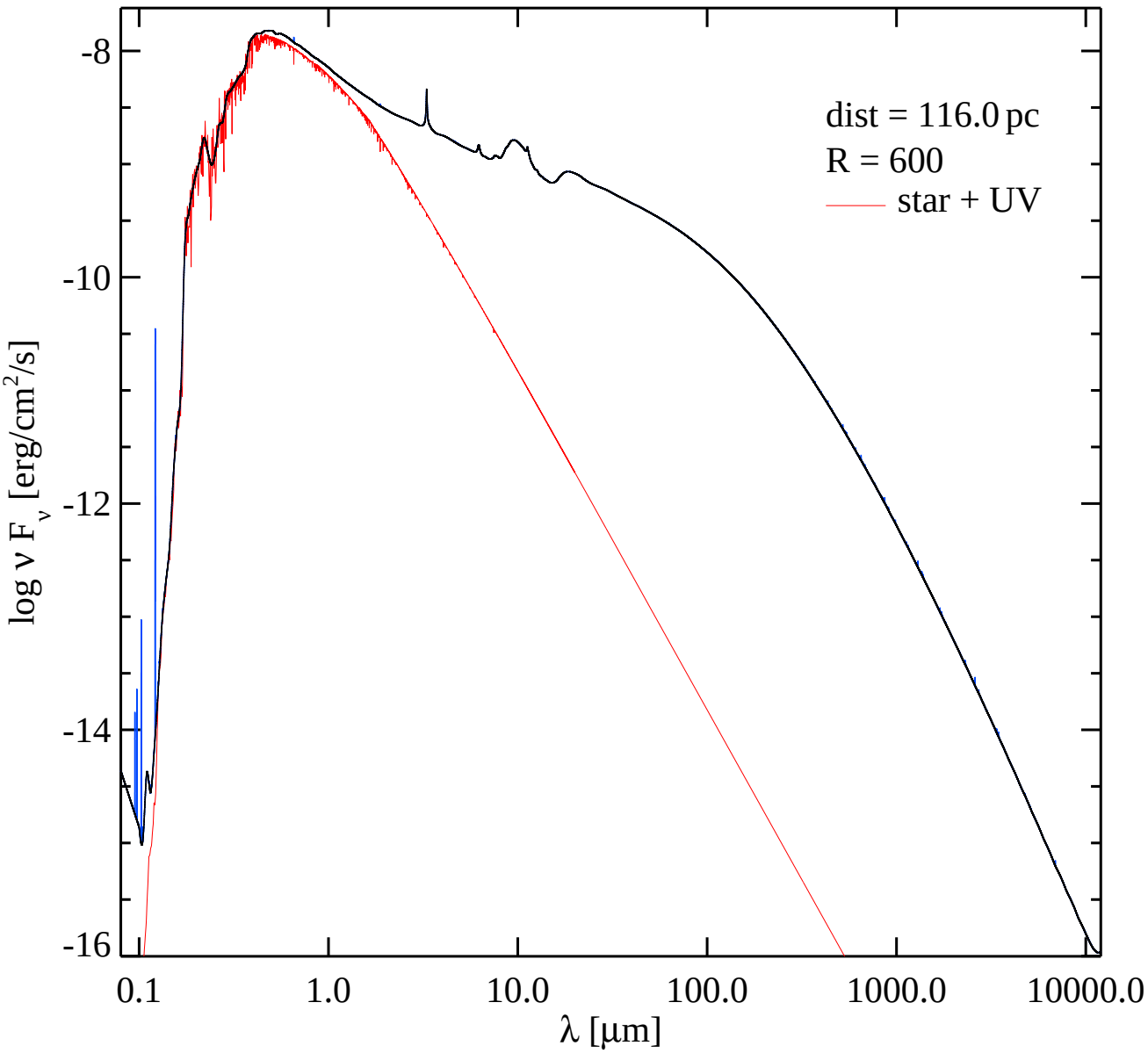

0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
z/r
0.1
1.0
10.0
100.0
r [AU]
1µm
3µm
6µm
10µm
30µm
60µm
100µm
200µm
1000µm
AV=1
4
6
8
10
log n<H> [cm-3]

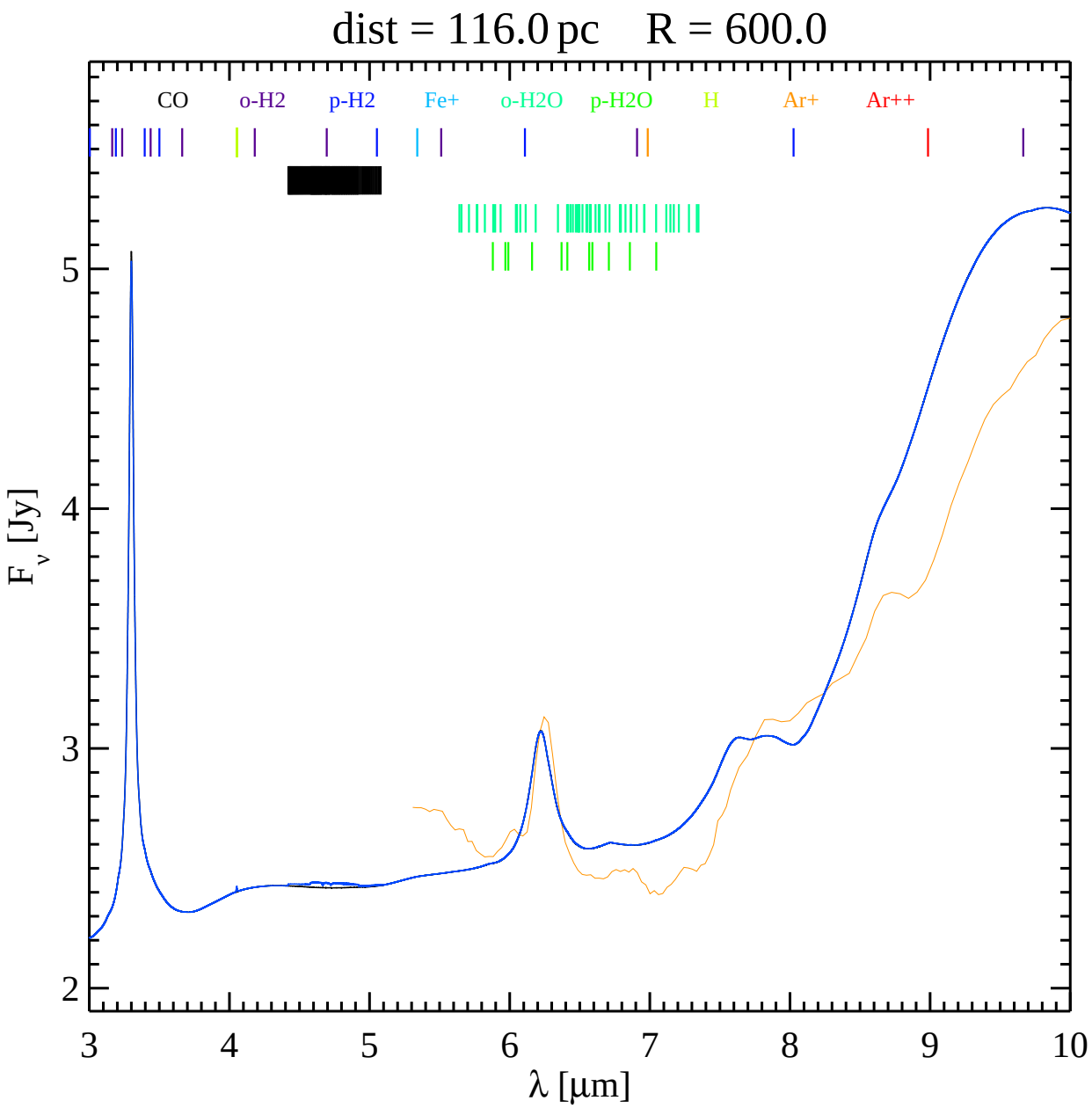

baseline=102.2m , basePA=-143.3°
ProDiMo
0.6
0.4
0.2
0.0
V²
9
10
11
12
λ [μm]

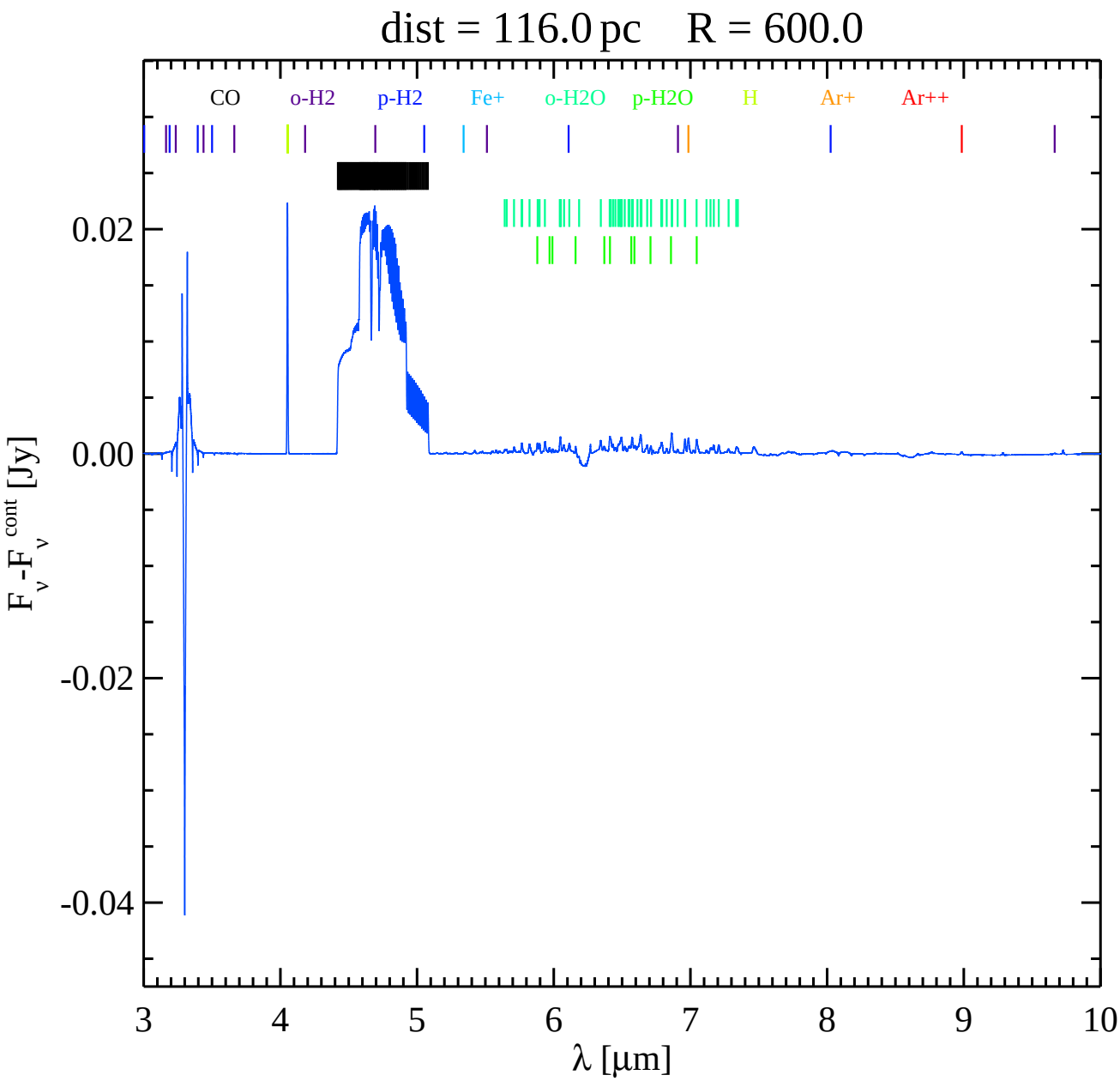

baseline=91.0m , basePA=-136.3º
ProDiMo
0.6
0.4
0.2
0.0
V²
9
10
11
12
λ [μm]

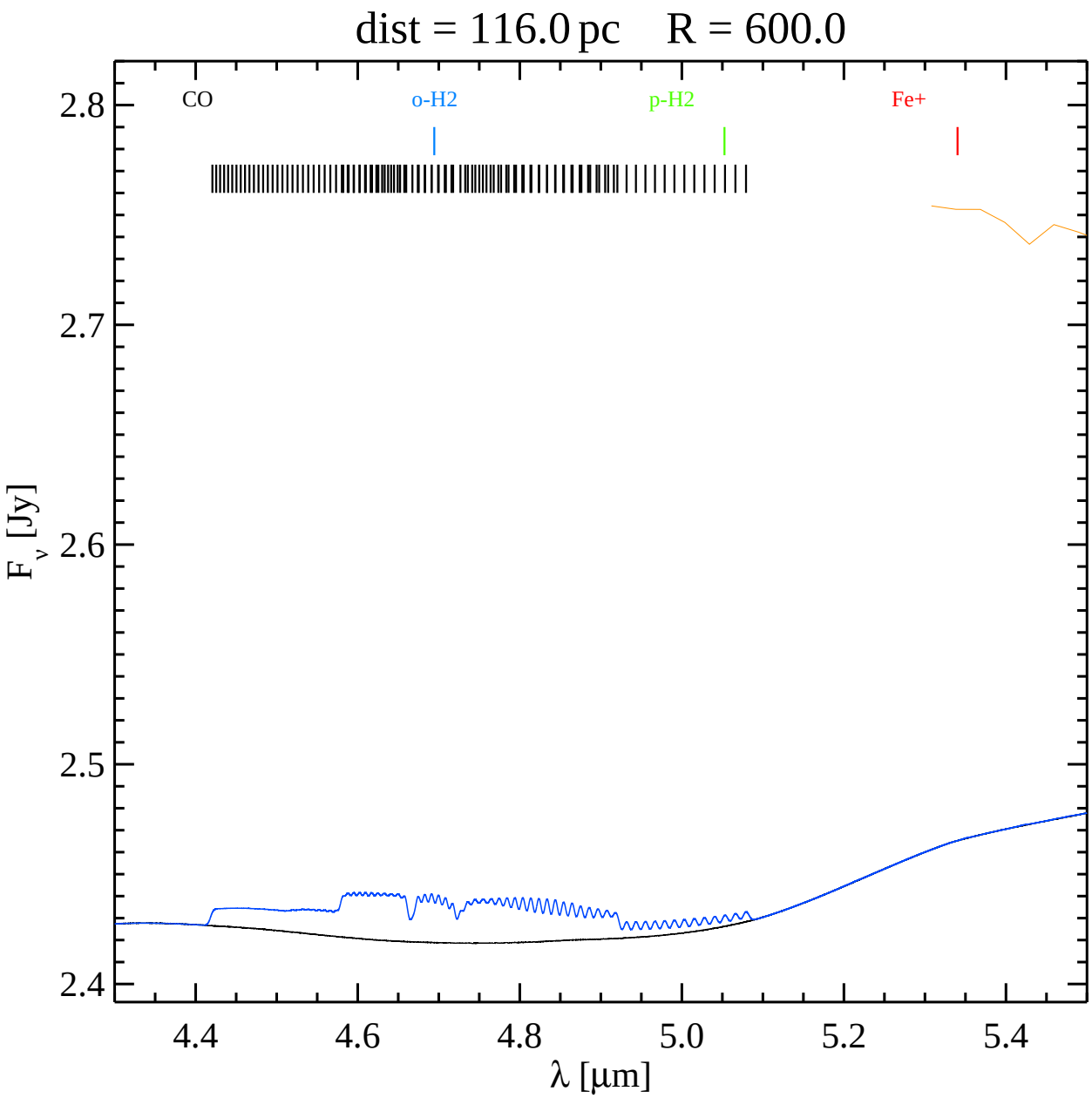

baseline=89.6m , basePA=-136.3°
ProDiMo
0.6
0.4
0.2
0.0
V²
9
10
11
12
λ [μm]

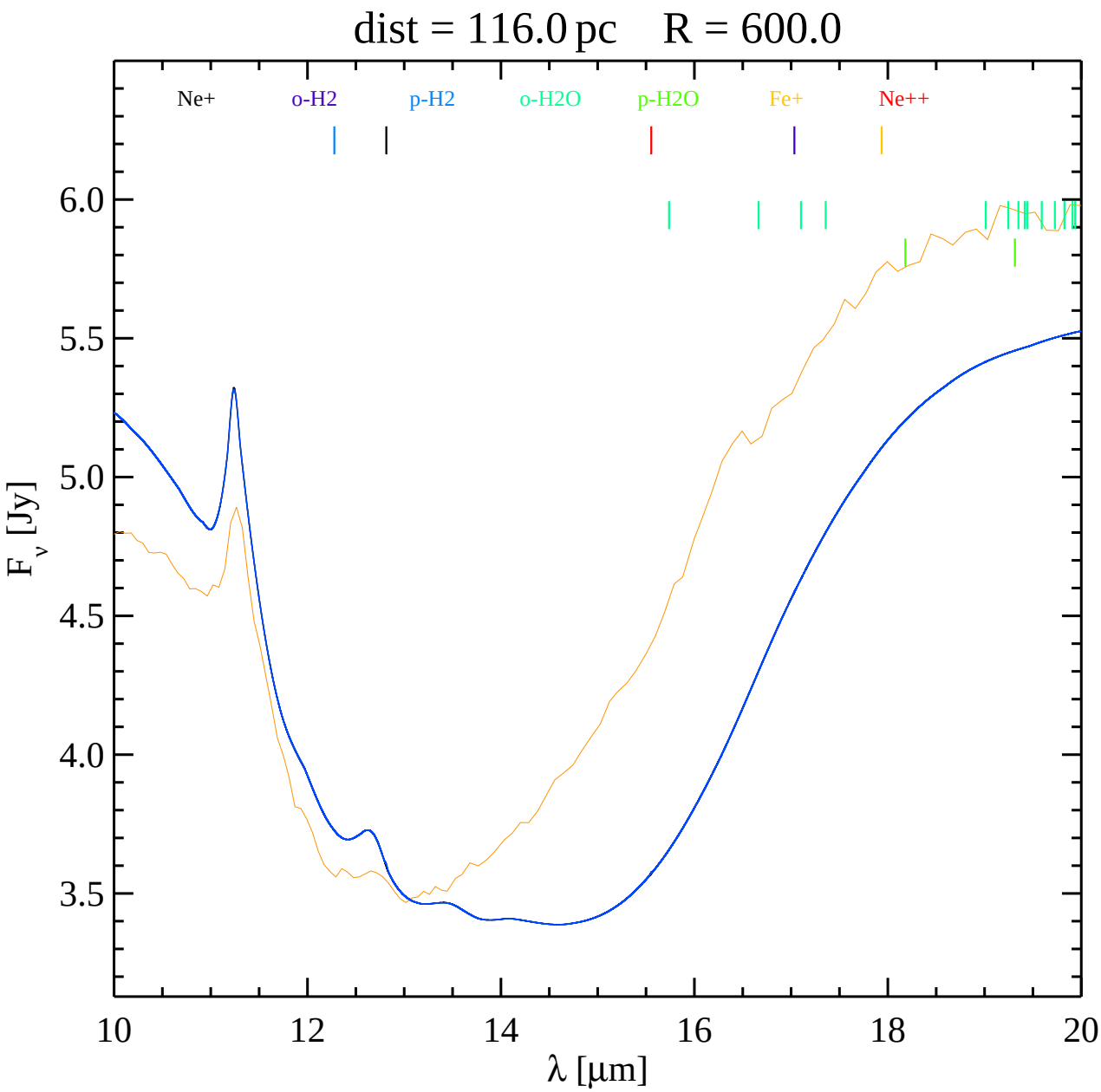

dist = 116.0 pc
R = 100000
star + UV
log ν F_ν [erg/cm²/s]
λ [μm]
-8
-10
-12
-14
-16
0.1
1.0
10.0
100.0
1000.0
10000.0

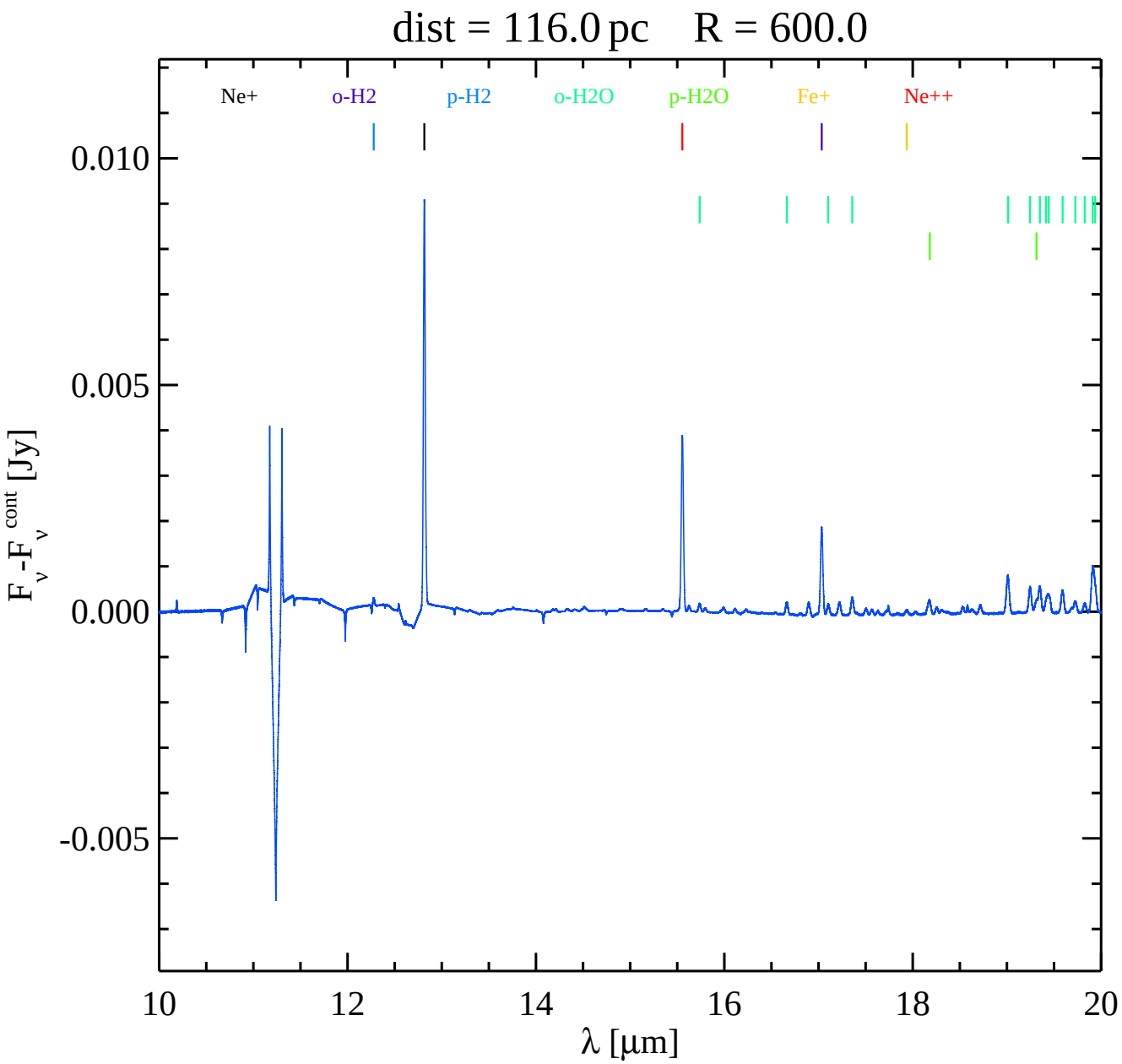

dist = 116.0 pc
R = 600
star + UV
-8
-10
-12
-14
-16
log ν F_ν [erg/cm²/s]
0.1
1.0
10.0
100.0
1000.0
10000.0
λ [μm]

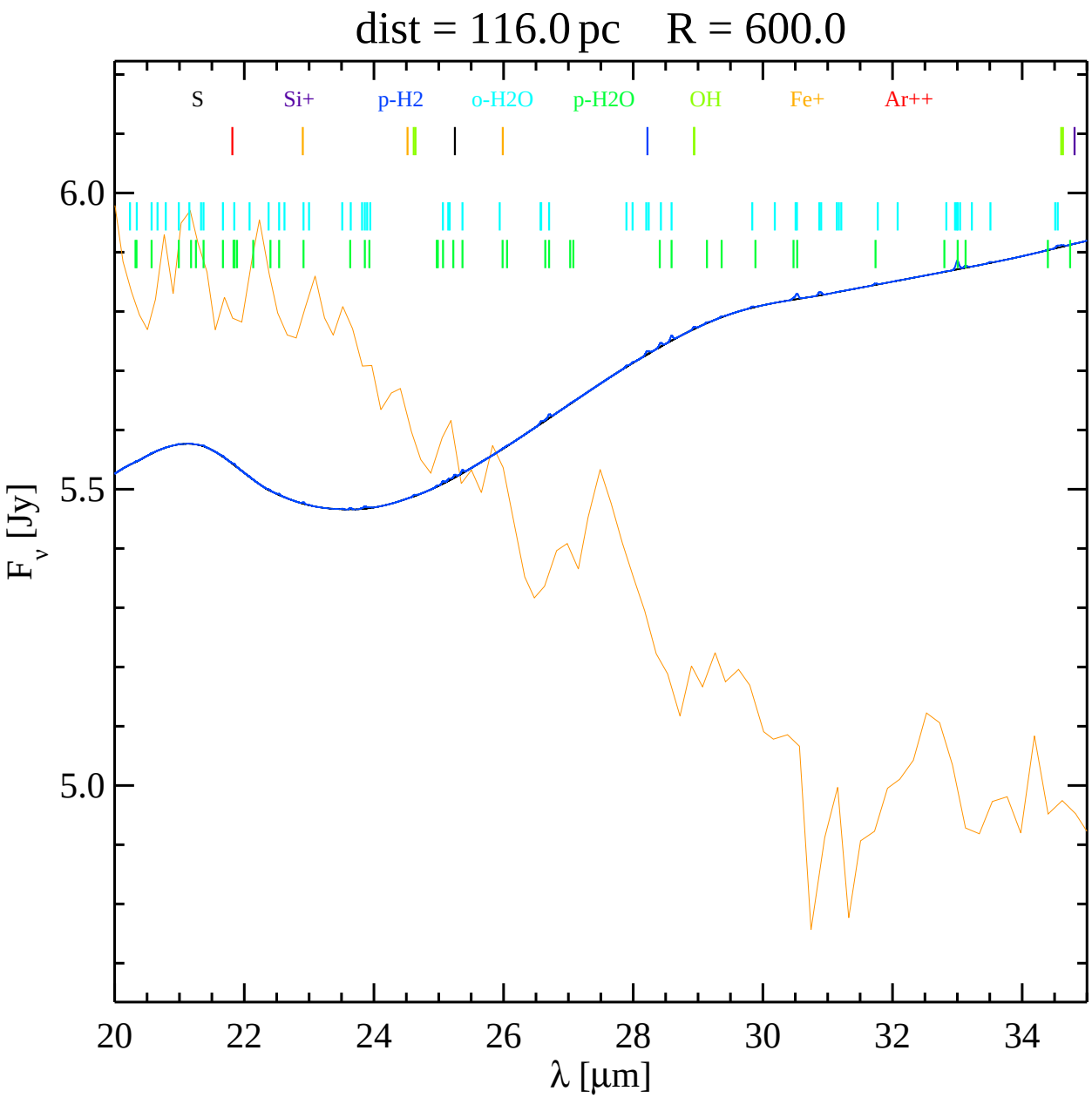

dist = 116.0 pc R = 600.0
CO
o-H2
p-H2
Fe+
o-H2O
p-H2O
H
Ar+
Ar++
F_ν [Jy]
λ [μm]
2
3
4
5
3
4
5
6
7
8
9
10

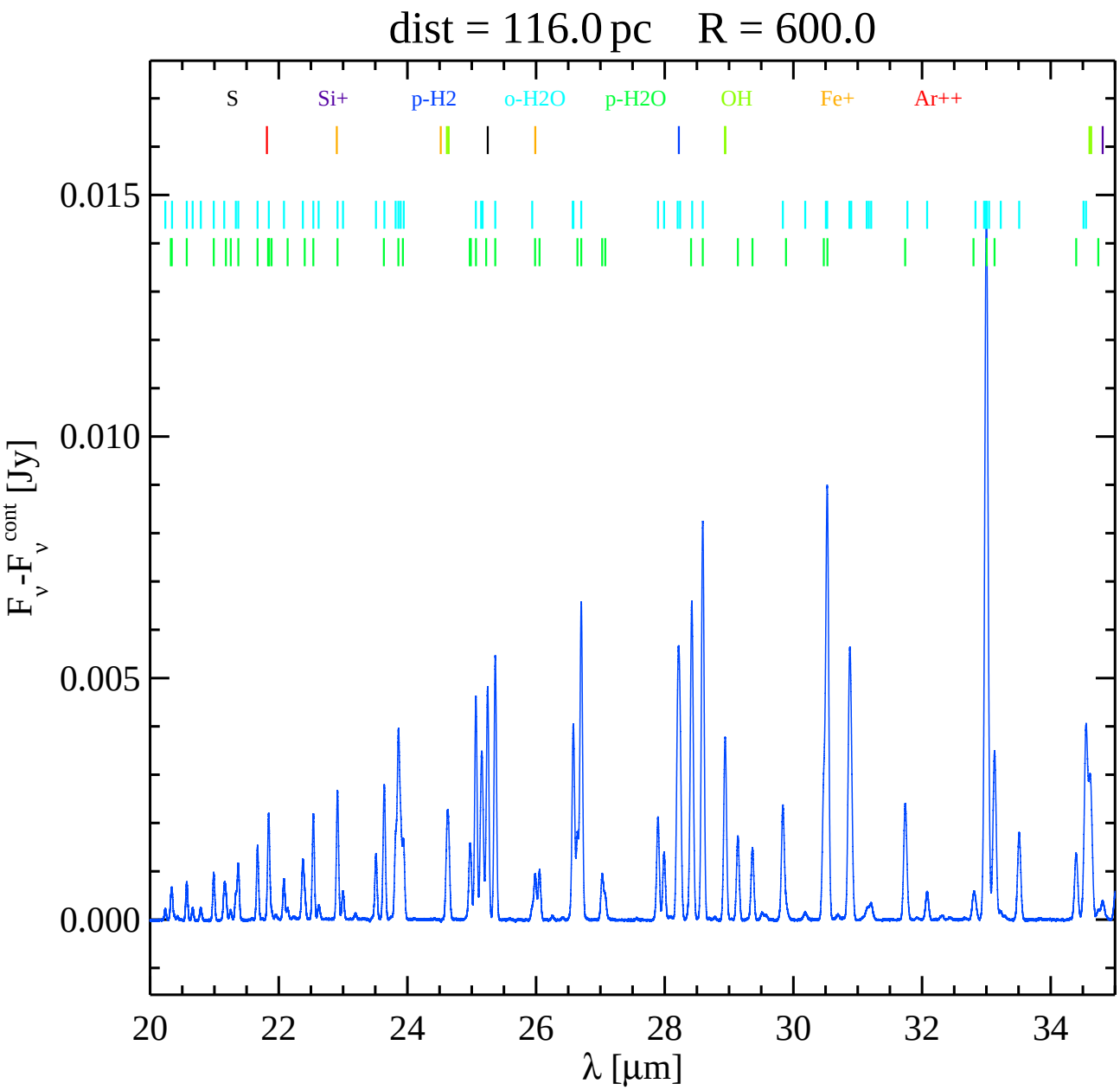

dist = 116.0 pc R = 600.0
CO
o-H2
p-H2
Fe+
o-H2O
p-H2O
H
Ar+
Ar++
0.02
0.00
-0.02
-0.04
F_ν -F_ν^cont [Jy]
3
4
5
6
7
8
9
10
λ [μm]

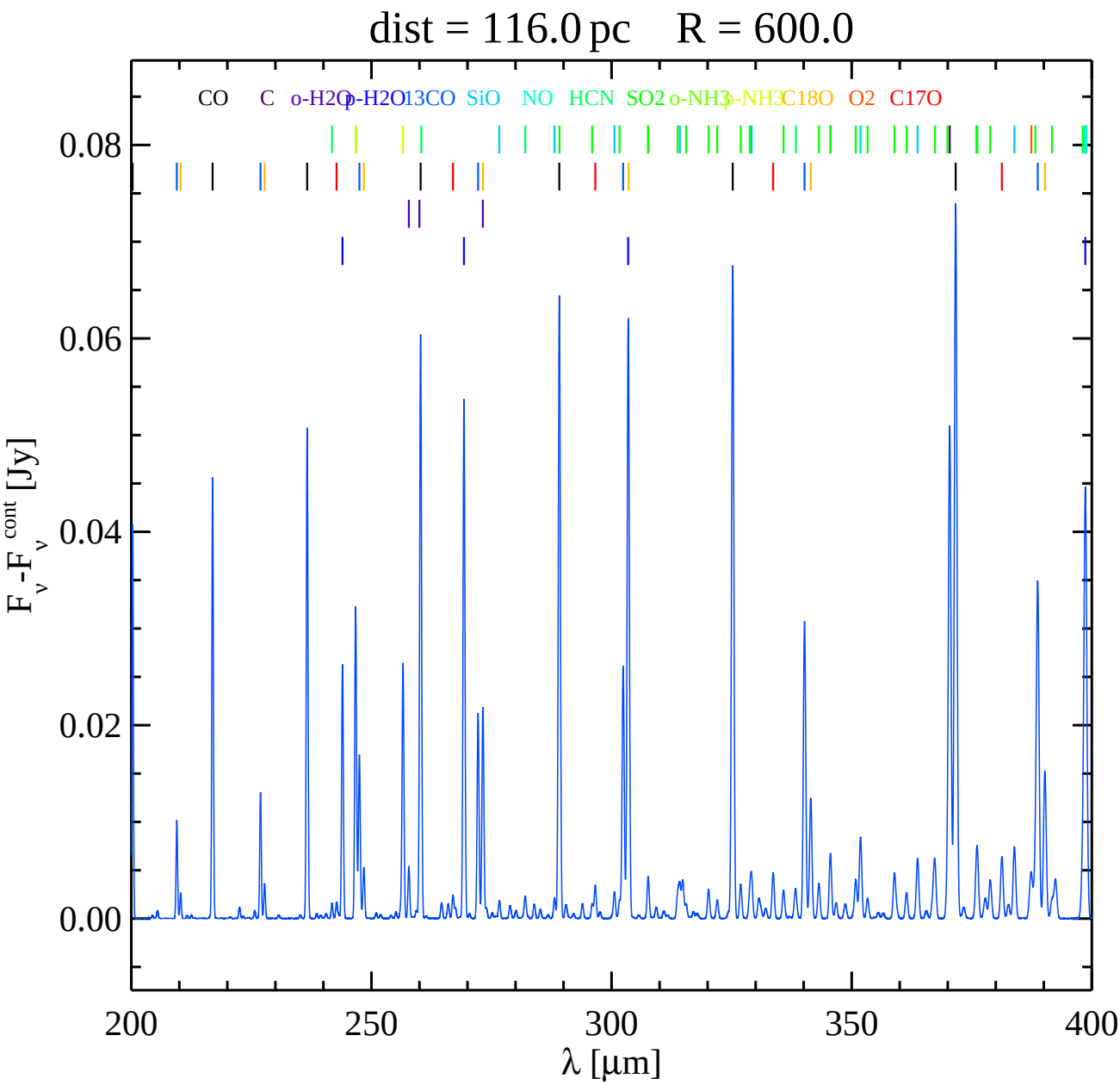

dist = 116.0 pc R = 600.0
CO
o-H2
p-H2
Fe+
2.8
2.7
2.6
2.5
2.4
F_ν [Jy]
4.4
4.6
4.8
5.0
5.2
5.4
λ [μm]

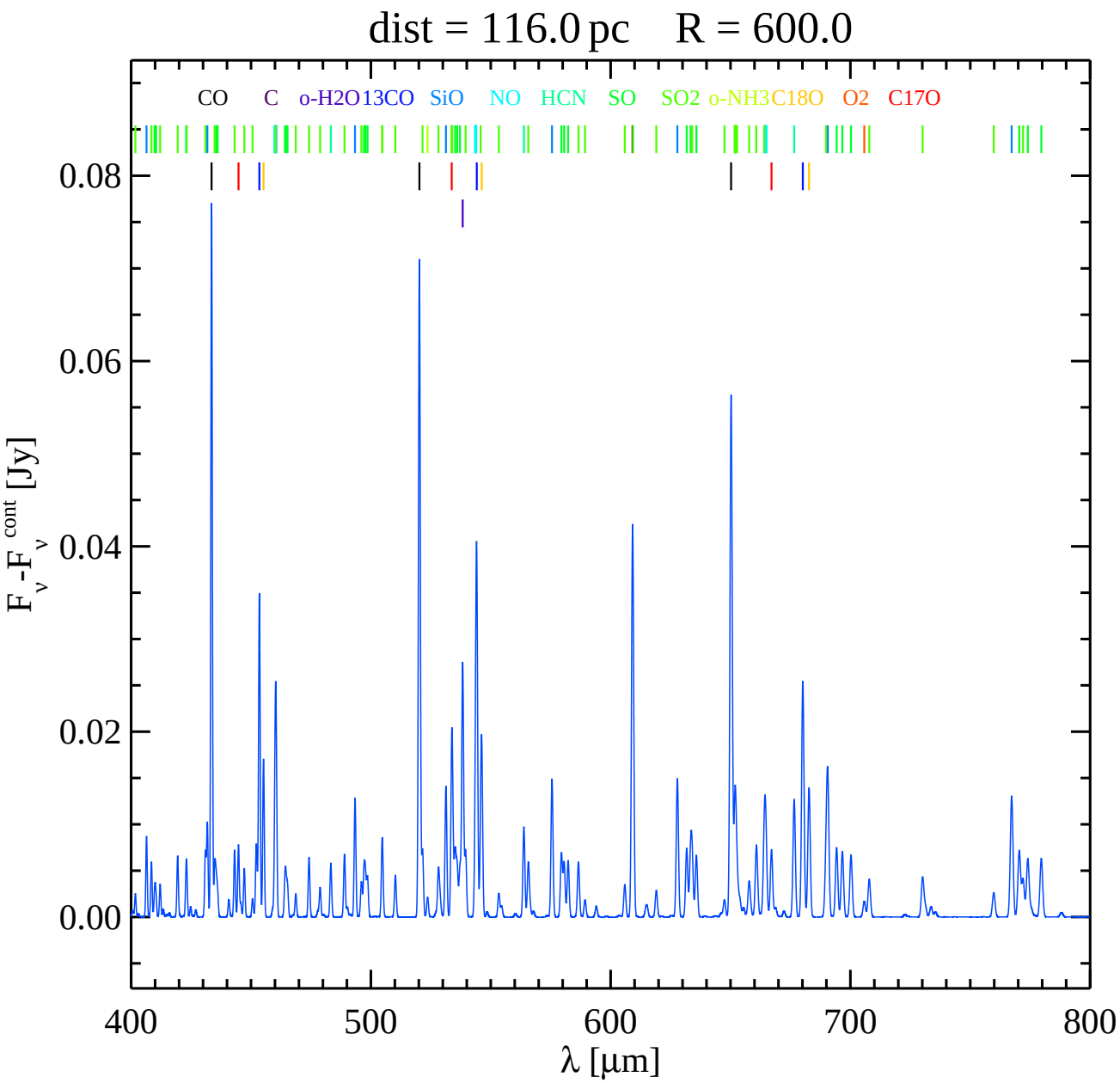

dist = 116.0 pc R = 600.0
Ne+
o-H2
p-H2
o-H2O
p-H2O
Fe+
Ne++
6.0
5.5
5.0
4.5
4.0
3.5
F_ν [Jy]
10
12
14
16
18
20
λ [μm]

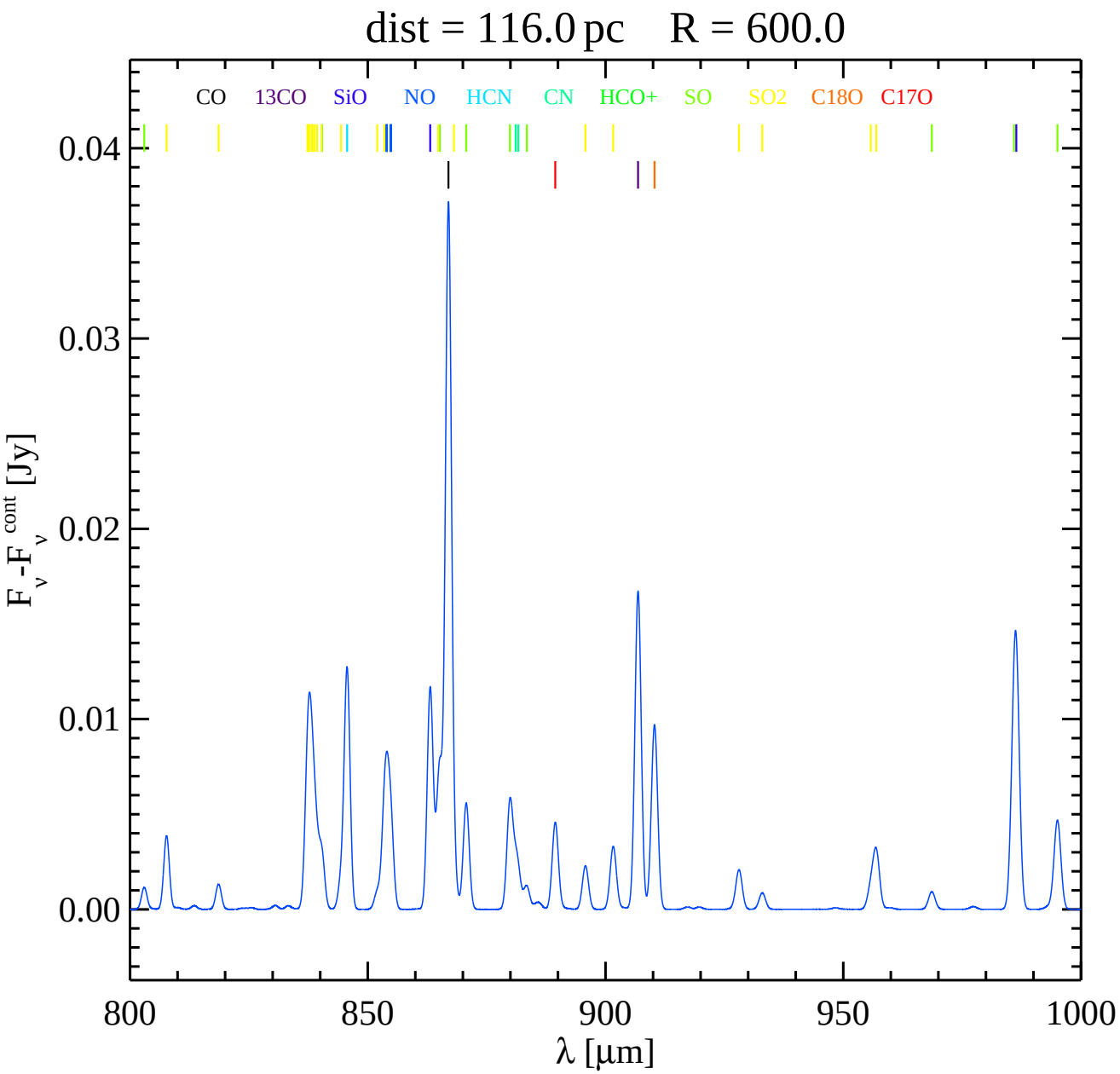

dist = 116.0 pc R = 600.0
Ne+
o-H2
p-H2
o-H2O
p-H2O
Fe+
Ne++
0.010
0.005
0.000
-0.005
F_ν -F_ν^cont [Jy]
10
12
14
16
18
20
λ [μm]

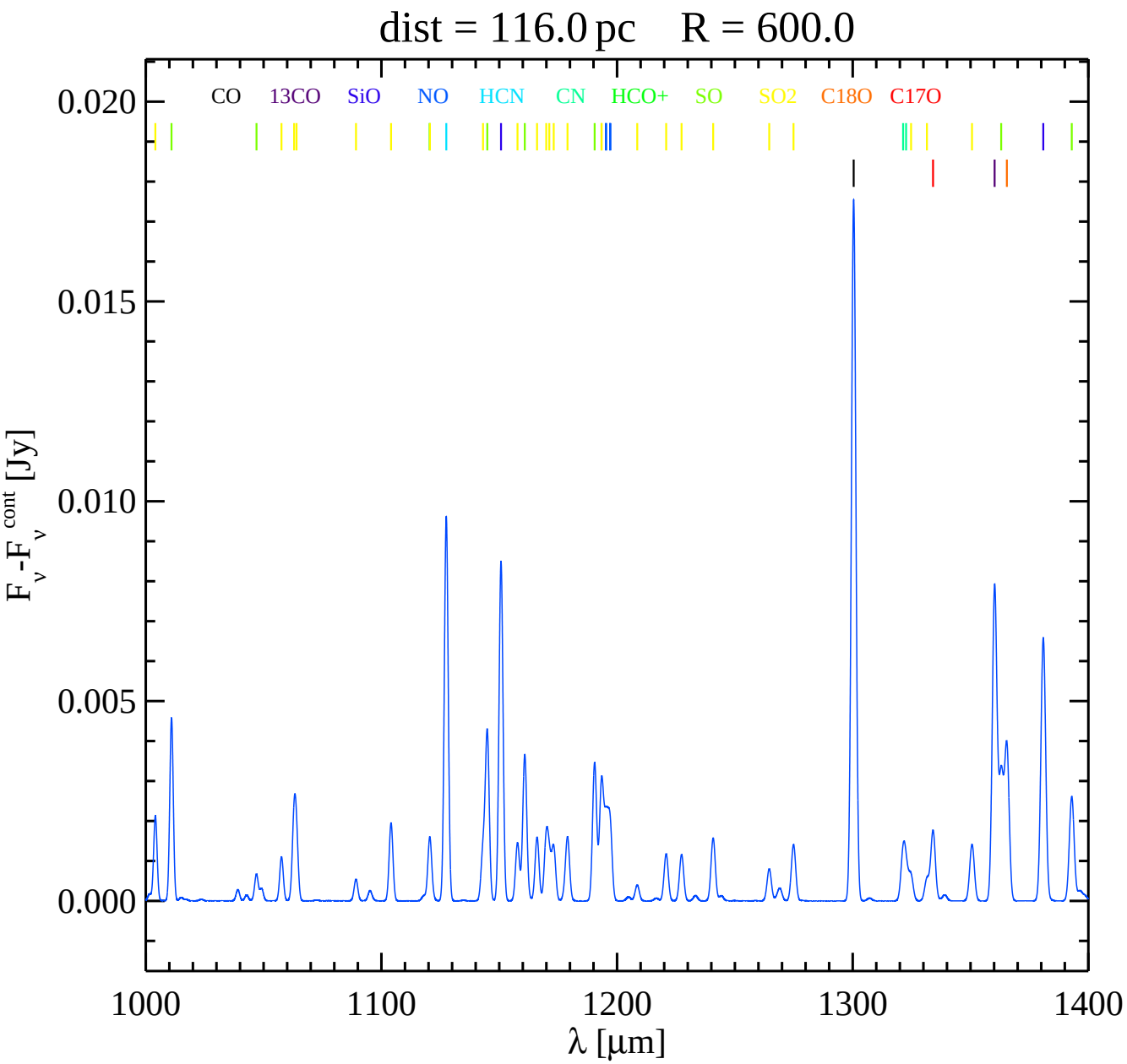

dist = 116.0 pc R = 600.0
S
Si+
p-H2
o-H2O
p-H2O
OH
Fe+
Ar++
6.0
5.5
5.0
F_ν [Jy]
20
22
24
26
28
30
32
34
λ [μm]

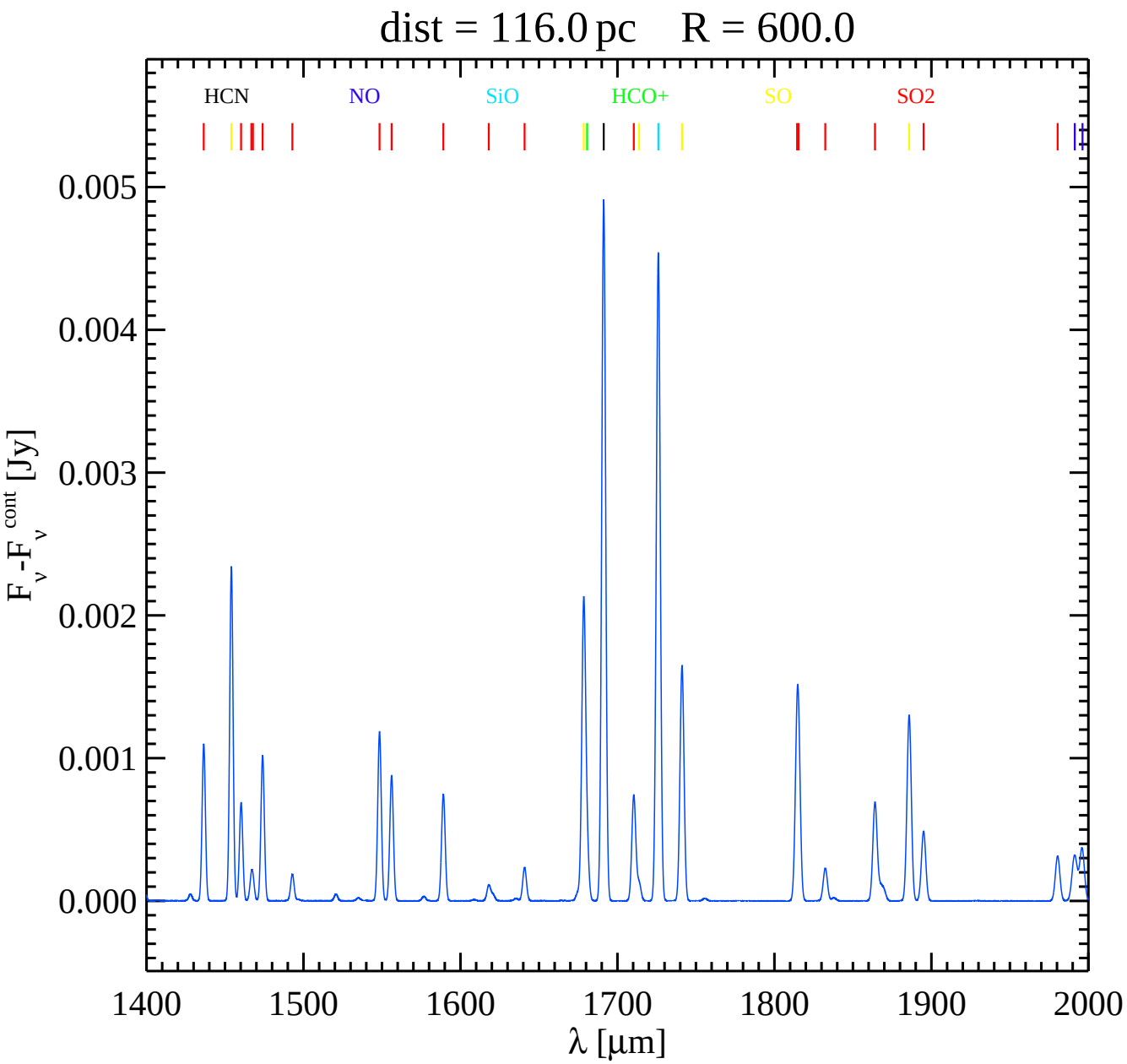

dist = 116.0 pc R = 600.0
S
Si+
p-H2
o-H2O
p-H2O
OH
Fe+
Ar++
0.015
0.010
0.005
0.000
F_ν - F_ν^cont [Jy]
20
22
24
26
28
30
32
34
λ [μm]

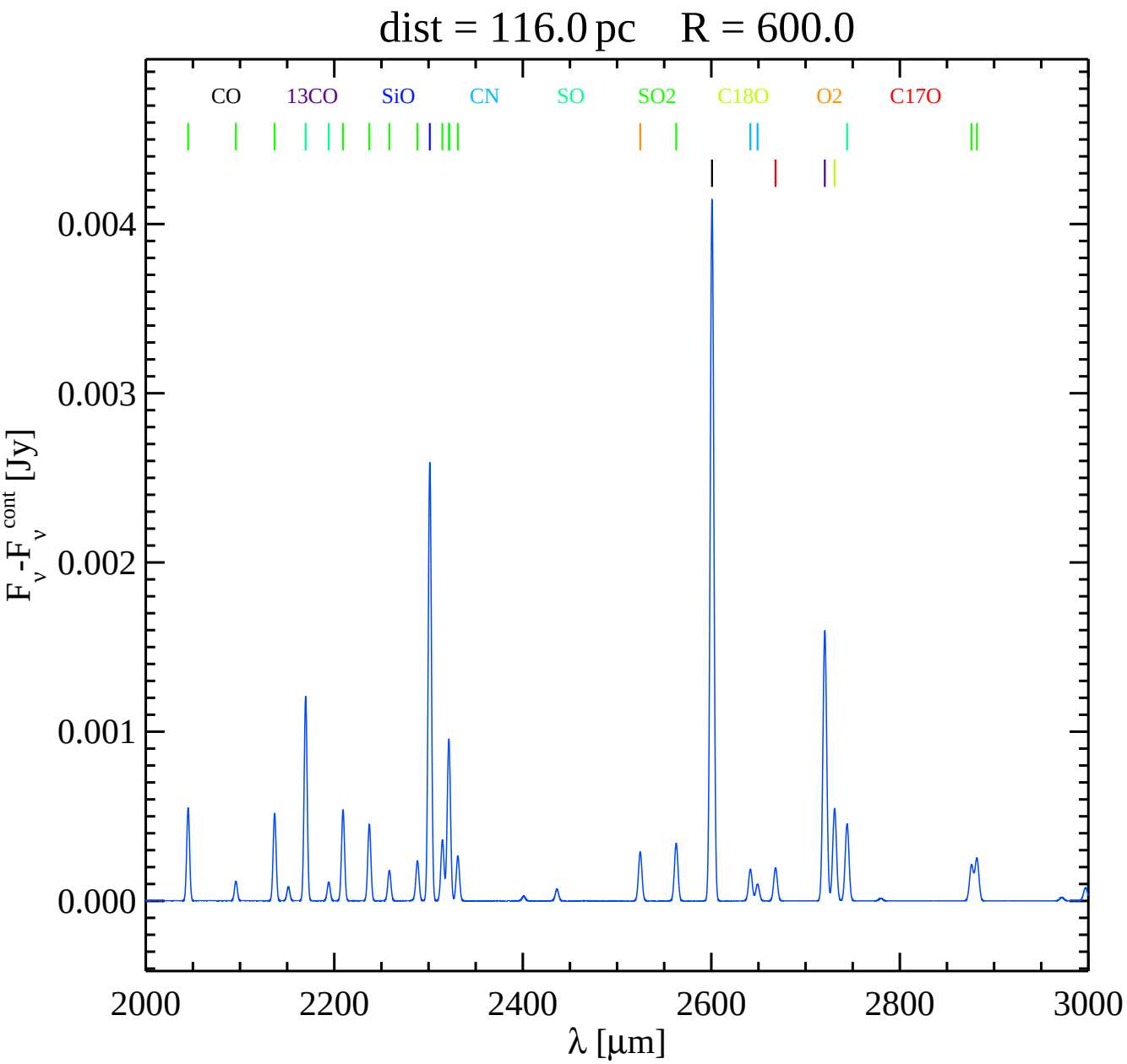

dist = 116.0 pc R = 600.0
CO
C
o-H2O
p-H2O
13CO
SiO
NO
HCN
SO2
o-NH3
p-NH3
C18O
O2
C17O
0.08
0.06
0.04
0.02
0.00
F_ν -F_ν^cont [Jy]
200
250
300
350
400
λ [μm]

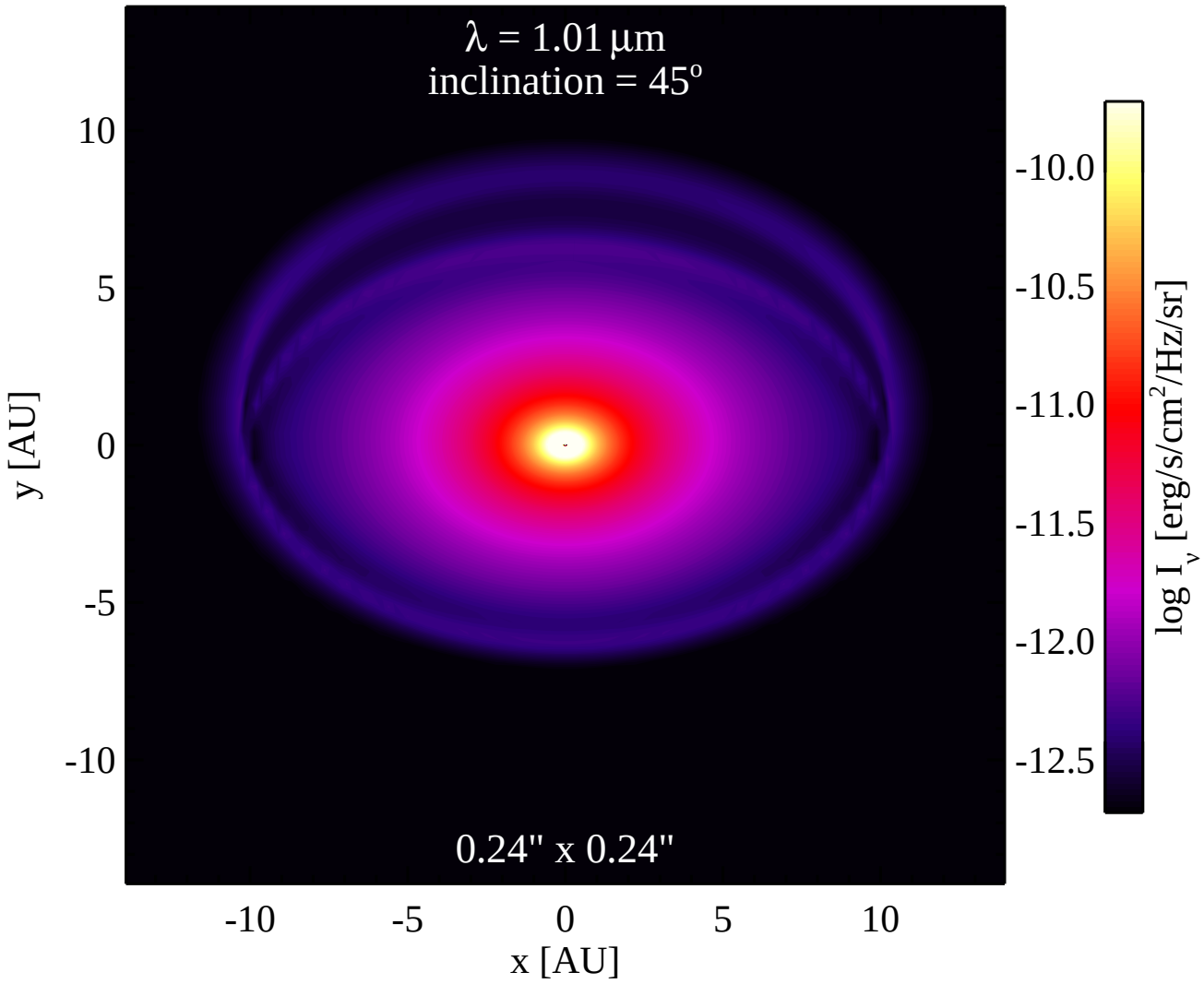

dist = 116.0 pc R = 600.0
CO C o-H2O 13CO SiO NO HCN SO SO2 o-NH3 C18O O2 C17O
0.08
0.06
0.04
0.02
0.00
F_ν - F_ν^cont [Jy]
400
500
600
700
800
λ [μm]

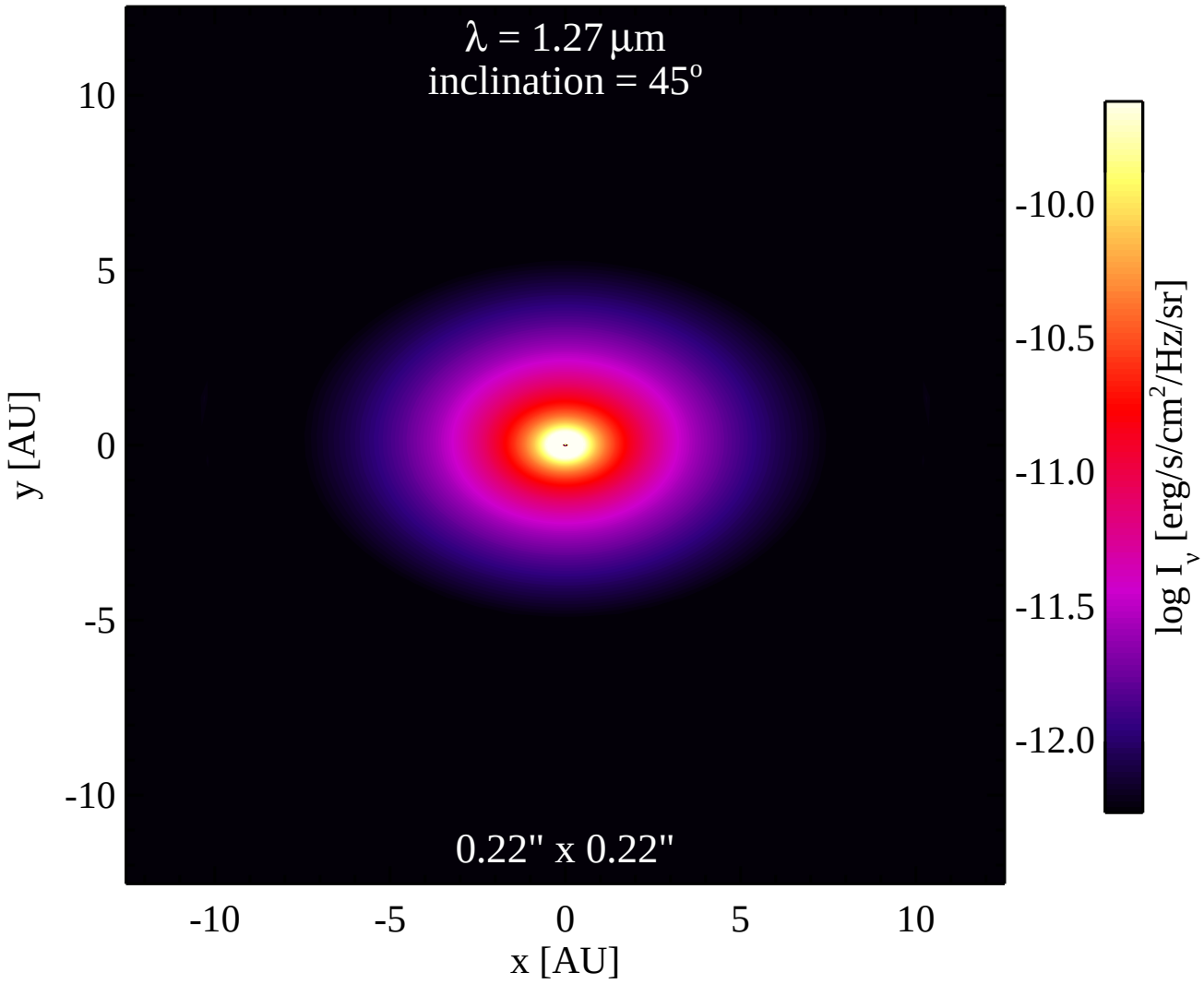

dist = 116.0 pc R = 600.0
CO
13CO
SiO
NO
HCN
CN
HCO+
SO
SO2
C18O
C17O
0.04
0.03
0.02
0.01
0.00
F_ν -F_ν^cont [Jy]
800
850
900
950
1000
λ [μm]

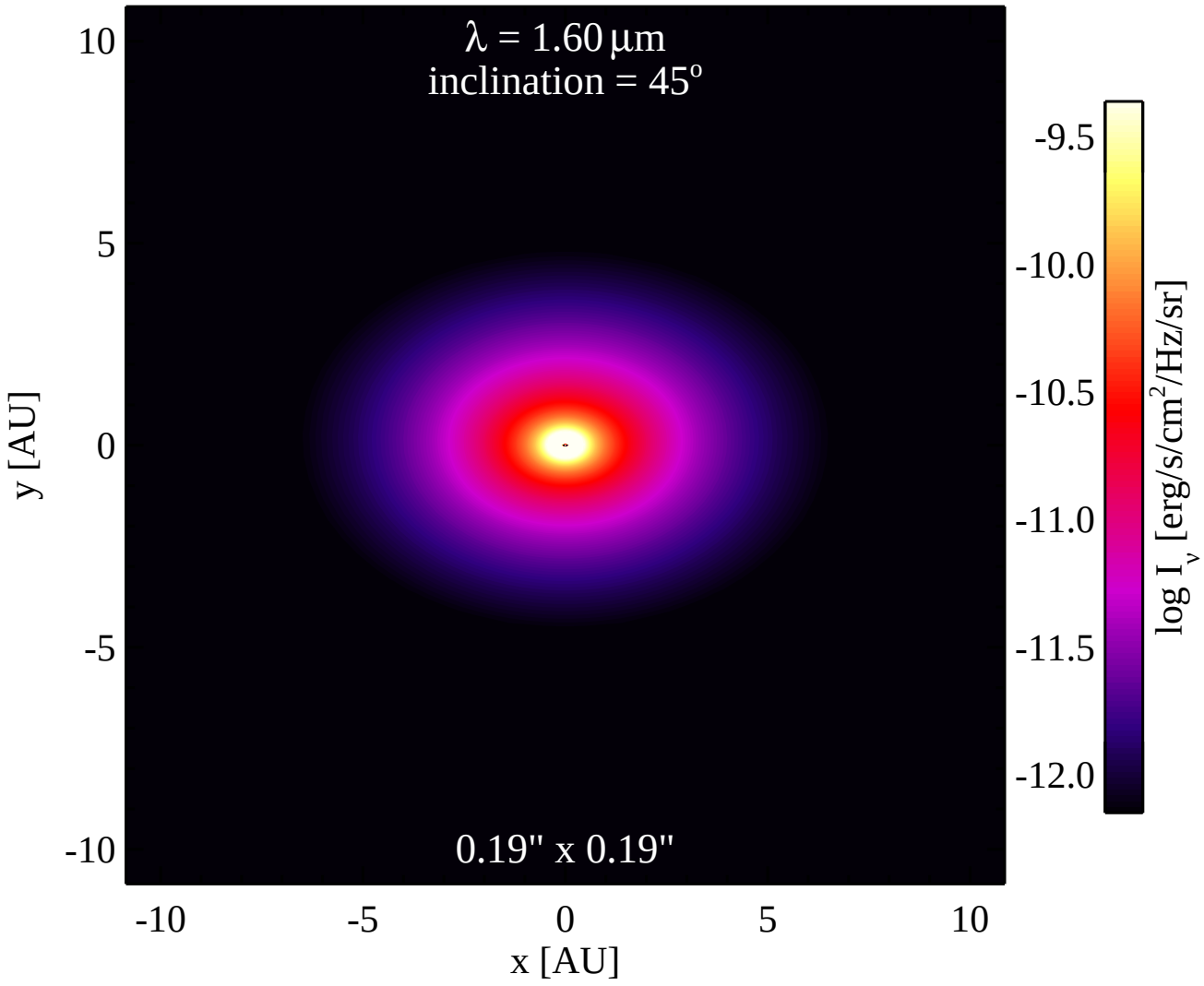

dist = 116.0 pc R = 600.0
CO
13CO
SiO
NO
HCN
CN
HCO+
SO
SO2
C18O
C17O
0.020
0.015
0.010
0.005
0.000
F_ν -F_ν^cont [Jy]
1000
1100
1200
1300
1400
λ [μm]

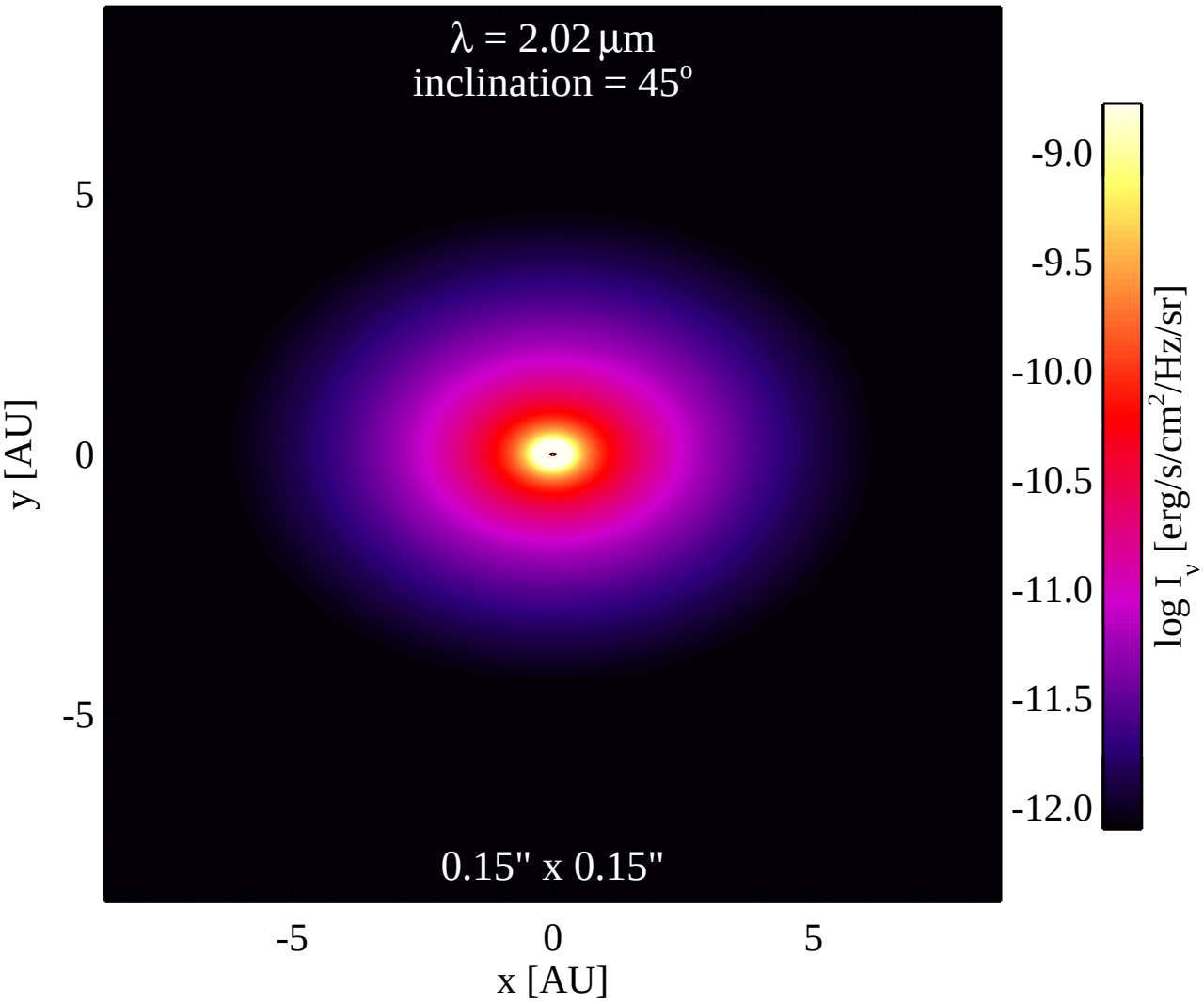

dist = 116.0 pc R = 600.0
HCN
NO
SiO
HCO+
SO
SO2
0.005
0.004
0.003
0.002
0.001
0.000
F_ν - F_ν^cont [Jy]
1400
1500
1600
1700
1800
1900
2000
λ [μm]

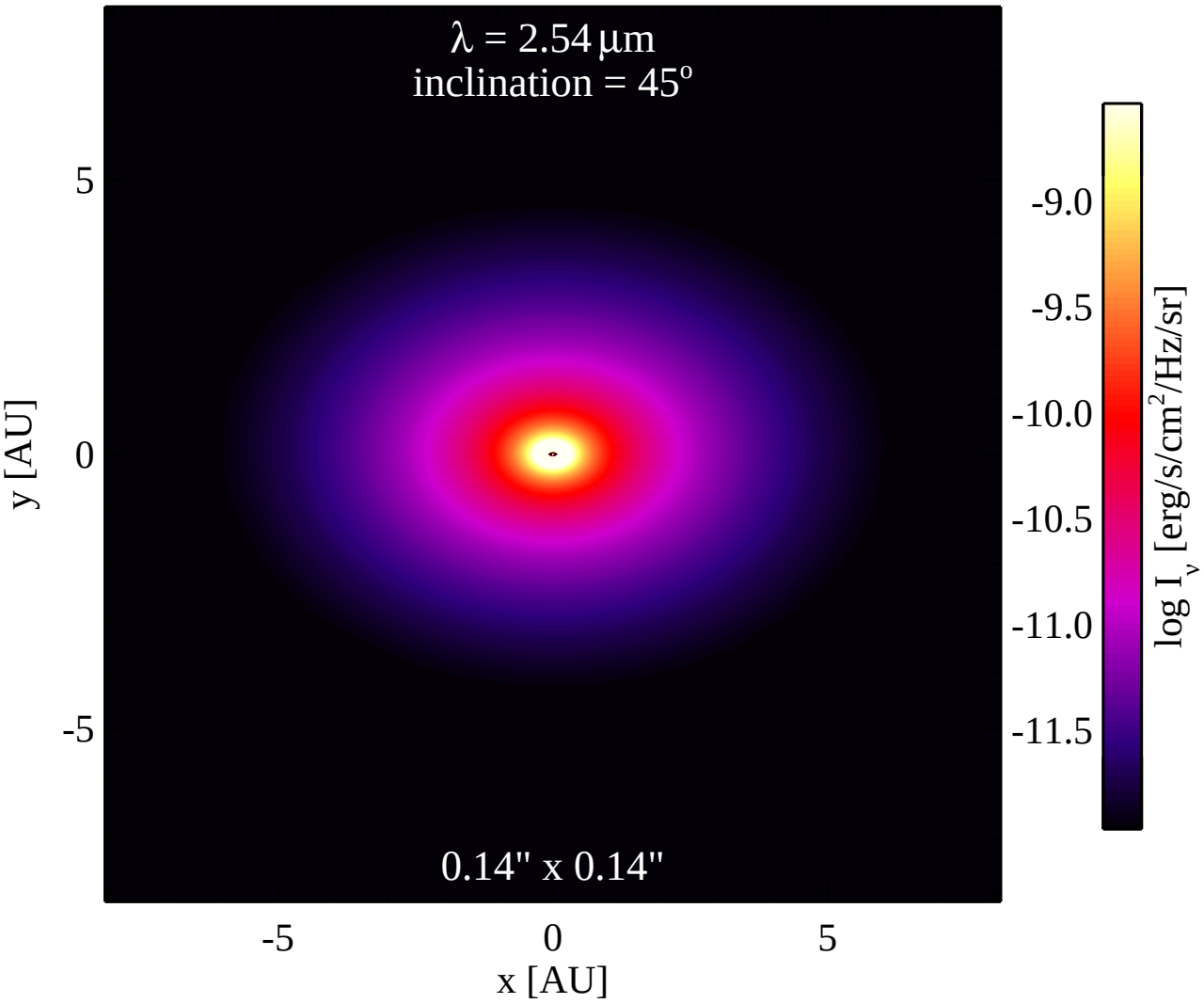

dist = 116.0 pc R = 600.0
CO
13CO
SiO
CN
SO
SO2
C18O
O2
C17O
0.004
0.003
0.002
0.001
0.000
F_ν -F_ν^cont [Jy]
2000
2200
2400
2600
2800
3000
λ [μm]

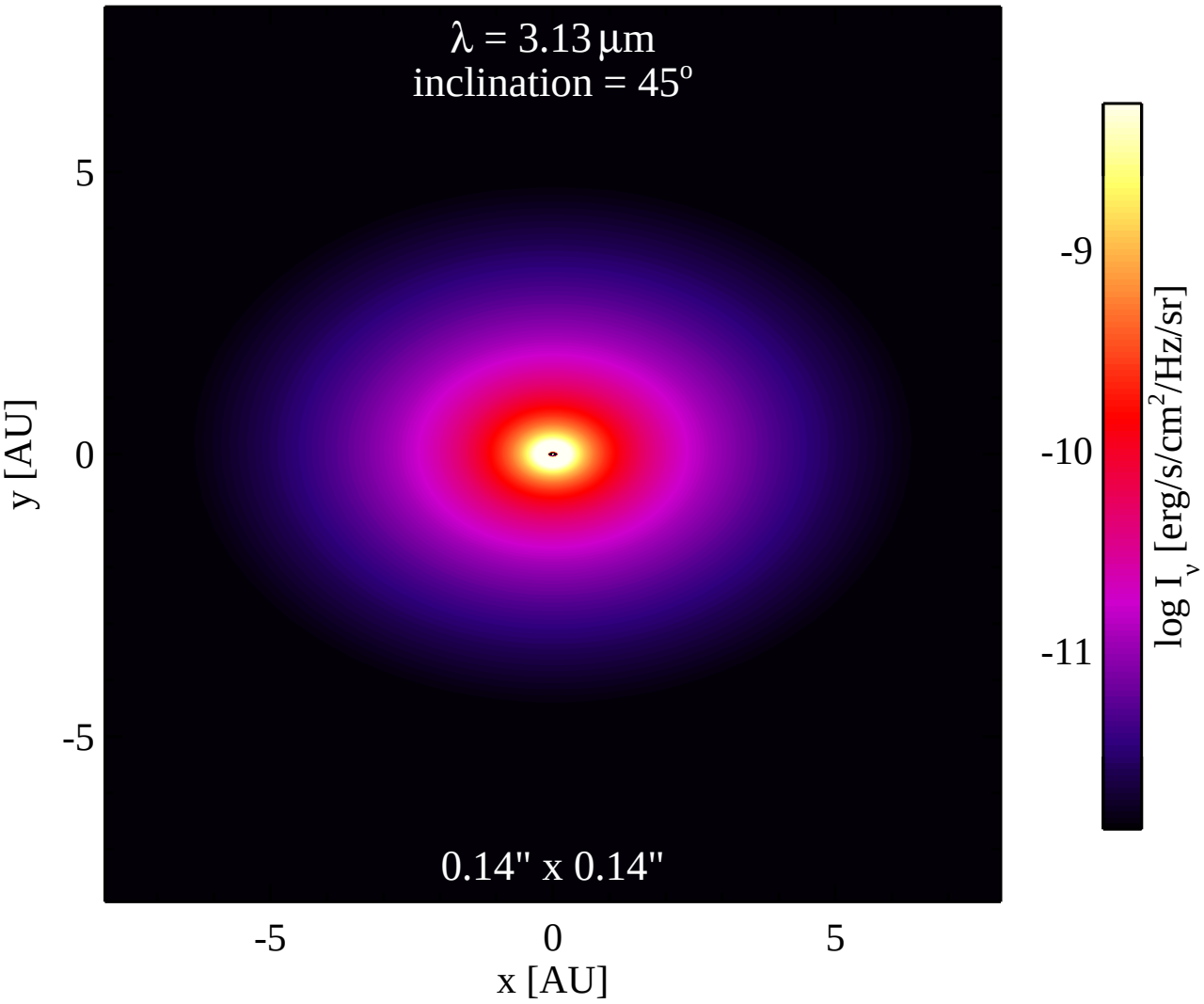

λ = 1.01 μm
inclination = 45°
0.24" x 0.24"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-10.0
-10.5
-11.0
-11.5
-12.0
-12.5
log I_ν [erg/s/cm²/Hz/sr]

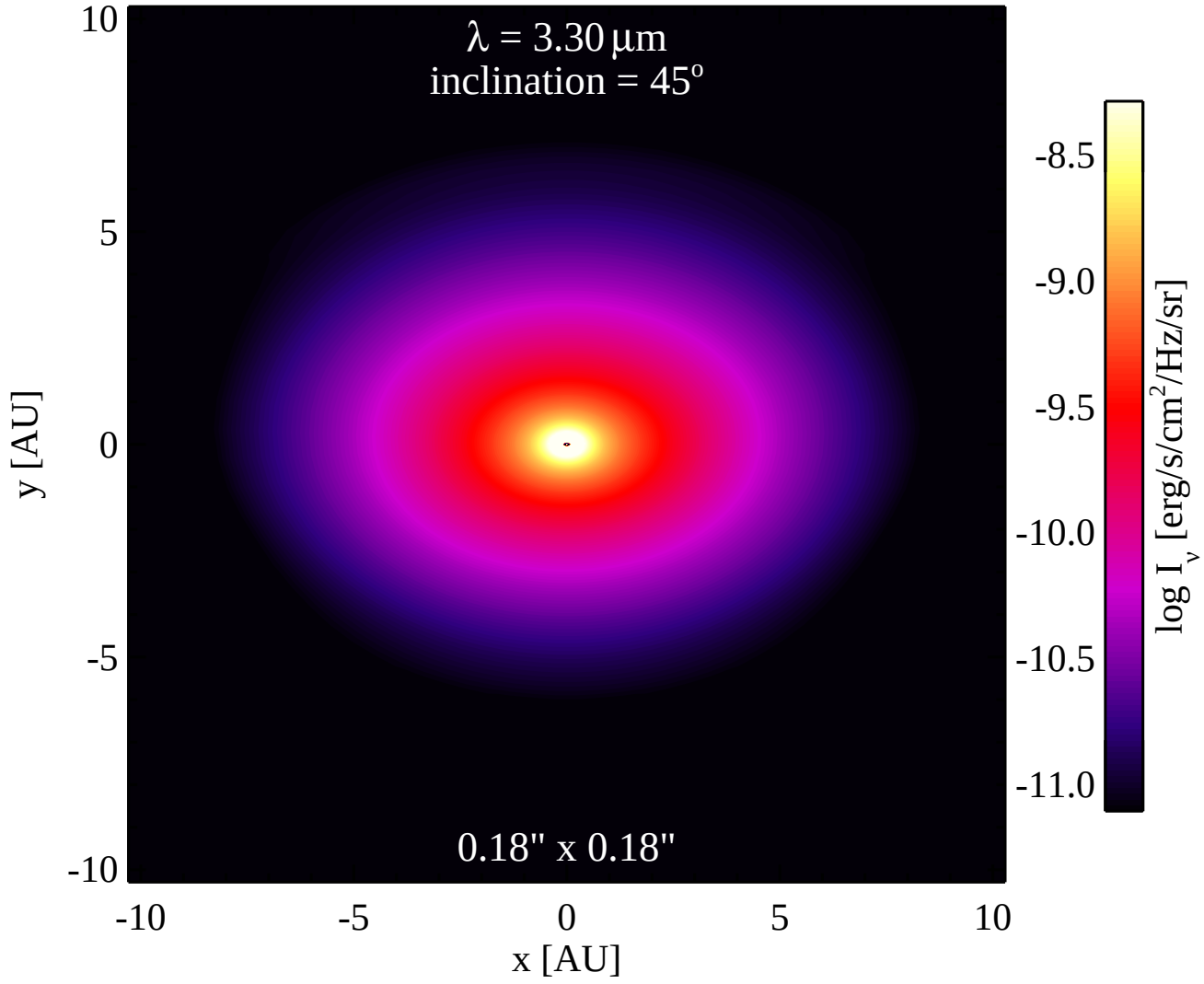

λ = 1.27 μm
inclination = 45°
0.22" x 0.22"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-10.0
-10.5
-11.0
-11.5
-12.0
log I_ν [erg/s/cm²/Hz/sr]

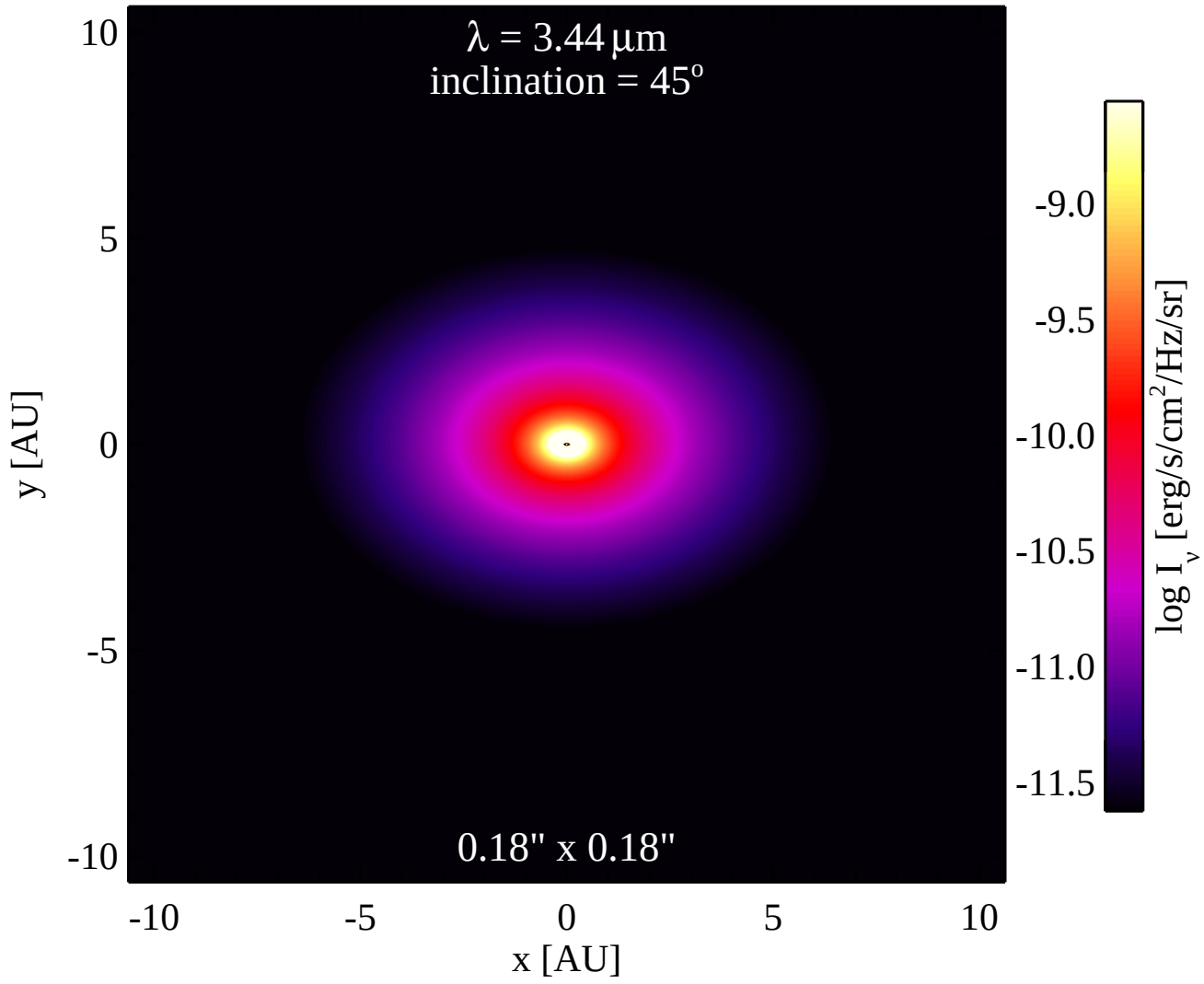

λ = 1.60 μm
inclination = 45°
0.19" x 0.19"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-9.5
-10.0
-10.5
-11.0
-11.5
-12.0
log I_ν [erg/s/cm²/Hz/sr]

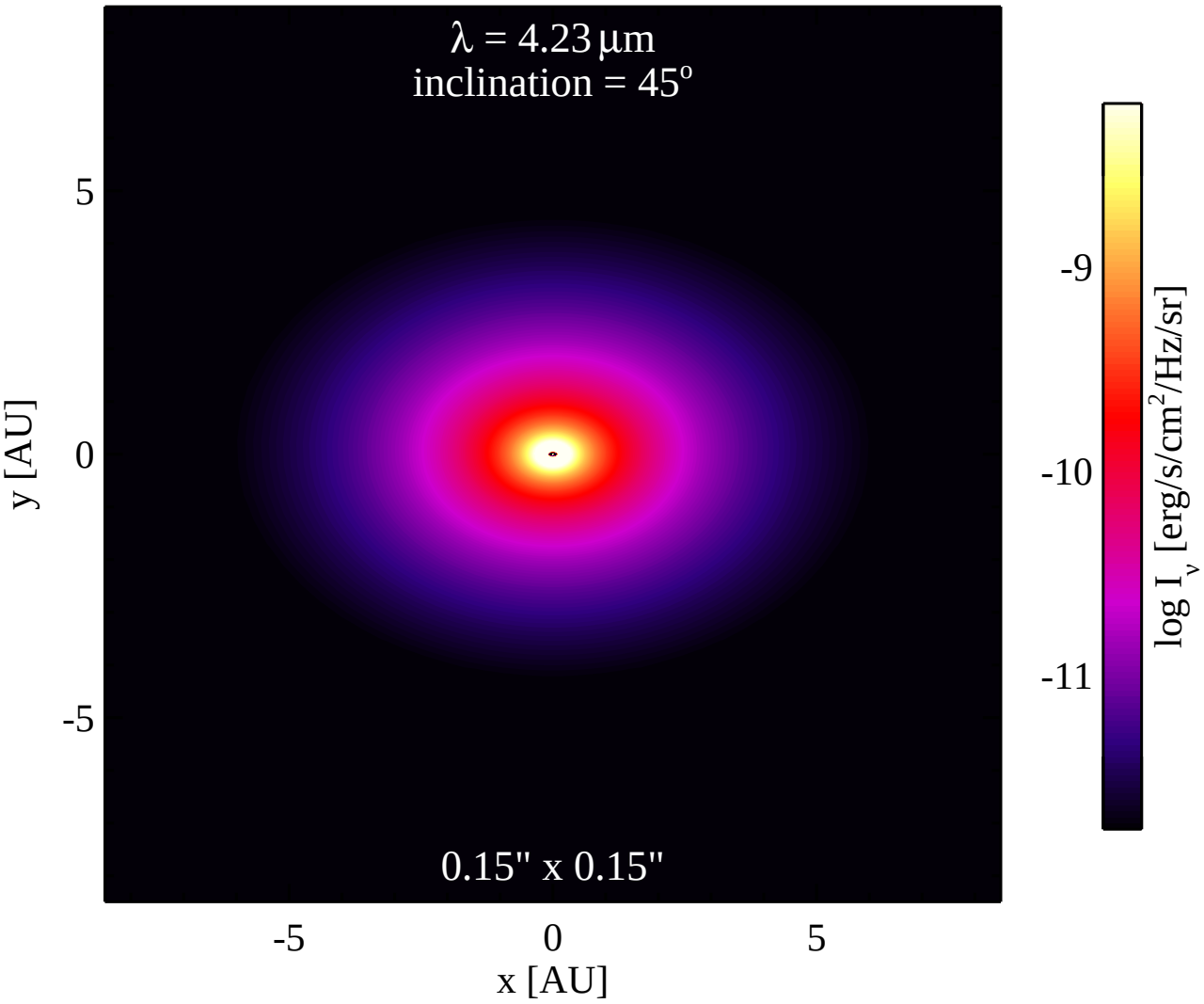

λ = 2.02 μm
inclination = 45°
0.15" x 0.15"
y [AU]
x [AU]
5
0
-5
-5
0
5
-9.0
-9.5
-10.0
-10.5
-11.0
-11.5
-12.0
log I_ν [erg/s/cm²/Hz/sr]

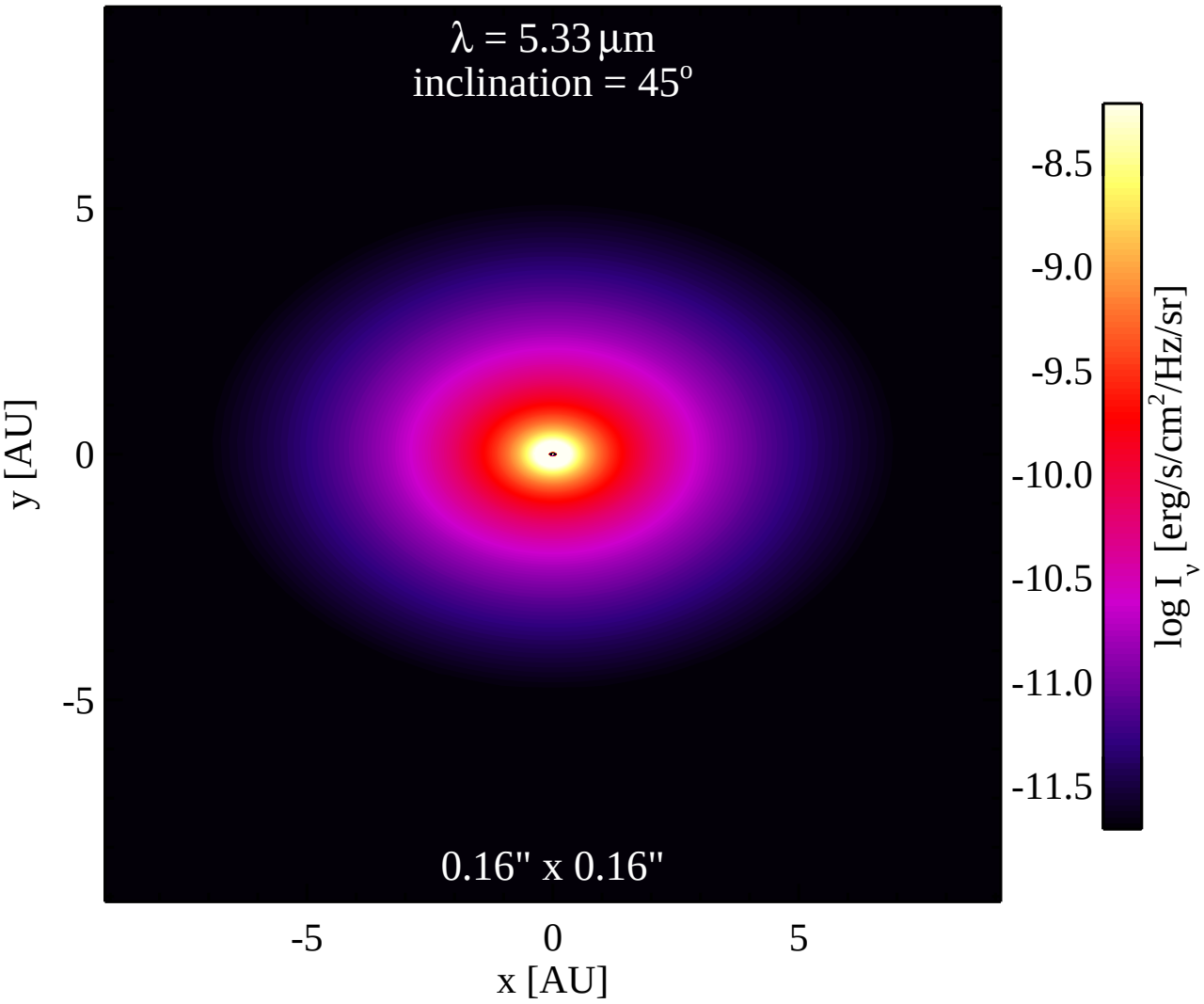

λ = 2.54 μm
inclination = 45°
0.14" x 0.14"
y [AU]
5
0
-5
-5
0
5
x [AU]
-9.0
-9.5
-10.0
-10.5
-11.0
-11.5
log I_ν [erg/s/cm²/Hz/sr]

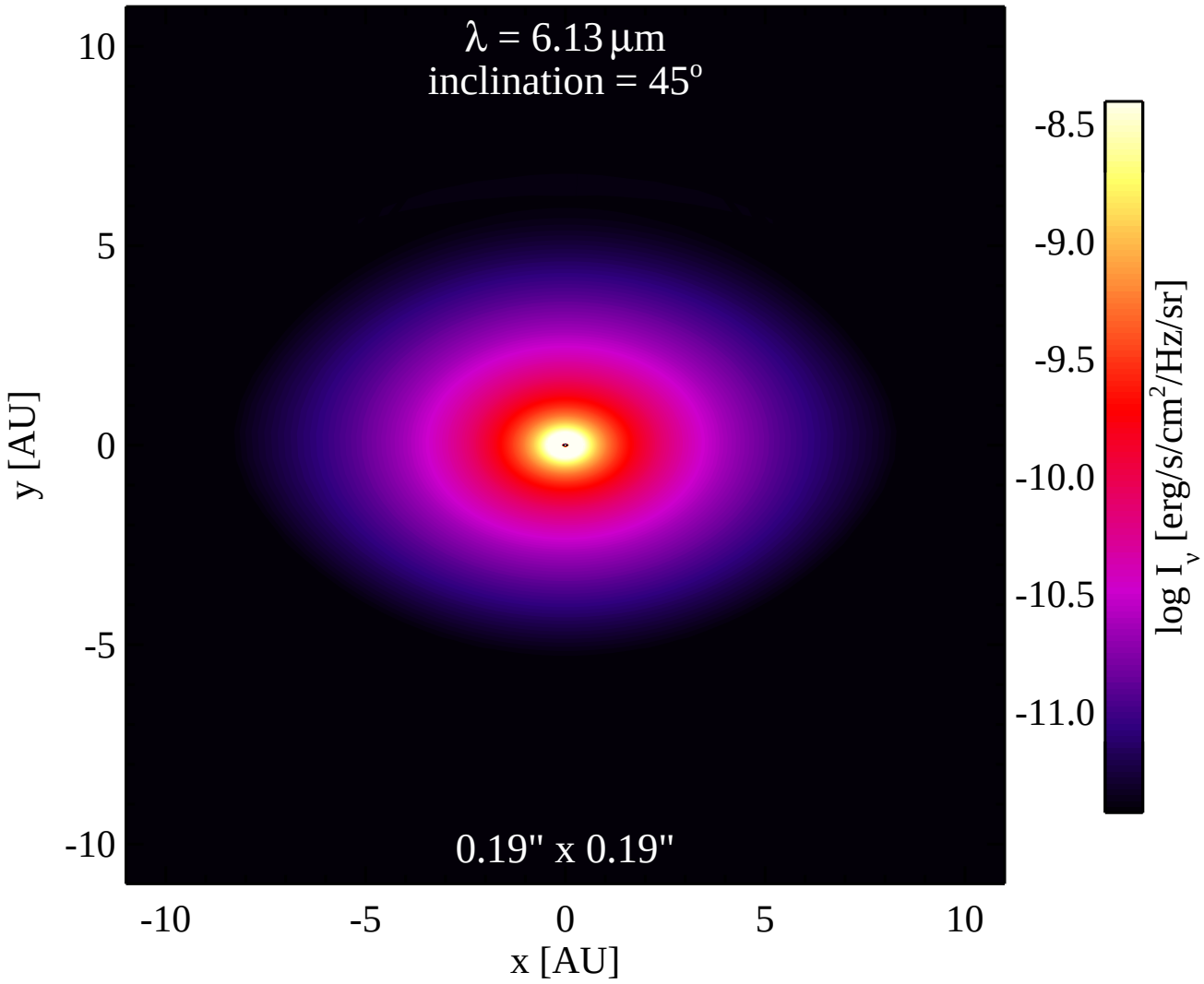

λ = 3.13 μm
inclination = 45°
0.14" x 0.14"
y [AU]
x [AU]
5
0
-5
-5
0
5
-9
-10
-11
log I_ν [erg/s/cm²/Hz/sr]

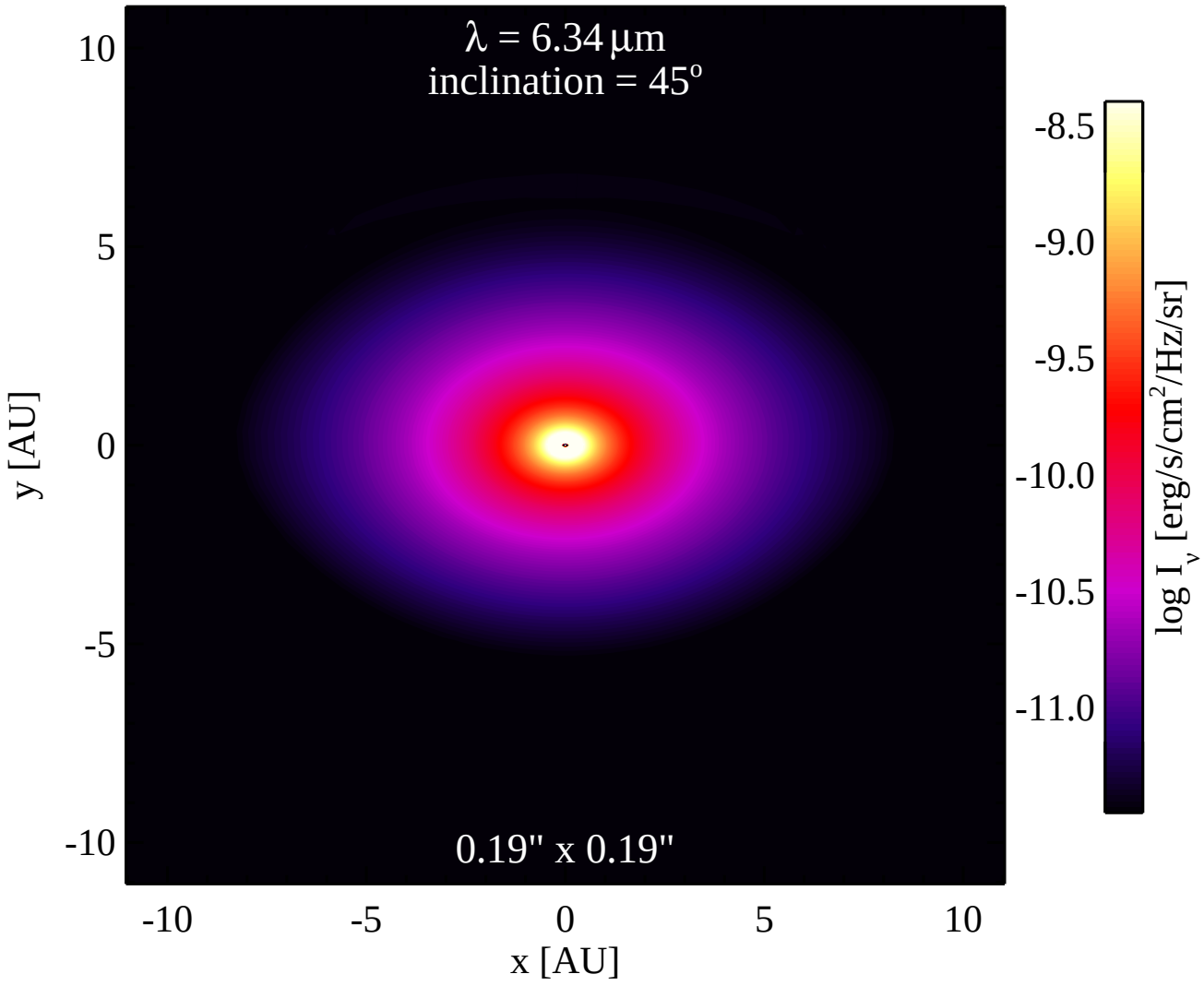

λ = 3.30 μm
inclination = 45°
0.18" x 0.18"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-8.5
-9.0
-9.5
-10.0
-10.5
-11.0
log I_ν [erg/s/cm²/Hz/sr]

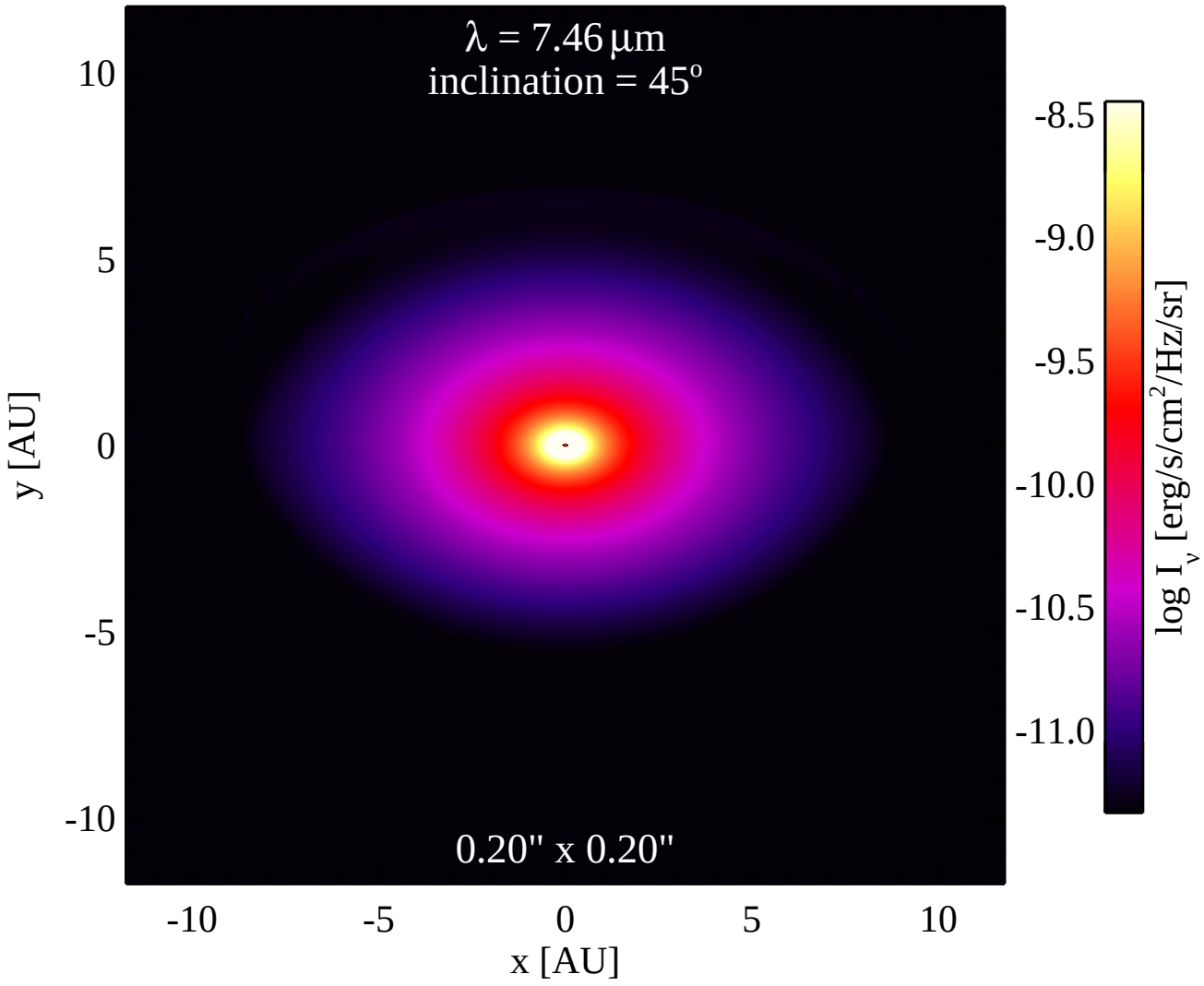

λ = 3.44 μm
inclination = 45°
0.18" x 0.18"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-9.0
-9.5
-10.0
-10.5
-11.0
-11.5
log I_ν [erg/s/cm²/Hz/sr]

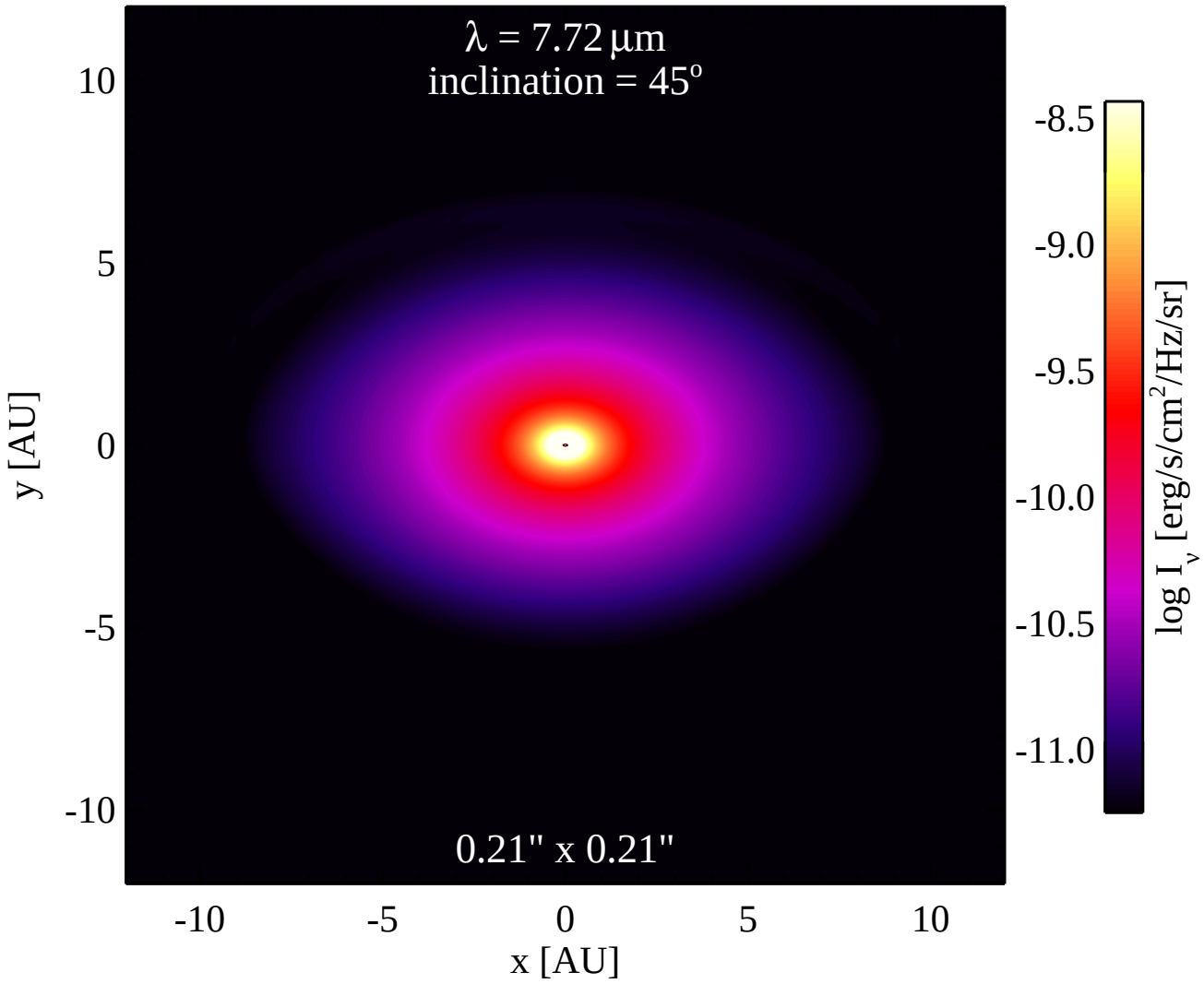

λ = 4.23 μm
inclination = 45°
0.15" x 0.15"
y [AU]
x [AU]
5
0
-5
-5
0
5
-9
-10
-11
log I_ν [erg/s/cm²/Hz/sr]

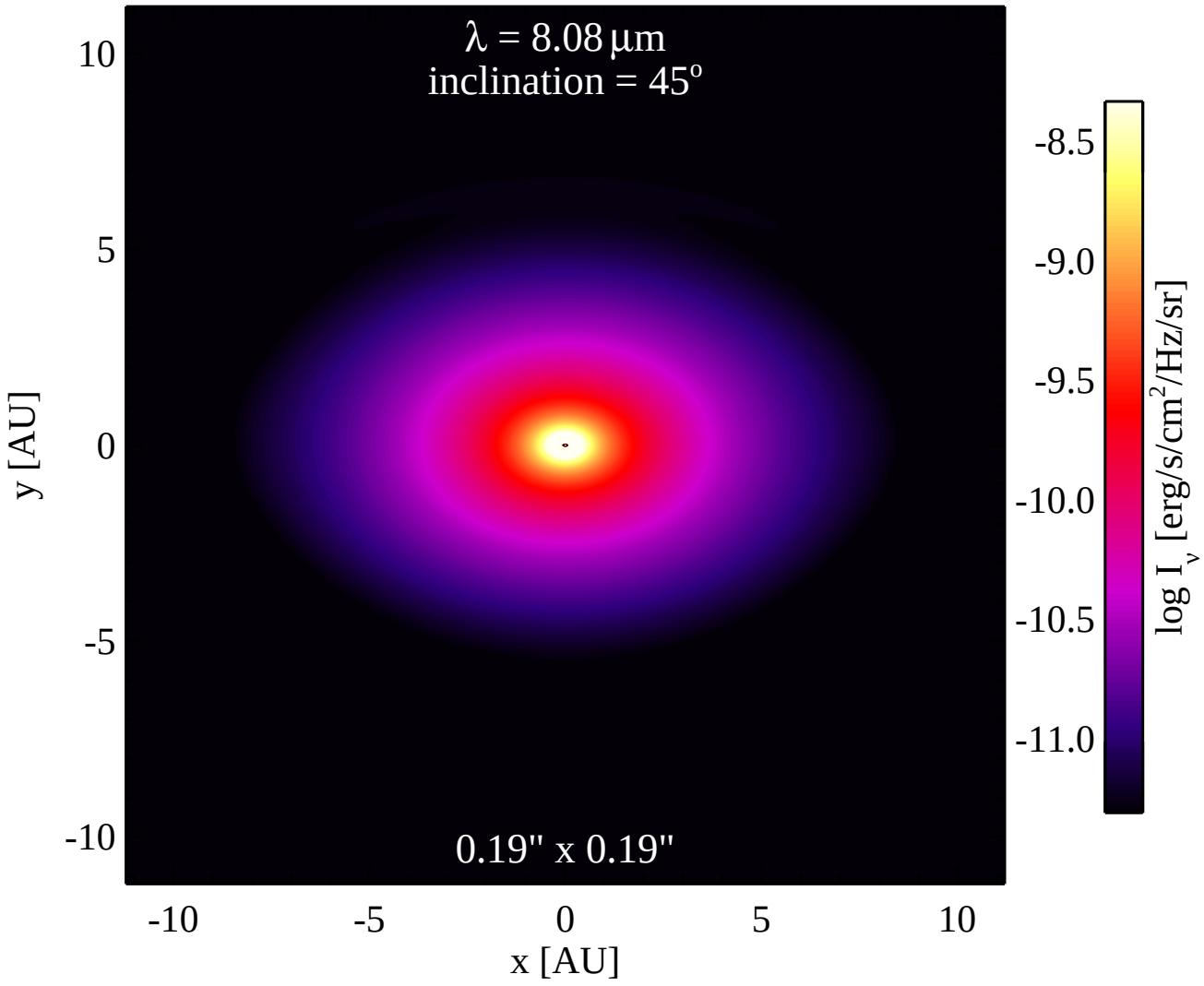

λ = 5.33 μm
inclination = 45°
0.16" x 0.16"
y [AU]
5
0
-5
x [AU]
-5
0
5
log I_ν [erg/s/cm²/Hz/sr]
-8.5
-9.0
-9.5
-10.0
-10.5
-11.0
-11.5

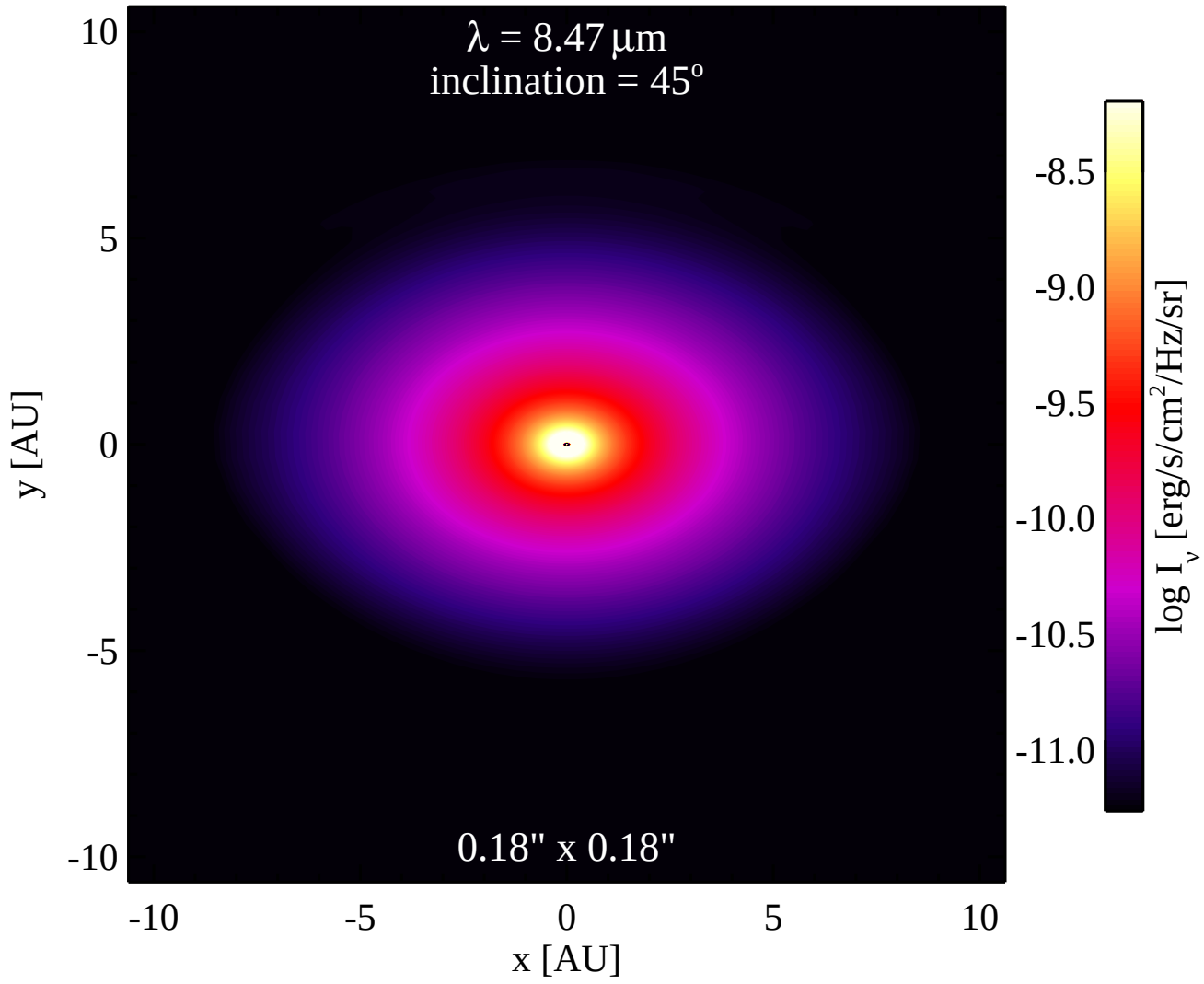

λ = 6.13 μm
inclination = 45°
0.19" x 0.19"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-8.5
-9.0
-9.5
-10.0
-10.5
-11.0
log I_ν [erg/s/cm²/Hz/sr]

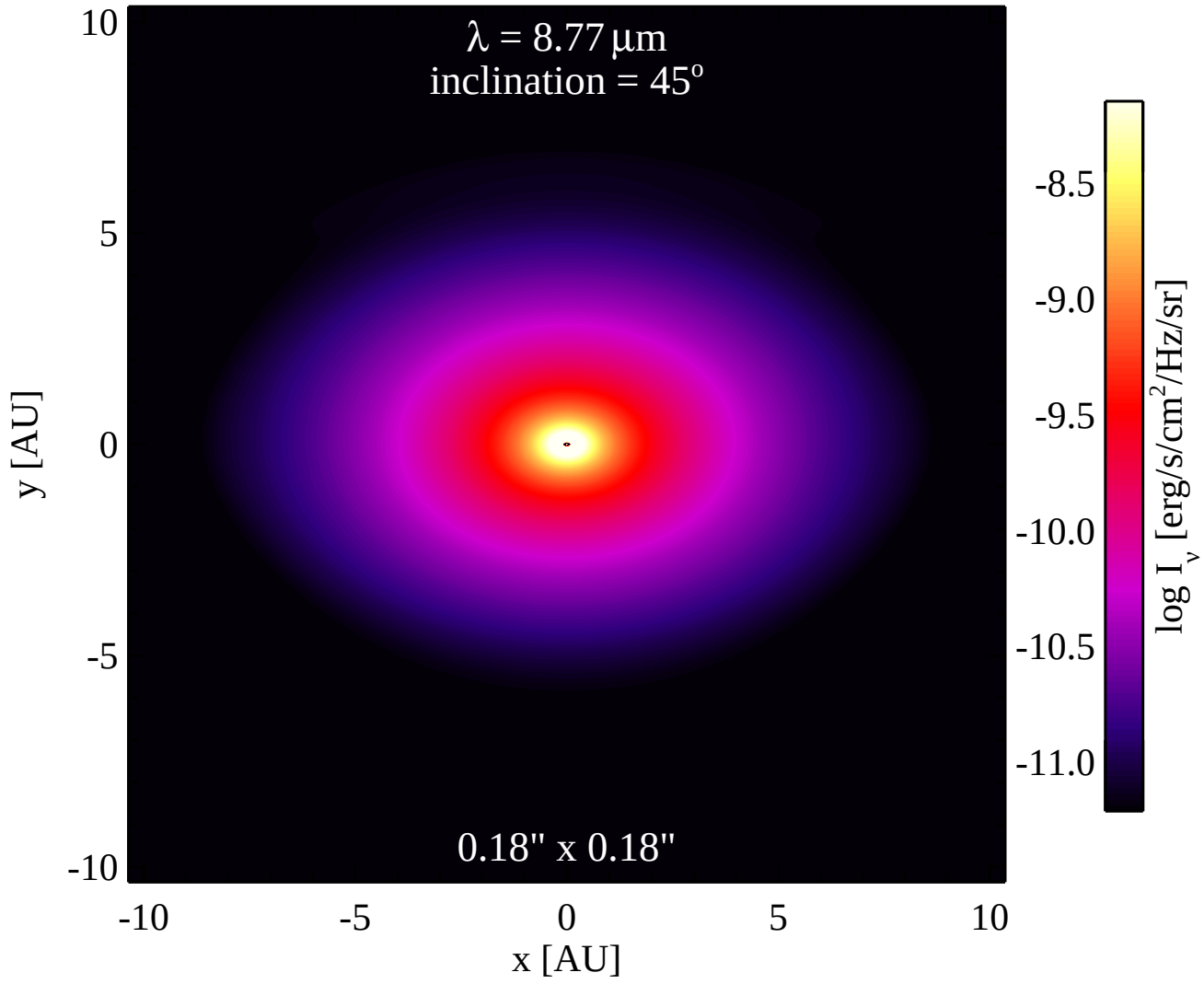

λ = 6.34 μm
inclination = 45°
0.19" x 0.19"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-8.5
-9.0
-9.5
-10.0
-10.5
-11.0
log I_ν [erg/s/cm²/Hz/sr]

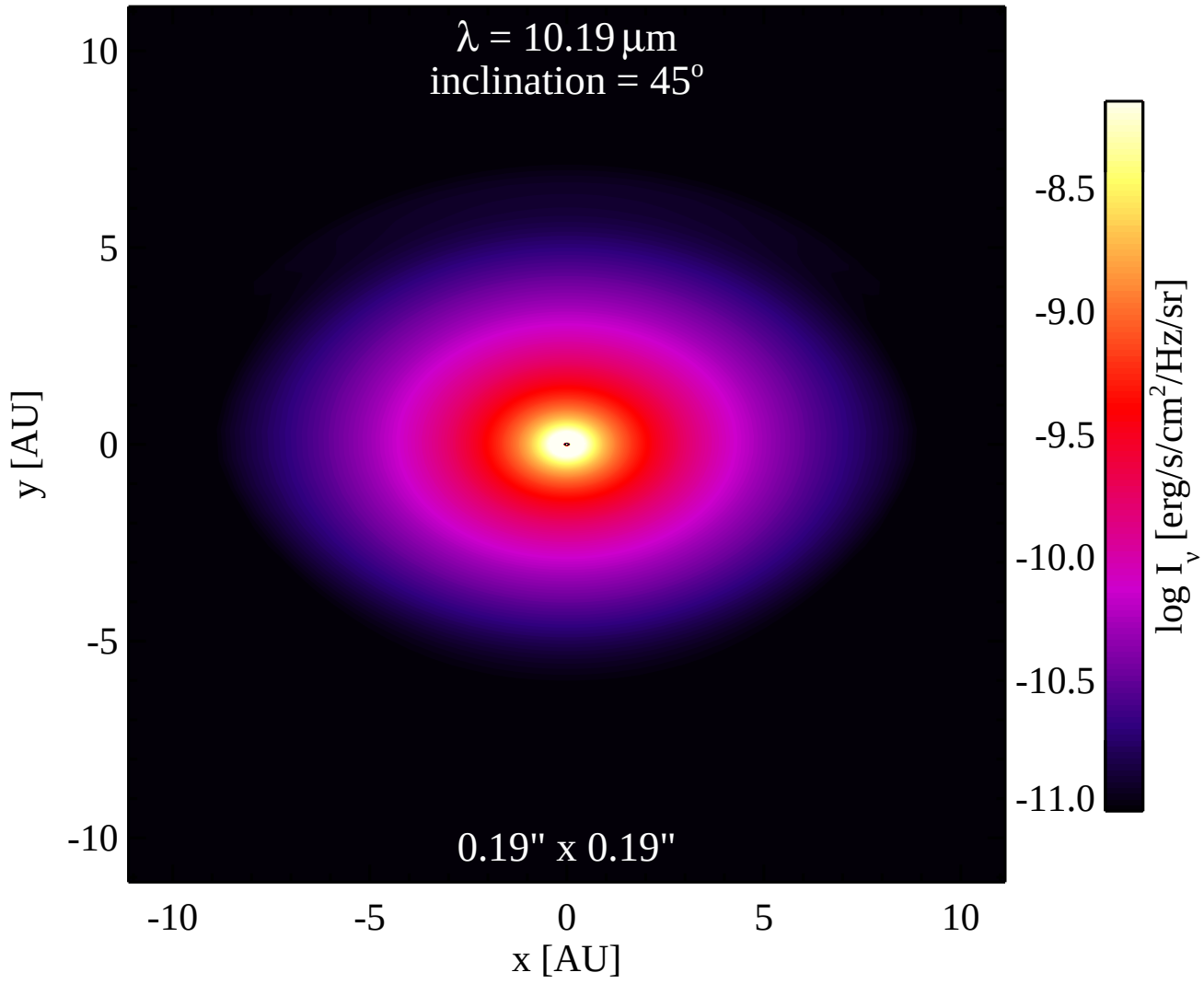

λ = 7.46 μm
inclination = 45°
0.20" x 0.20"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-8.5
-9.0
-9.5
-10.0
-10.5
-11.0
log I_ν [erg/s/cm²/Hz/sr]

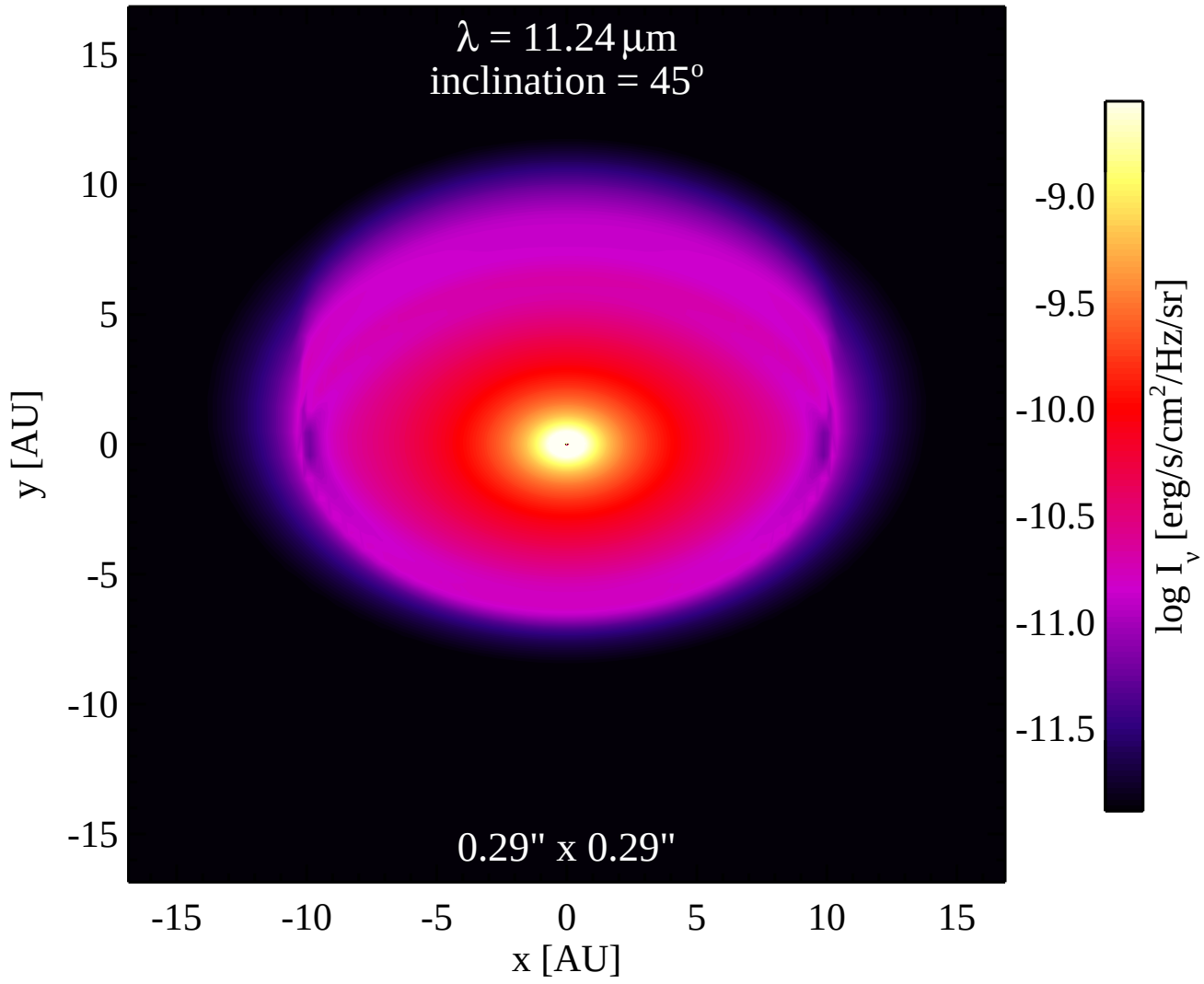

λ = 7.72 μm
inclination = 45°
0.21" x 0.21"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-8.5
-9.0
-9.5
-10.0
-10.5
-11.0
log I_ν [erg/s/cm²/Hz/sr]

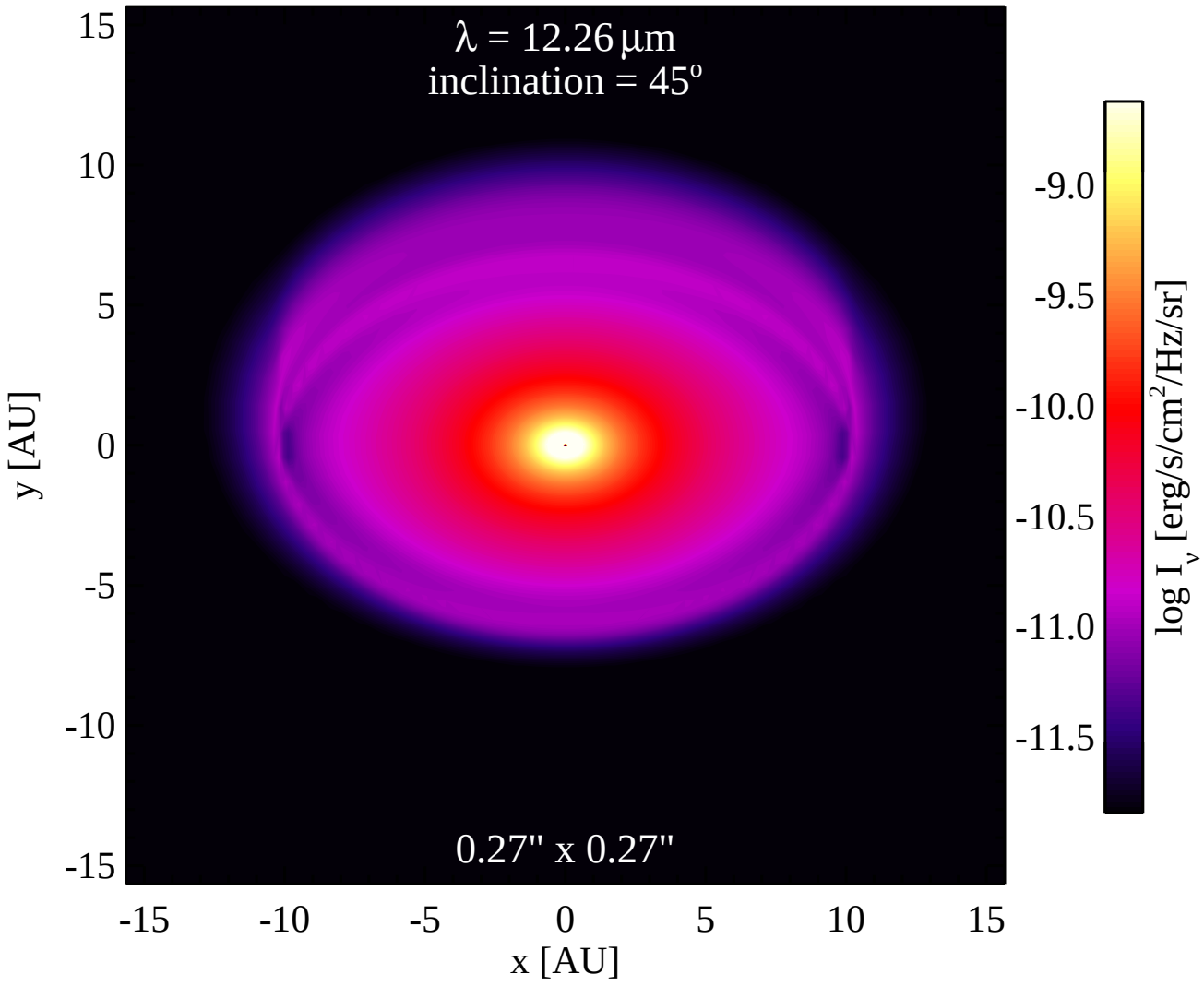

λ = 8.08 μm
inclination = 45°
0.19" x 0.19"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-8.5
-9.0
-9.5
-10.0
-10.5
-11.0
log I_ν [erg/s/cm²/Hz/sr]

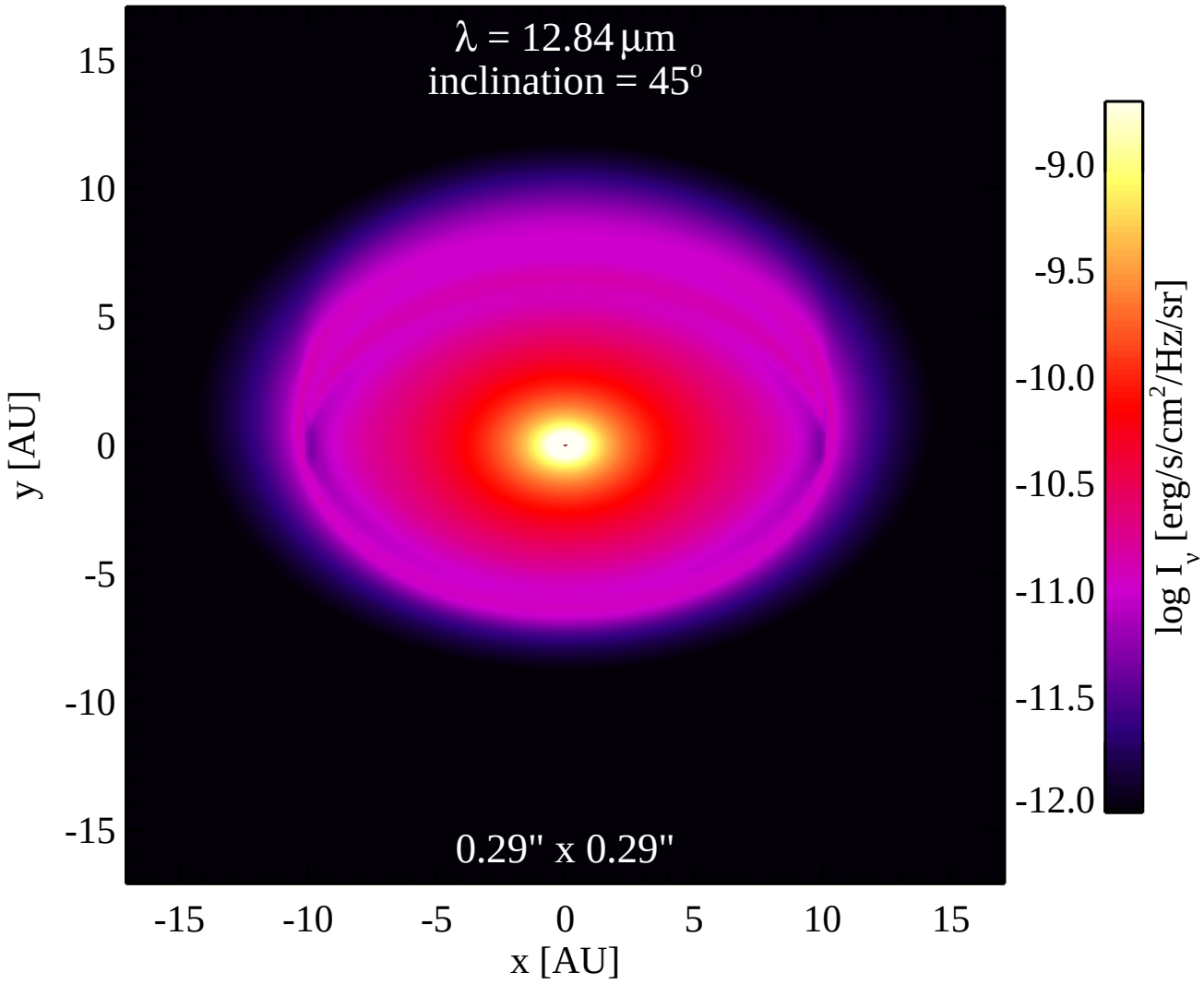

λ = 8.47 μm
inclination = 45°
0.18" x 0.18"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-8.5
-9.0
-9.5
-10.0
-10.5
-11.0
log I_ν [erg/s/cm²/Hz/sr]

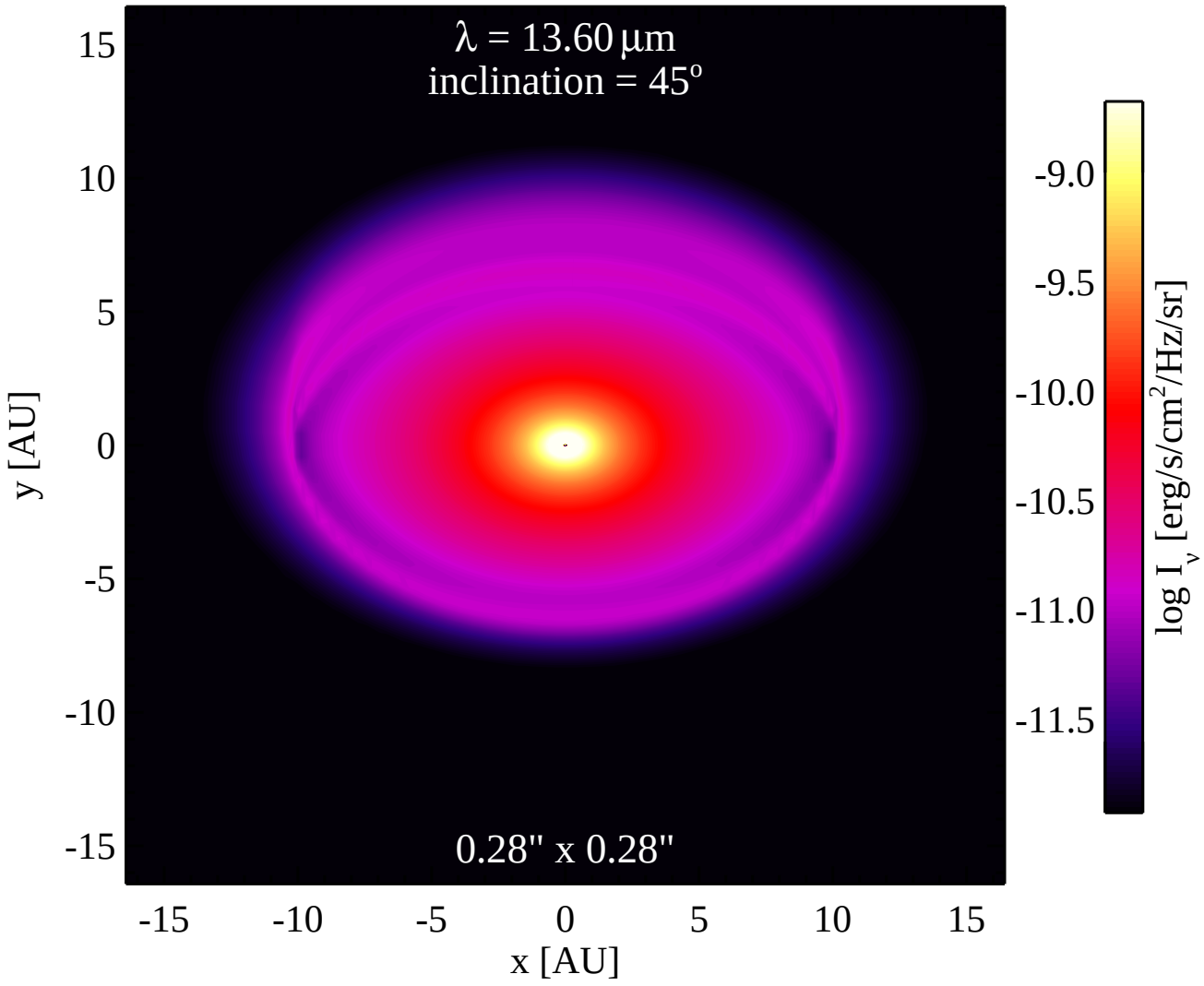

λ = 8.77 μm
inclination = 45°
0.18" x 0.18"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-8.5
-9.0
-9.5
-10.0
-10.5
-11.0
log I_ν [erg/s/cm²/Hz/sr]

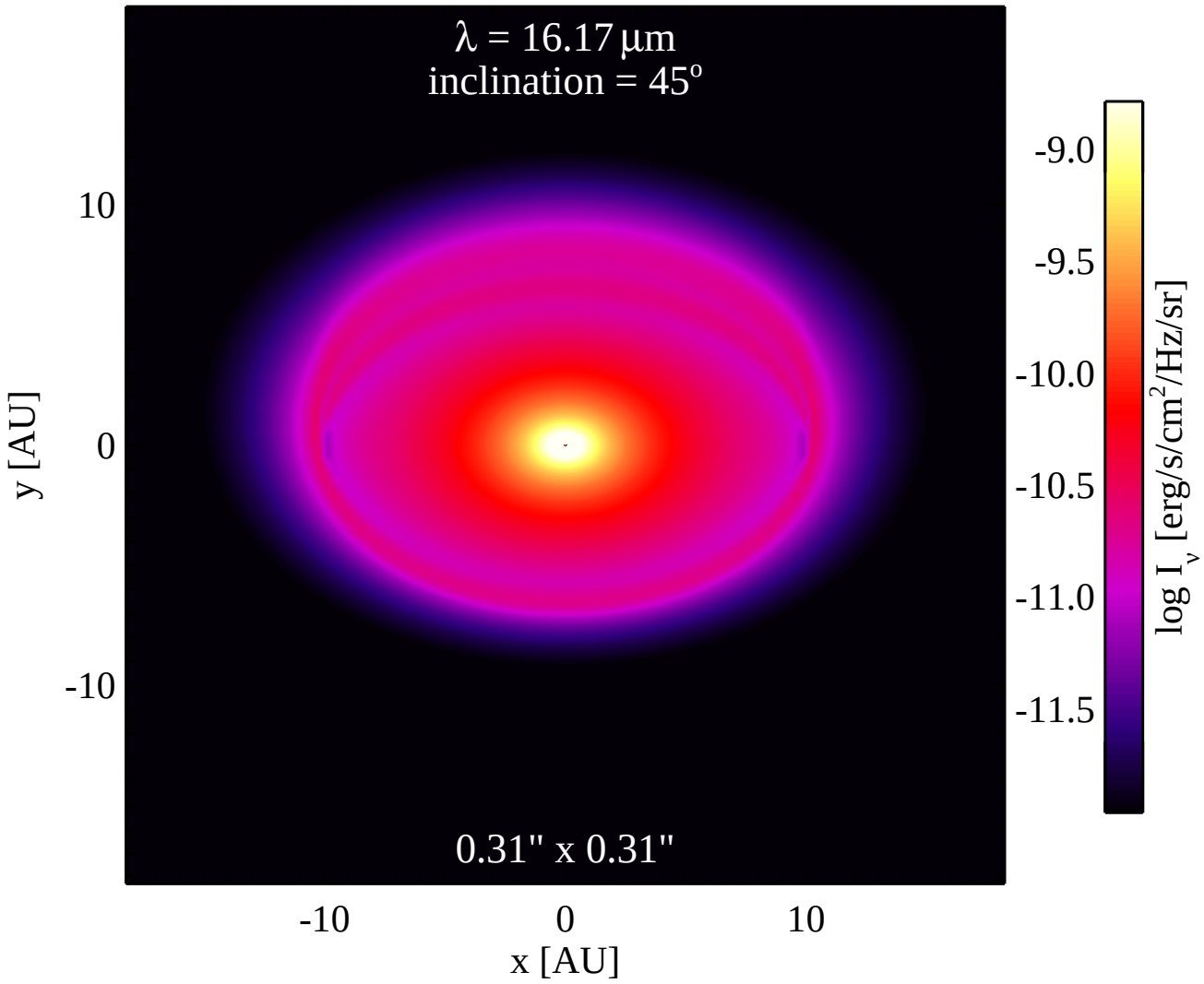

λ = 10.19 μm
inclination = 45°
0.19" x 0.19"
10
5
0
-5
-10
y [AU]
-10
-5
0
5
10
x [AU]
-8.5
-9.0
-9.5
-10.0
-10.5
-11.0
log I_ν [erg/s/cm²/Hz/sr]

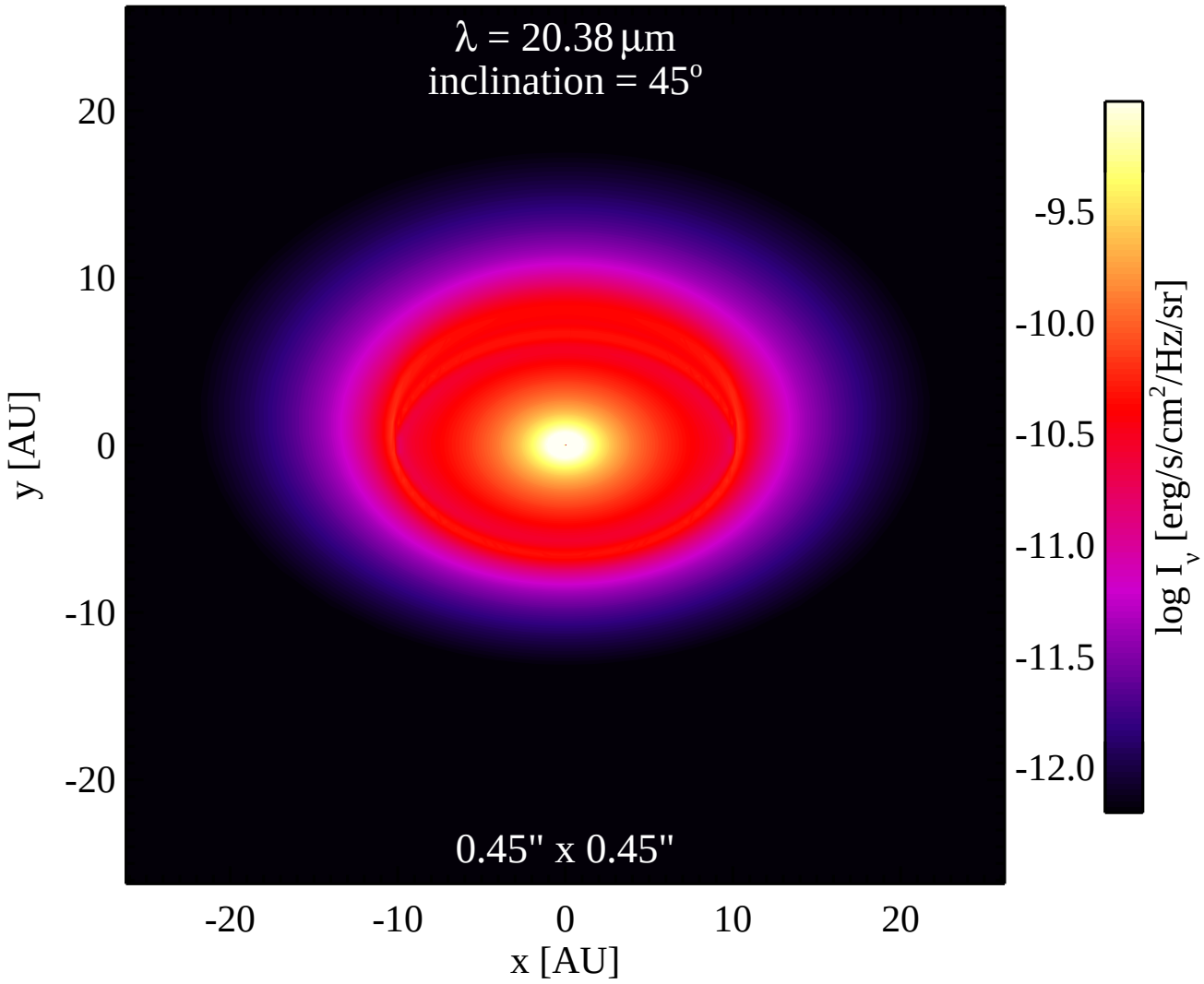

λ = 11.24 μm
inclination = 45°
0.29" x 0.29"
15
10
5
0
-5
-10
-15
y [AU]
-15
-10
-5
0
5
10
15
x [AU]
-9.0
-9.5
-10.0
-10.5
-11.0
-11.5
log I_ν [erg/s/cm²/Hz/sr]

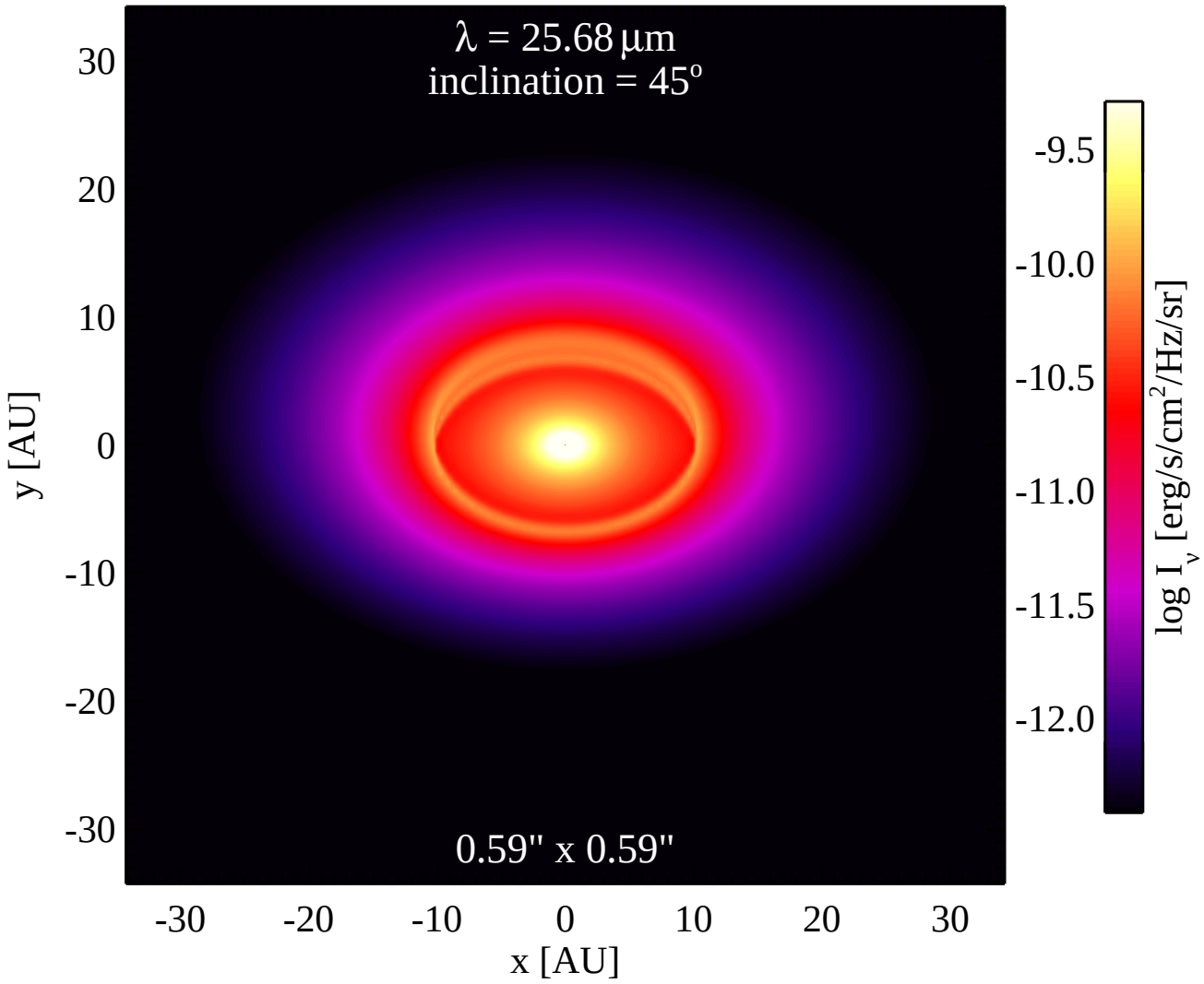

λ = 12.26 μm
inclination = 45°
0.27" x 0.27"
15
10
5
0
-5
-10
-15
y [AU]
-15
-10
-5
0
5
10
15
x [AU]
-9.0
-9.5
-10.0
-10.5
-11.0
-11.5
log I_ν [erg/s/cm²/Hz/sr]

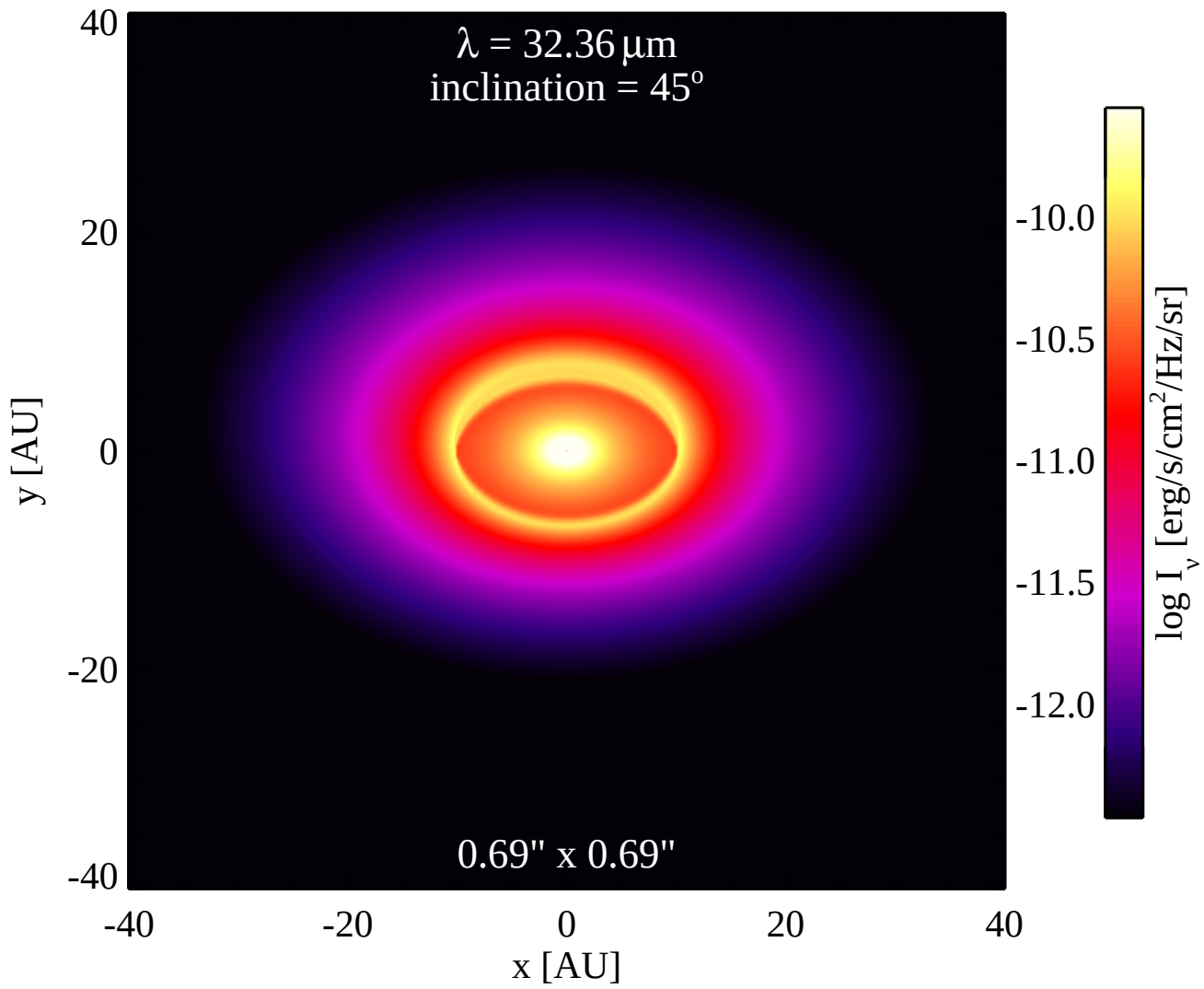

λ = 12.84 μm
inclination = 45°
0.29" x 0.29"
15
10
5
0
-5
-10
-15
y [AU]
-15
-10
-5
0
5
10
15
x [AU]
-9.0
-9.5
-10.0
-10.5
-11.0
-11.5
-12.0
log I_ν [erg/s/cm²/Hz/sr]

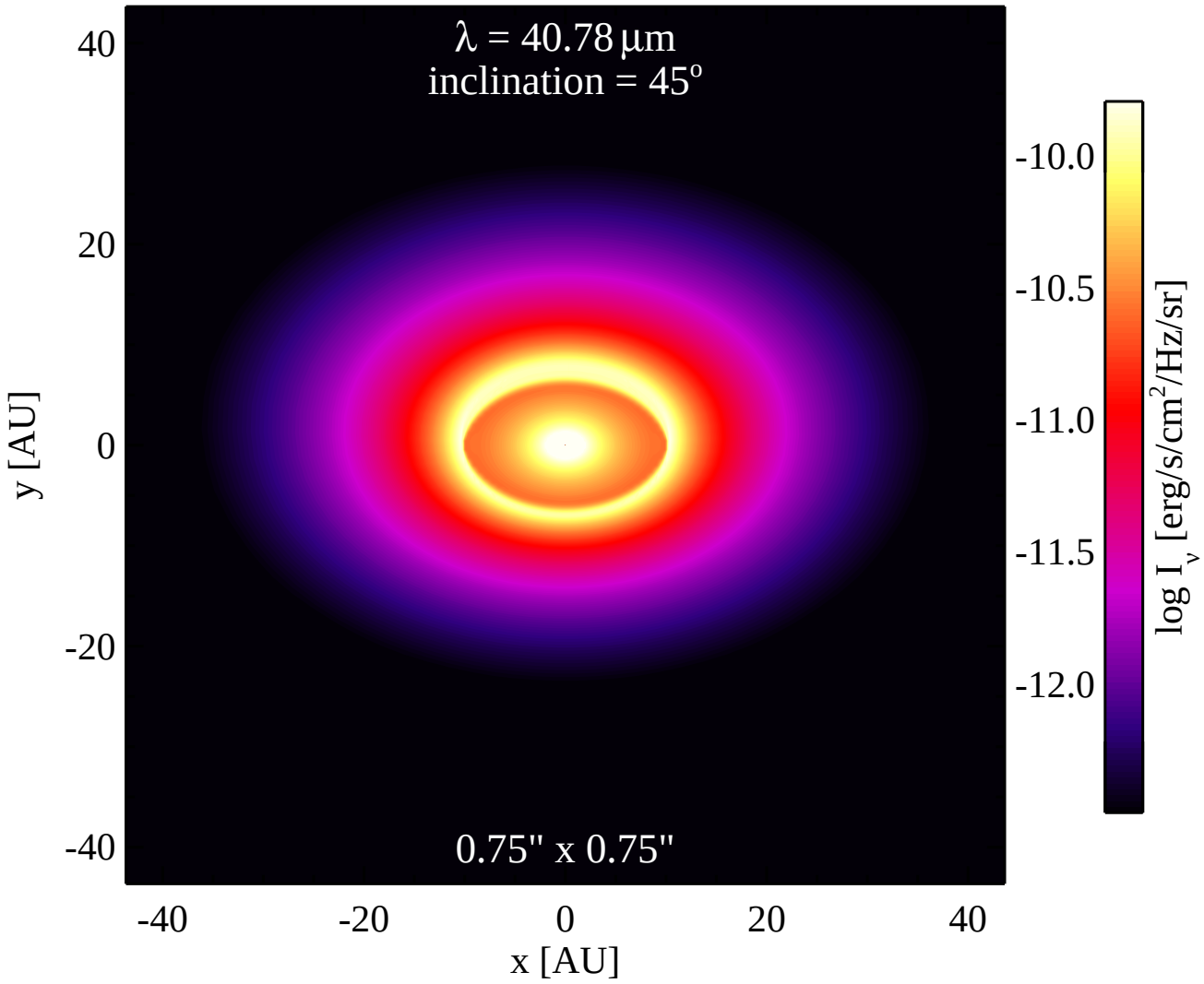

λ = 13.60 μm
inclination = 45°
0.28" x 0.28"
15
10
5
0
-5
-10
-15
y [AU]
-15
-10
-5
0
5
10
15
x [AU]
-9.0
-9.5
-10.0
-10.5
-11.0
-11.5
log I_ν [erg/s/cm²/Hz/sr]

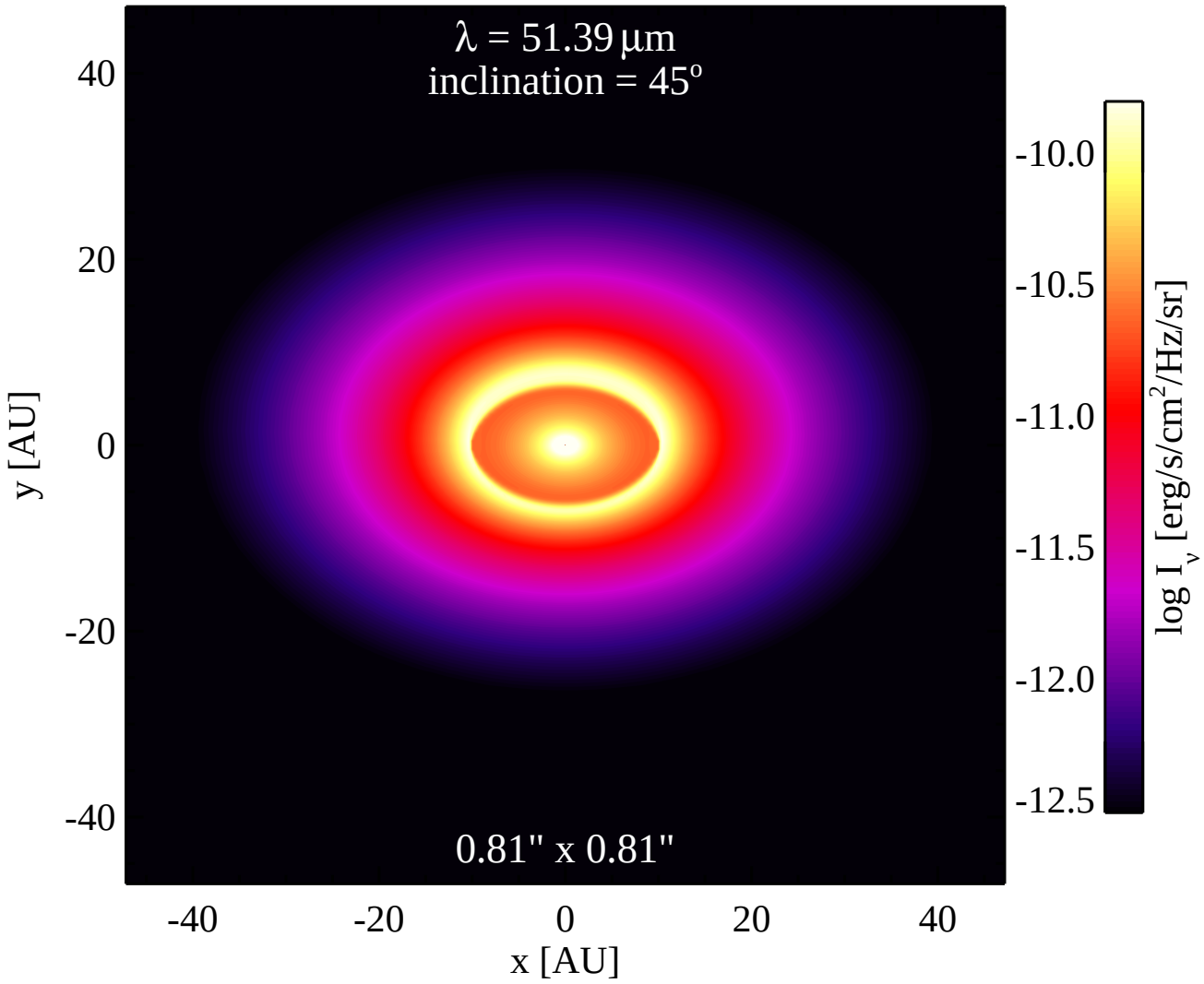

λ = 16.17 μm
inclination = 45°
0.31" x 0.31"
10
0
-10
y [AU]
-10
0
10
x [AU]
-9.0
-9.5
-10.0
-10.5
-11.0
-11.5
log I_ν [erg/s/cm²/Hz/sr]

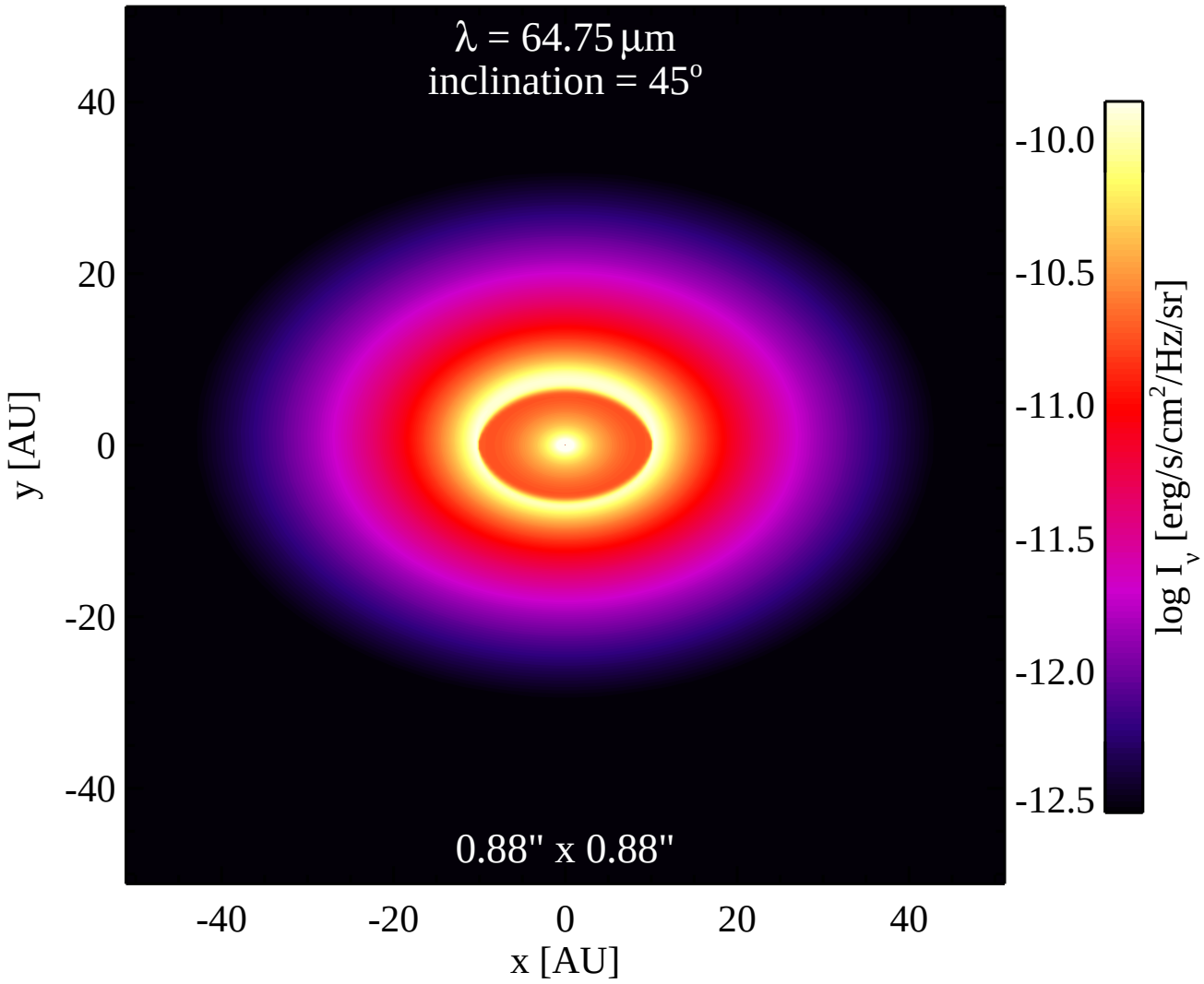

λ = 20.38 μm
inclination = 45°
0.45" x 0.45"
20
10
0
-10
-20
y [AU]
-20
-10
0
10
20
x [AU]
-9.5
-10.0
-10.5
-11.0
-11.5
-12.0
log I_ν [erg/s/cm²/Hz/sr]

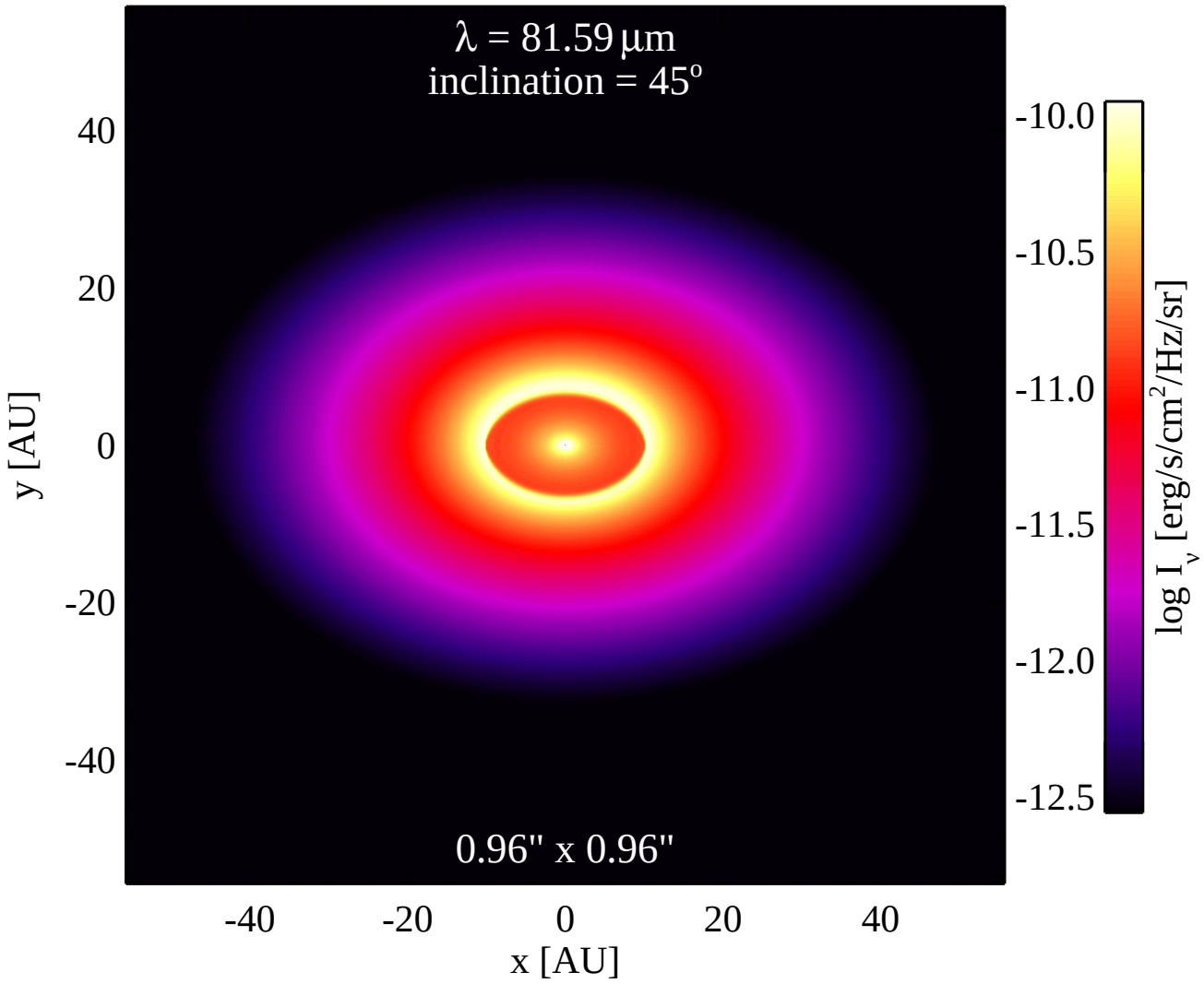

λ = 25.68 μm
inclination = 45°
0.59" x 0.59"
30
20
10
0
-10
-20
-30
y [AU]
-30
-20
-10
0
10
20
30
x [AU]
-9.5
-10.0
-10.5
-11.0
-11.5
-12.0
log I_ν [erg/s/cm²/Hz/sr]

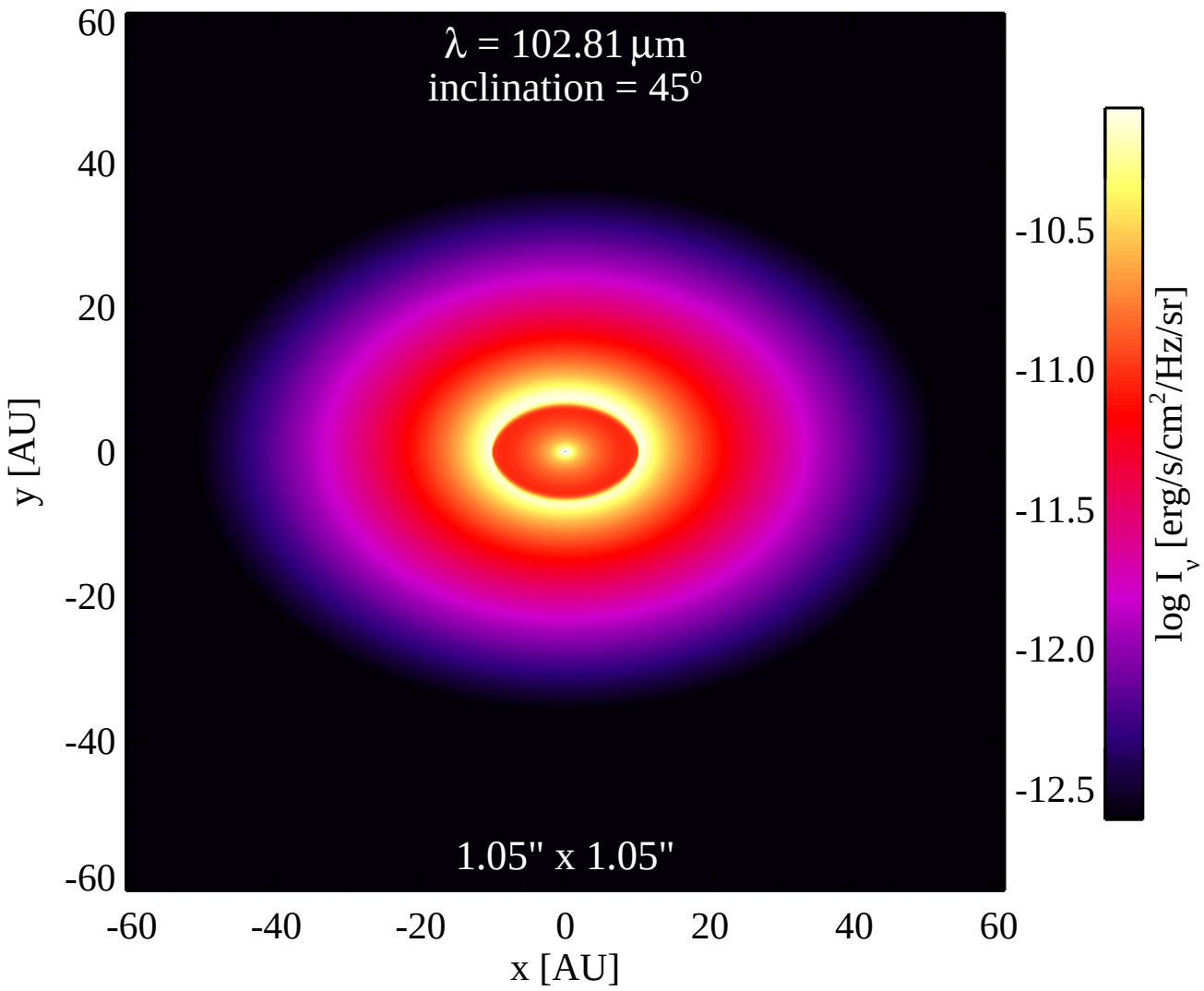

λ = 32.36 μm
inclination = 45°
0.69" x 0.69"
40
20
0
-20
-40
y [AU]
-40
-20
0
20
40
x [AU]
-10.0
-10.5
-11.0
-11.5
-12.0
log I_ν [erg/s/cm²/Hz/sr]

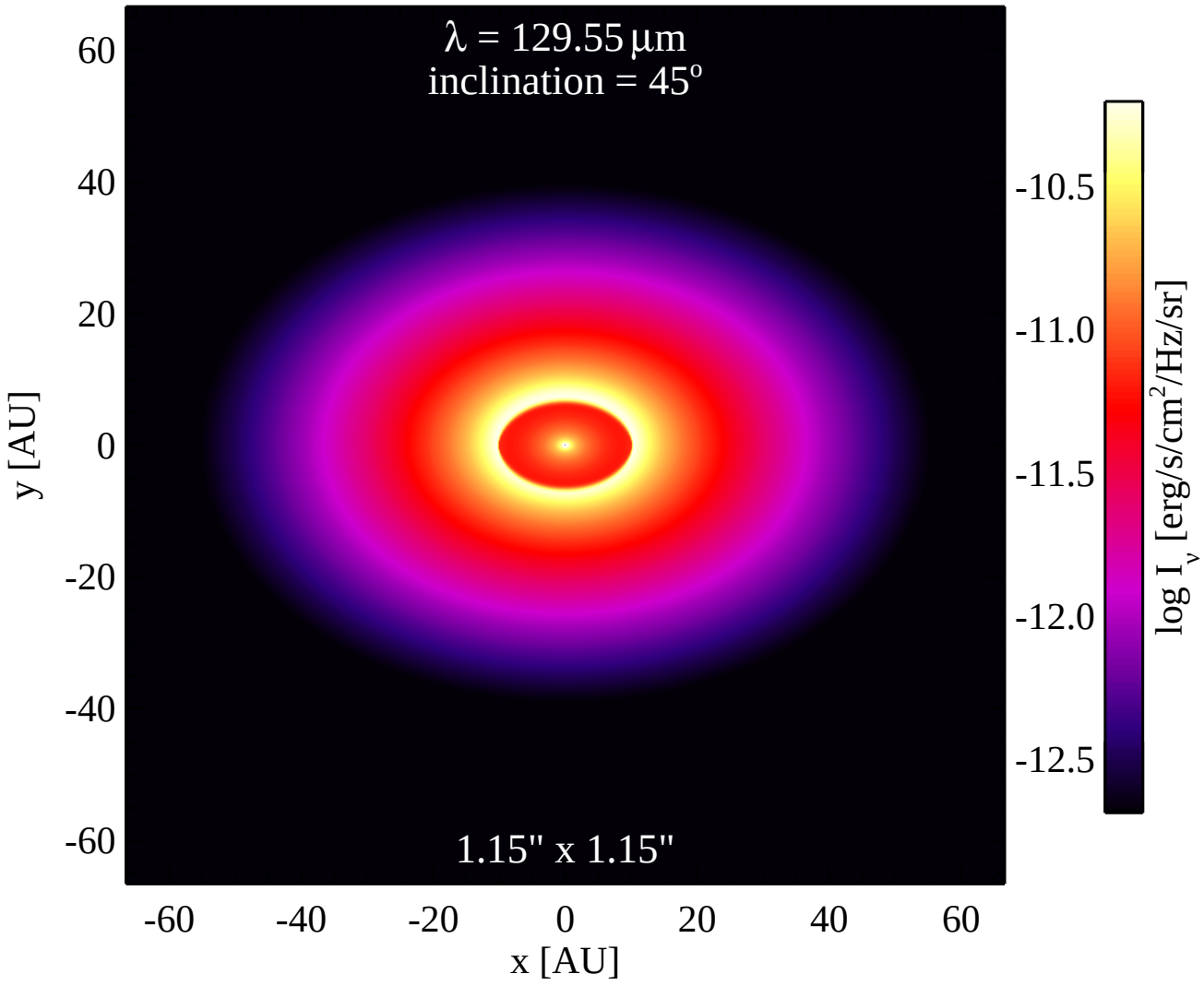

λ = 40.78 μm
inclination = 45°
0.75" x 0.75"
40
20
0
-20
-40
y [AU]
-40
-20
0
20
40
x [AU]
-10.0
-10.5
-11.0
-11.5
-12.0
log I_ν [erg/s/cm²/Hz/sr]

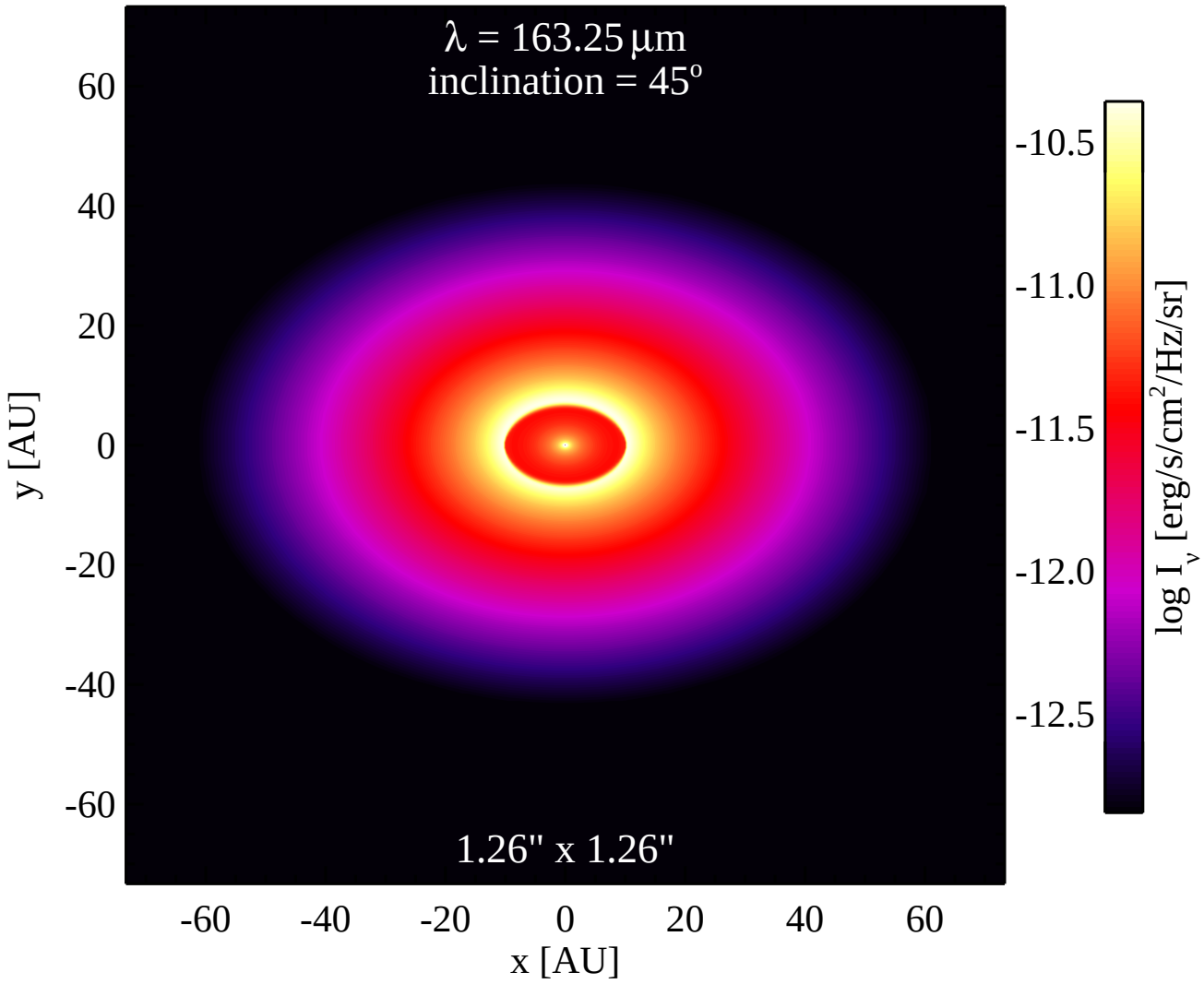

λ = 51.39 μm
inclination = 45°
0.81" x 0.81"
40
20
0
-20
-40
y [AU]
-40
-20
0
20
40
x [AU]
-10.0
-10.5
-11.0
-11.5
-12.0
-12.5
log I_ν [erg/s/cm²/Hz/sr]

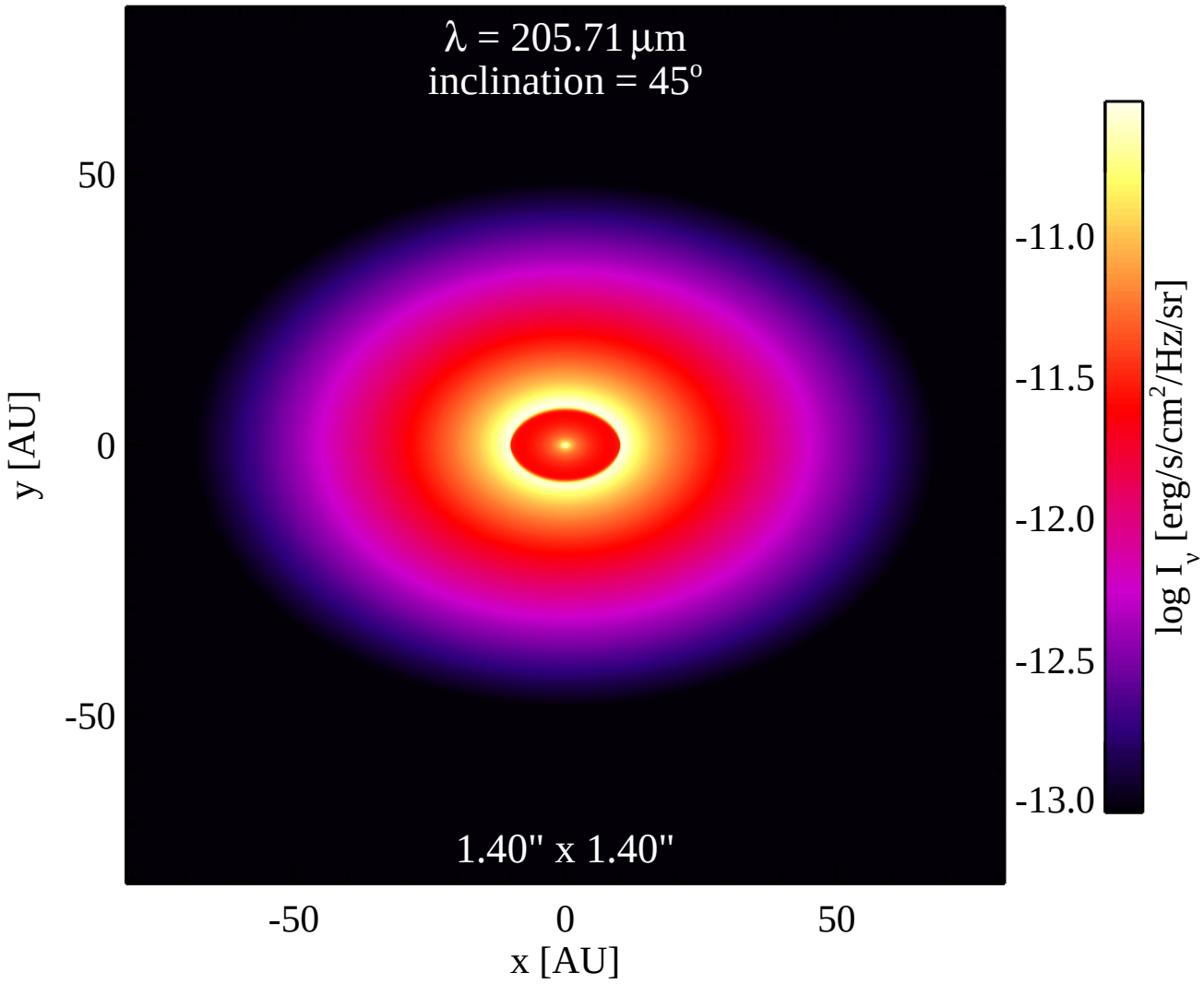

λ = 64.75 μm
inclination = 45°
0.88" x 0.88"
40
20
0
-20
-40
y [AU]
-40
-20
0
20
40
x [AU]
-10.0
-10.5
-11.0
-11.5
-12.0
-12.5
log I_ν [erg/s/cm²/Hz/sr]

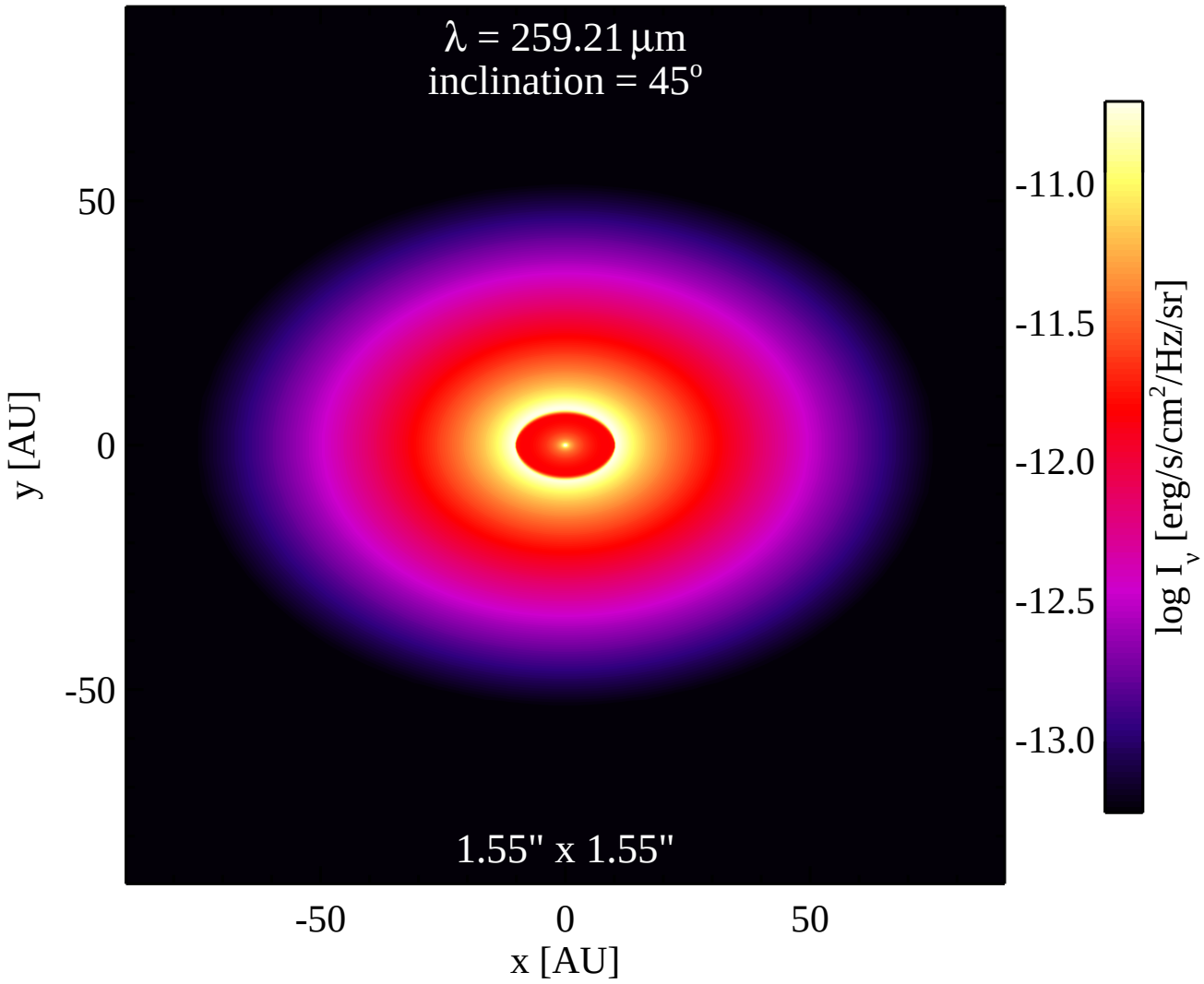

λ = 81.59 μm
inclination = 45°
0.96" x 0.96"
40
20
0
-20
-40
y [AU]
-40
-20
0
20
40
x [AU]
-10.0
-10.5
-11.0
-11.5
-12.0
-12.5
log I_ν [erg/s/cm²/Hz/sr]

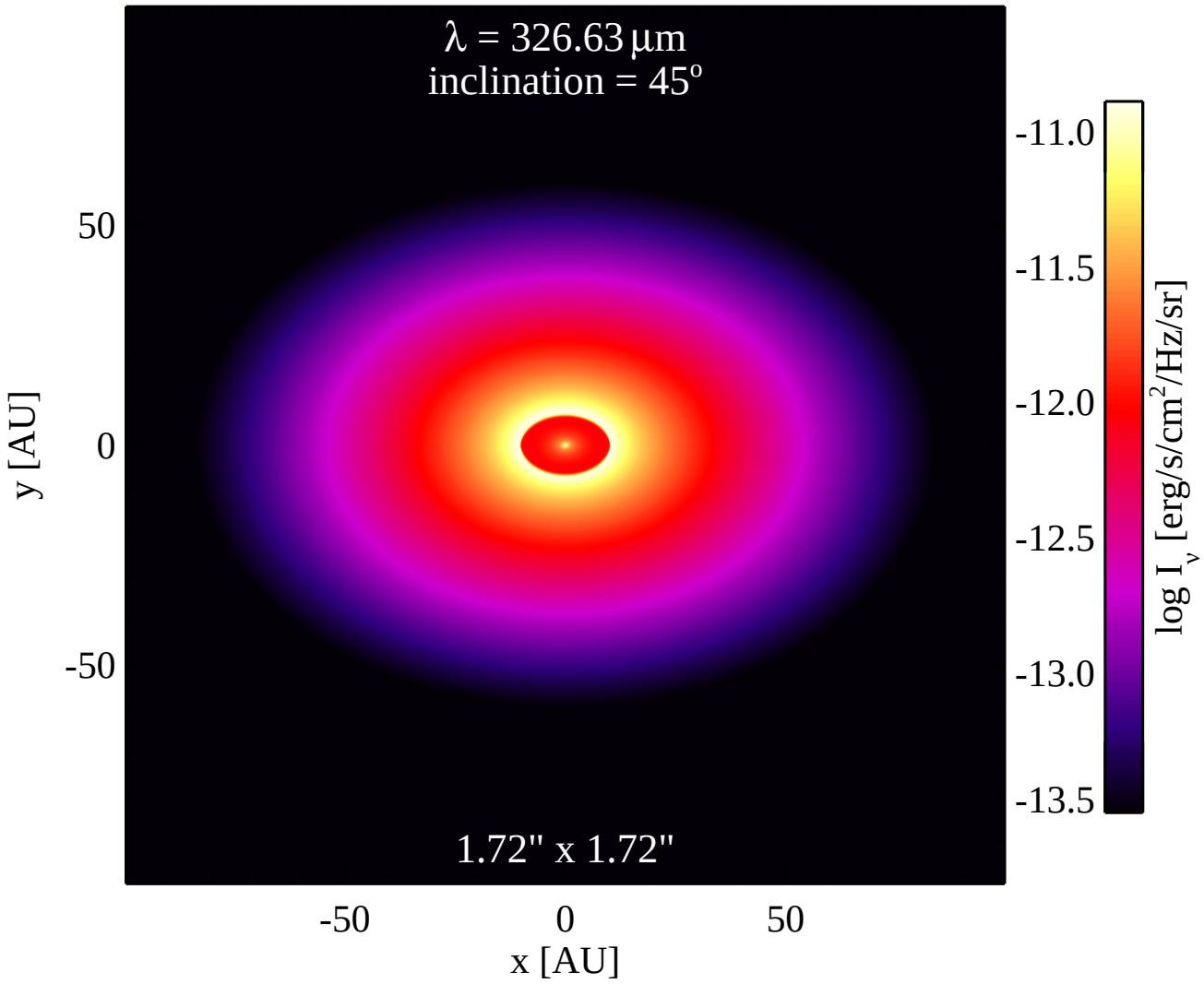

λ = 102.81 μm
inclination = 45°
1.05" x 1.05"
60
40
20
0
-20
-40
-60
y [AU]
-60
-40
-20
0
20
40
60
x [AU]
-10.5
-11.0
-11.5
-12.0
-12.5
log I_ν [erg/s/cm²/Hz/sr]

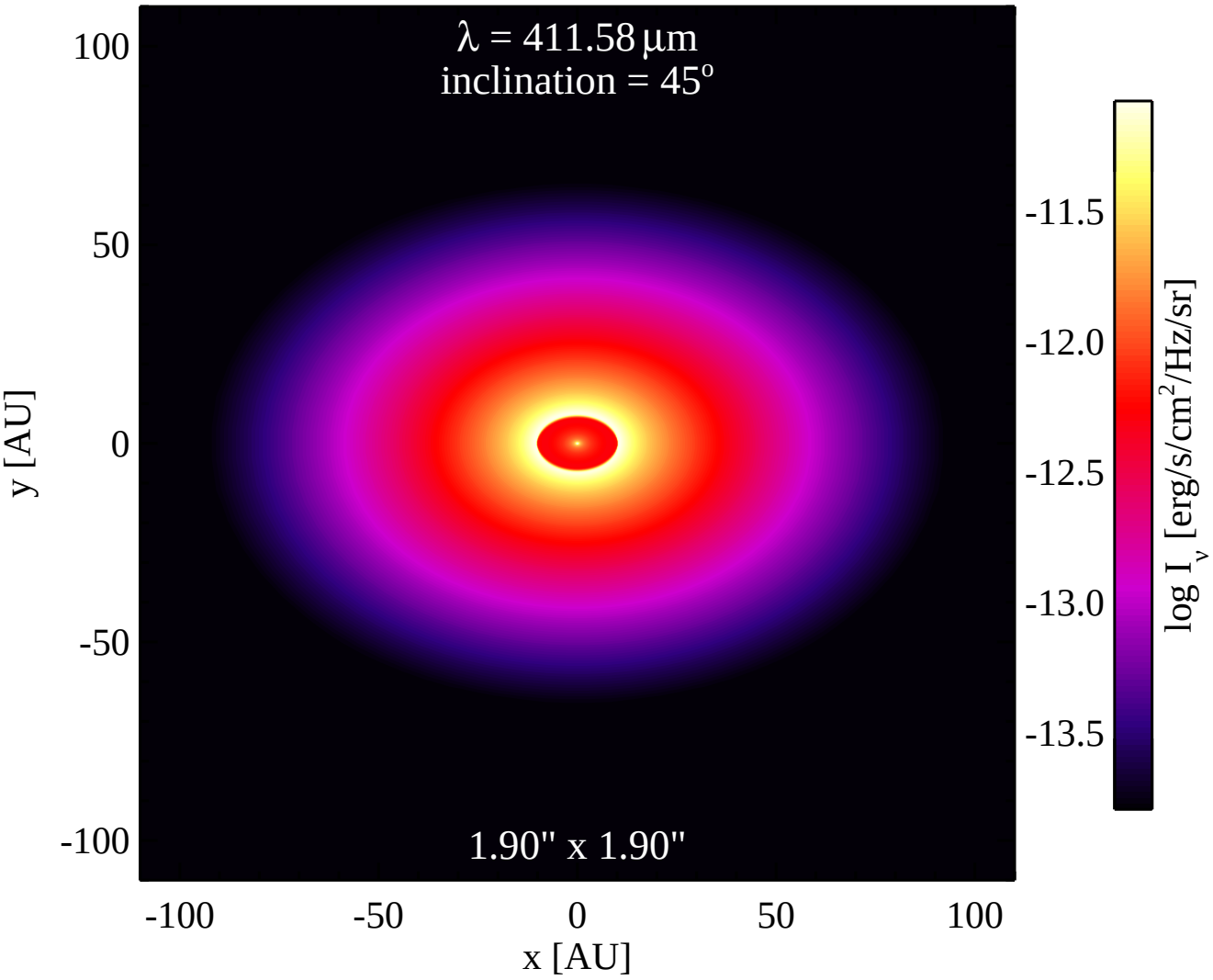

λ = 129.55 μm
inclination = 45°
1.15" x 1.15"
60
40
20
0
-20
-40
-60
y [AU]
-60
-40
-20
0
20
40
60
x [AU]
-10.5
-11.0
-11.5
-12.0
-12.5
log I_ν [erg/s/cm²/Hz/sr]

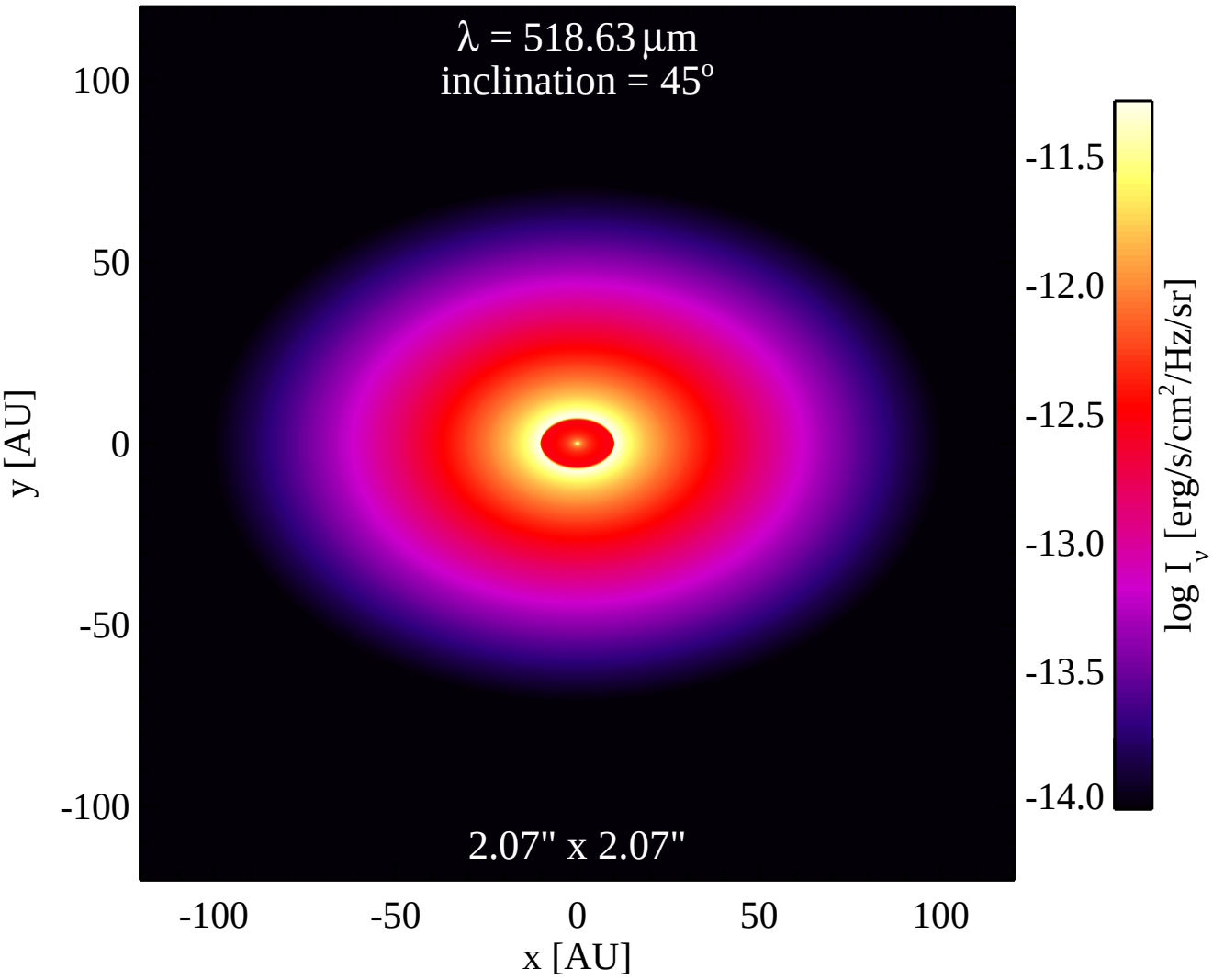

λ = 163.25 μm
inclination = 45°
1.26" x 1.26"
60
40
20
0
-20
-40
-60
y [AU]
-60
-40
-20
0
20
40
60
x [AU]
-10.5
-11.0
-11.5
-12.0
-12.5
log I_ν [erg/s/cm²/Hz/sr]

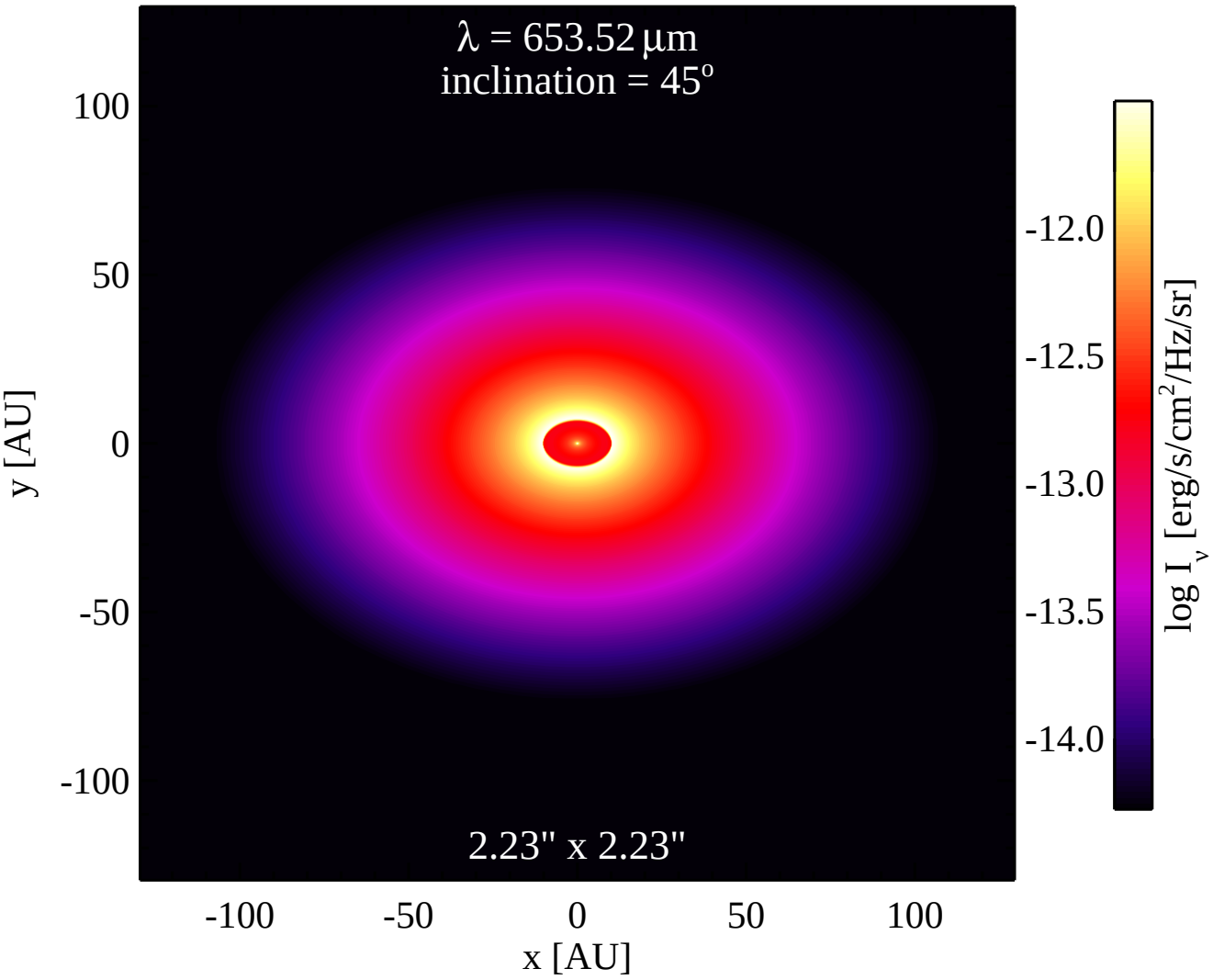

λ = 205.71 μm
inclination = 45°
1.40" x 1.40"
50
0
-50
y [AU]
-50
0
50
x [AU]
-11.0
-11.5
-12.0
-12.5
-13.0
log I_ν [erg/s/cm²/Hz/sr]

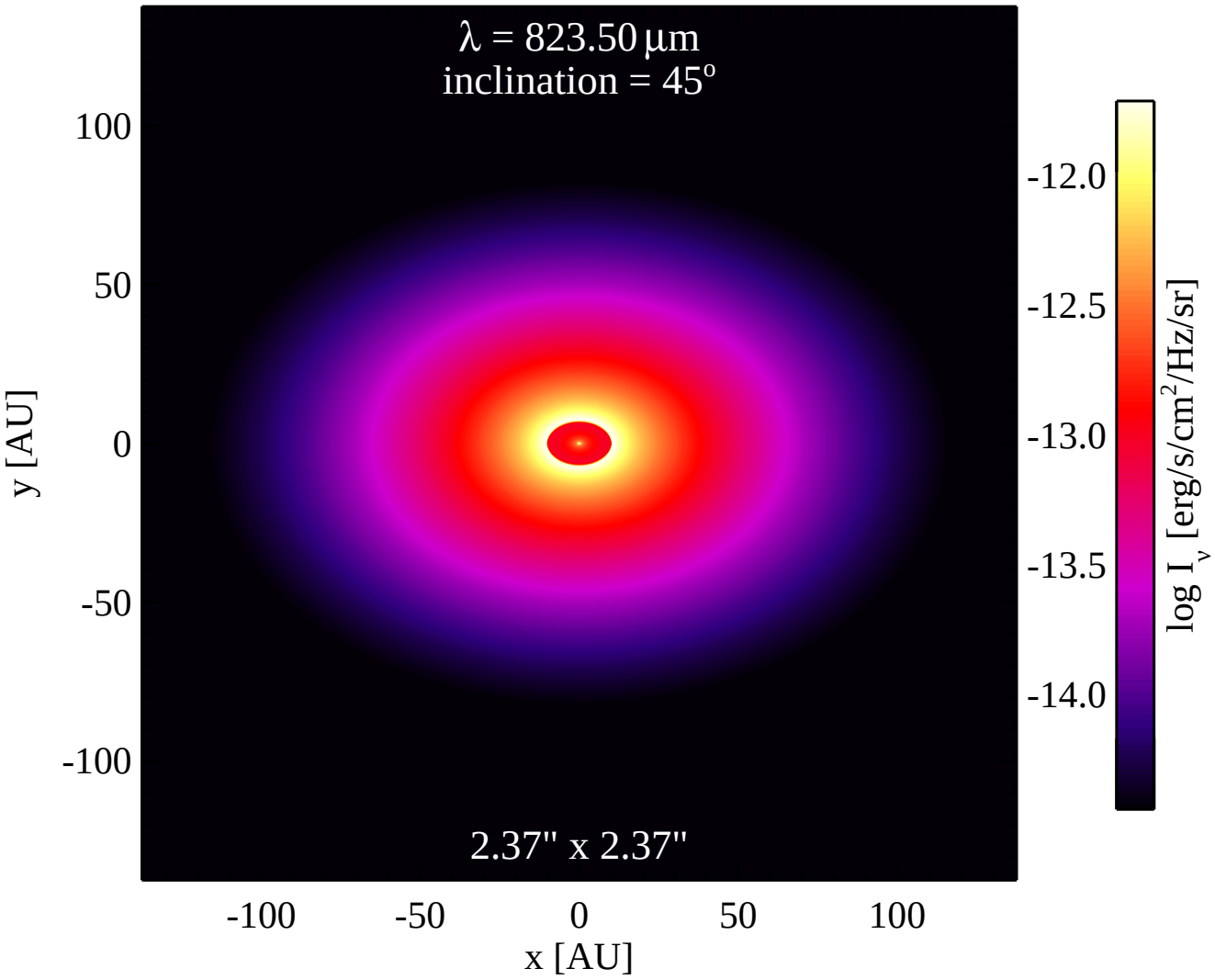

λ = 259.21 μm
inclination = 45°
1.55" x 1.55"
50
0
-50
y [AU]
-50
0
50
x [AU]
-11.0
-11.5
-12.0
-12.5
-13.0
log I_ν [erg/s/cm²/Hz/sr]

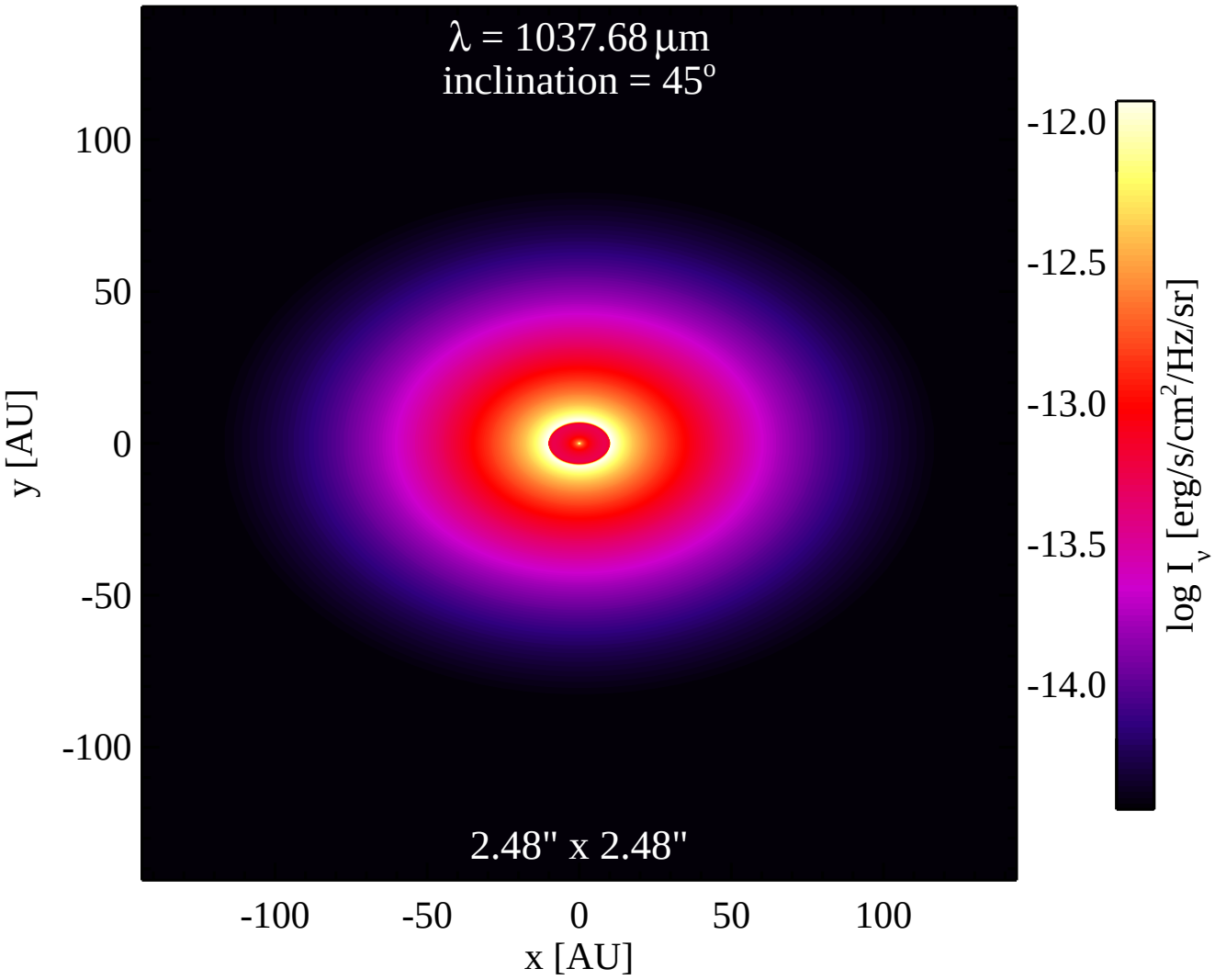

λ = 326.63 μm
inclination = 45°
1.72" x 1.72"
50
0
-50
y [AU]
-50
0
50
x [AU]
-11.0
-11.5
-12.0
-12.5
-13.0
-13.5
log I_ν [erg/s/cm²/Hz/sr]

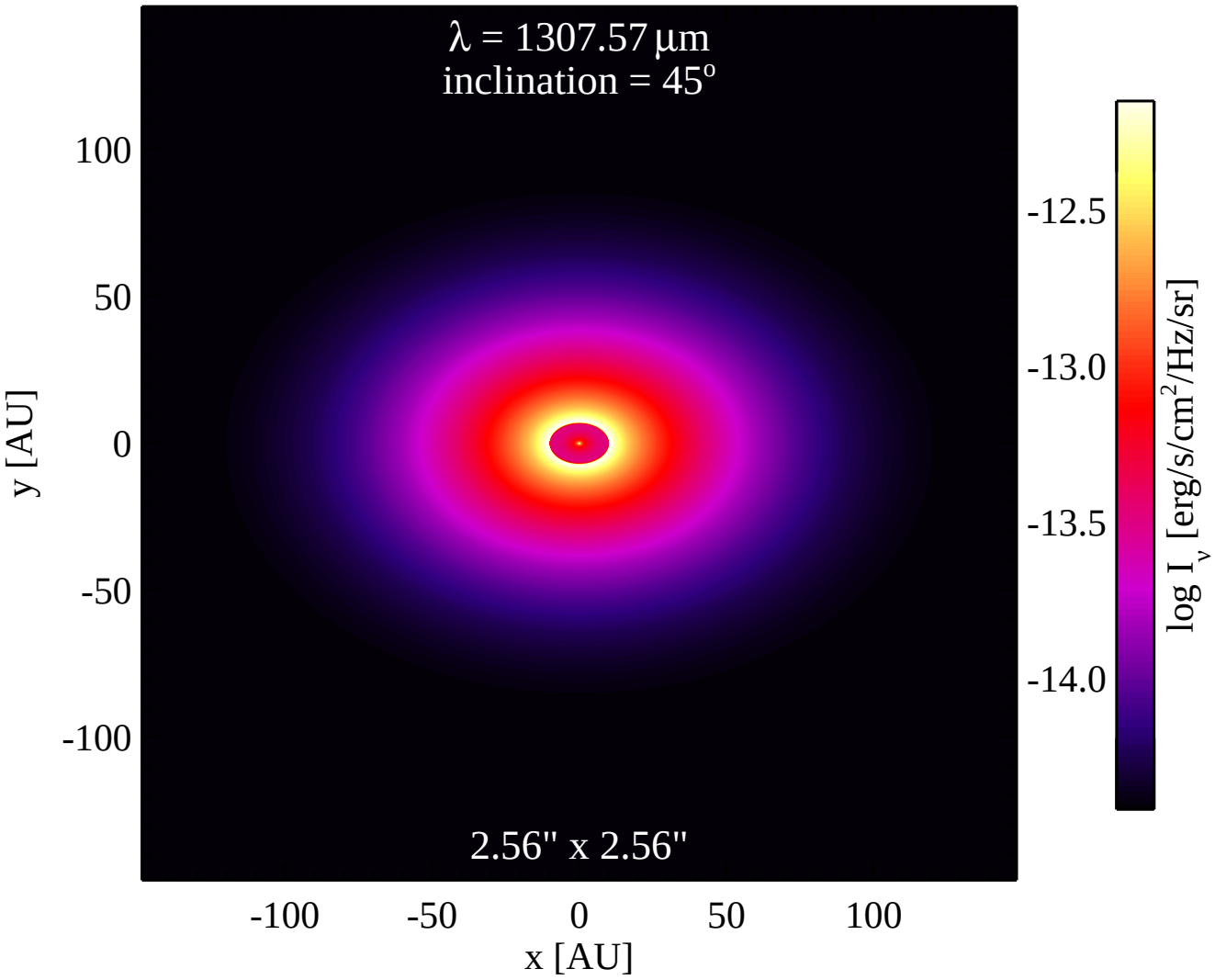

λ = 411.58 μm
inclination = 45°
1.90" x 1.90"
100
50
0
-50
-100
y [AU]
-100
-50
0
50
100
x [AU]
-11.5
-12.0
-12.5
-13.0
-13.5
log I_ν [erg/s/cm²/Hz/sr]

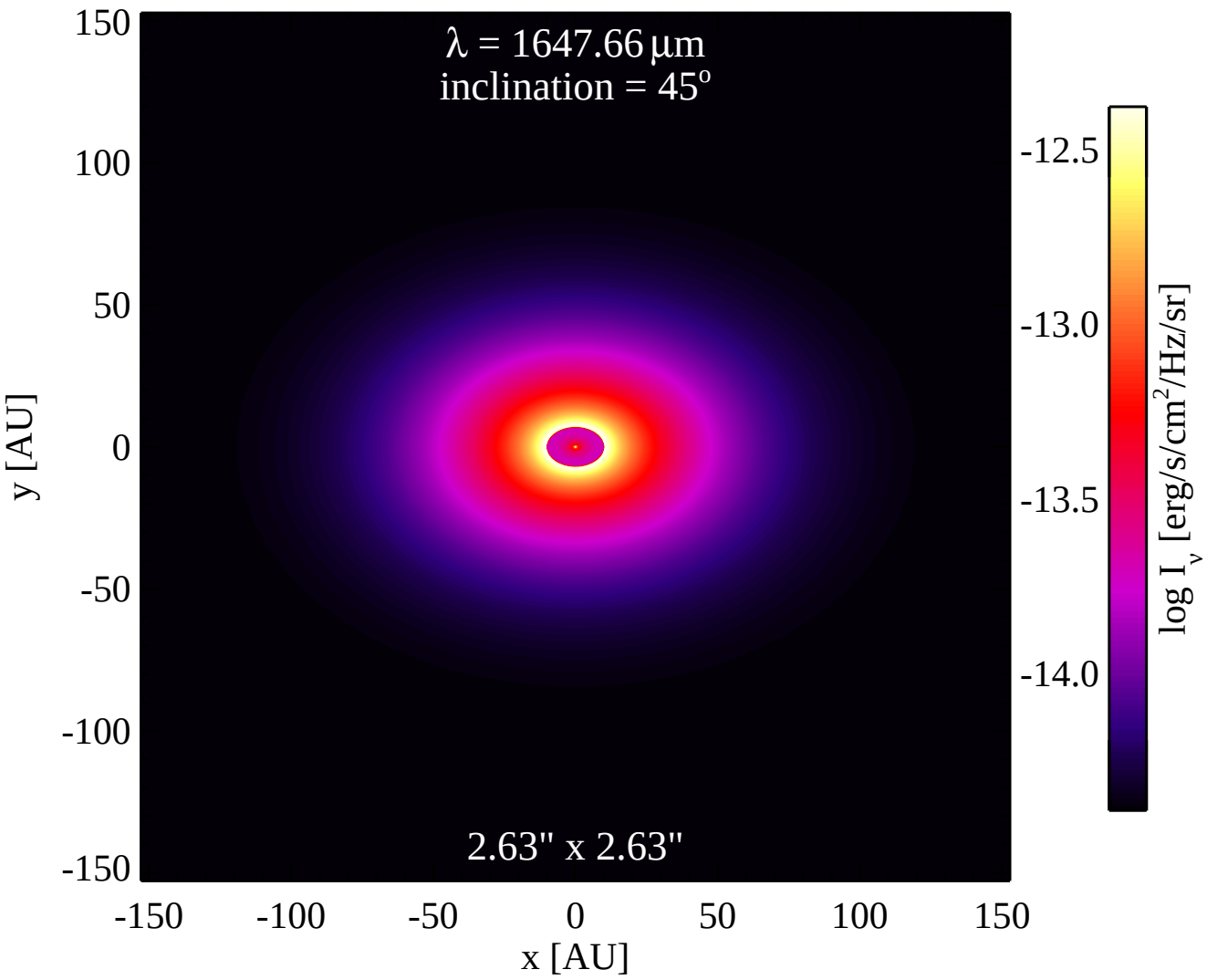

λ = 518.63 μm
inclination = 45°
2.07" x 2.07"
100
50
0
-50
-100
y [AU]
-100
-50
0
50
100
x [AU]
-11.5
-12.0
-12.5
-13.0
-13.5
-14.0
log I_ν [erg/s/cm²/Hz/sr]

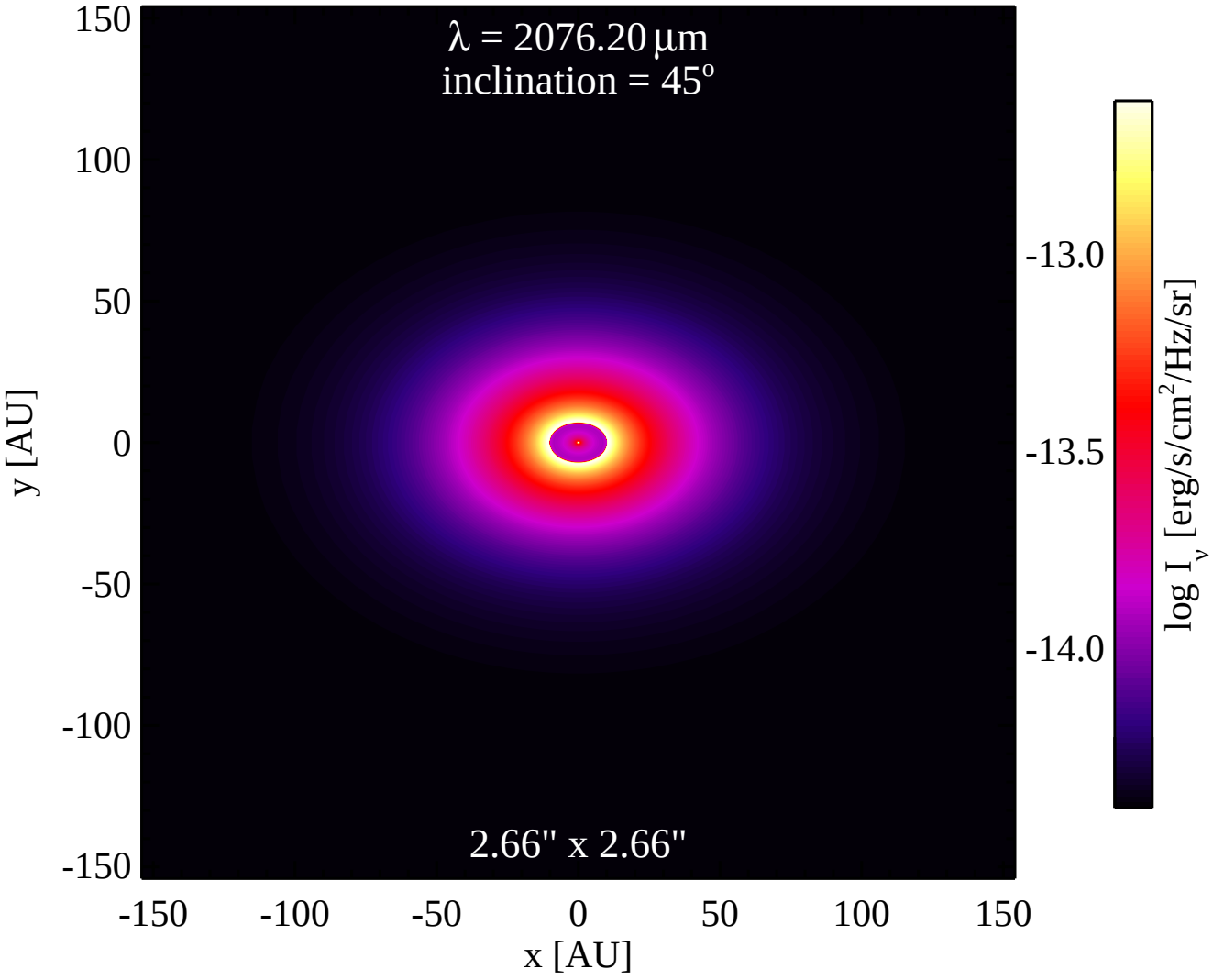

λ = 653.52 μm
inclination = 45°
2.23" x 2.23"
100
50
0
-50
-100
y [AU]
-100
-50
0
50
100
x [AU]
-12.0
-12.5
-13.0
-13.5
-14.0
log I_ν [erg/s/cm²/Hz/sr]

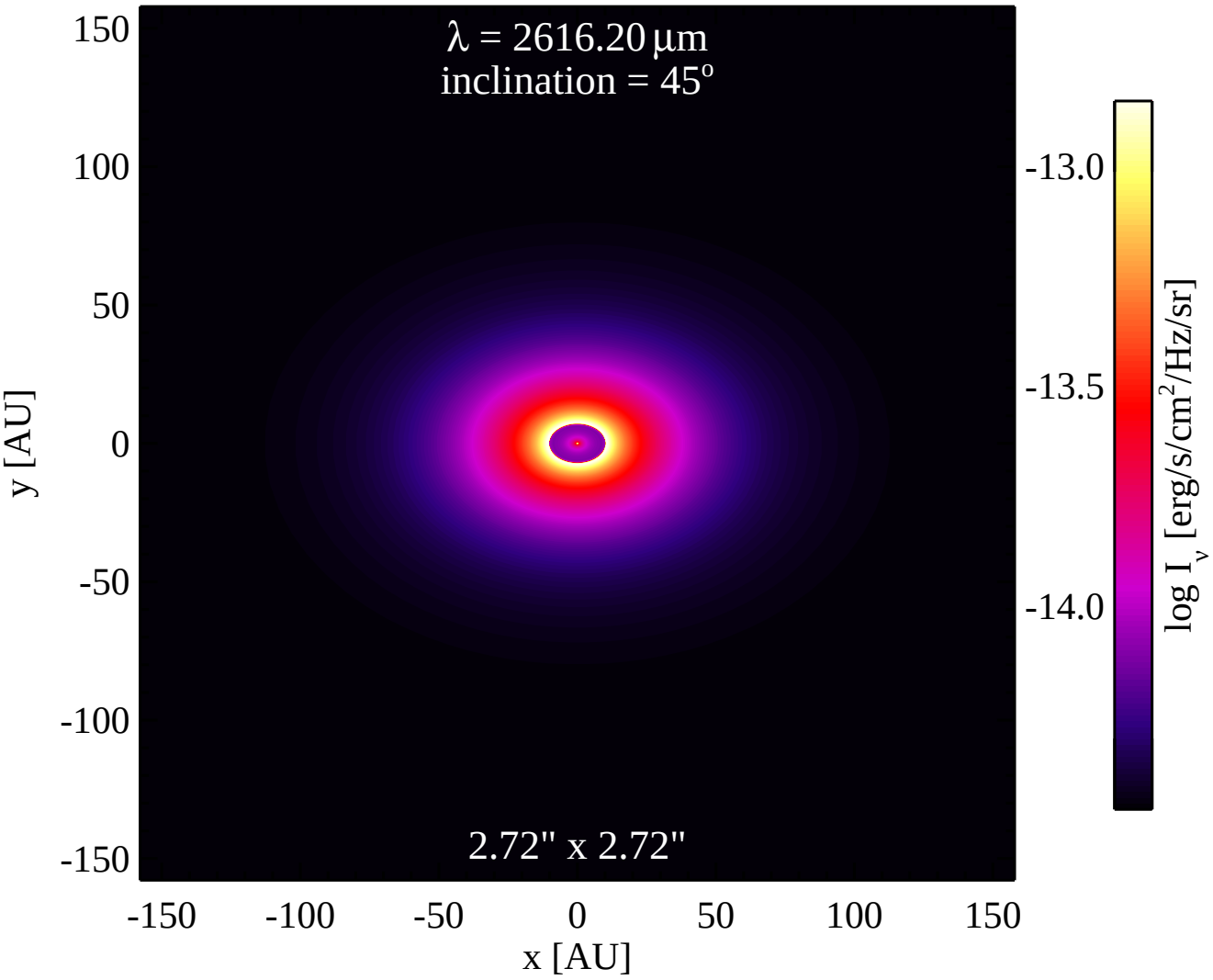

λ = 823.50 μm
inclination = 45°
2.37" x 2.37"
100
50
0
-50
-100
y [AU]
-100
-50
0
50
100
x [AU]
-12.0
-12.5
-13.0
-13.5
-14.0
log I_ν [erg/s/cm²/Hz/sr]

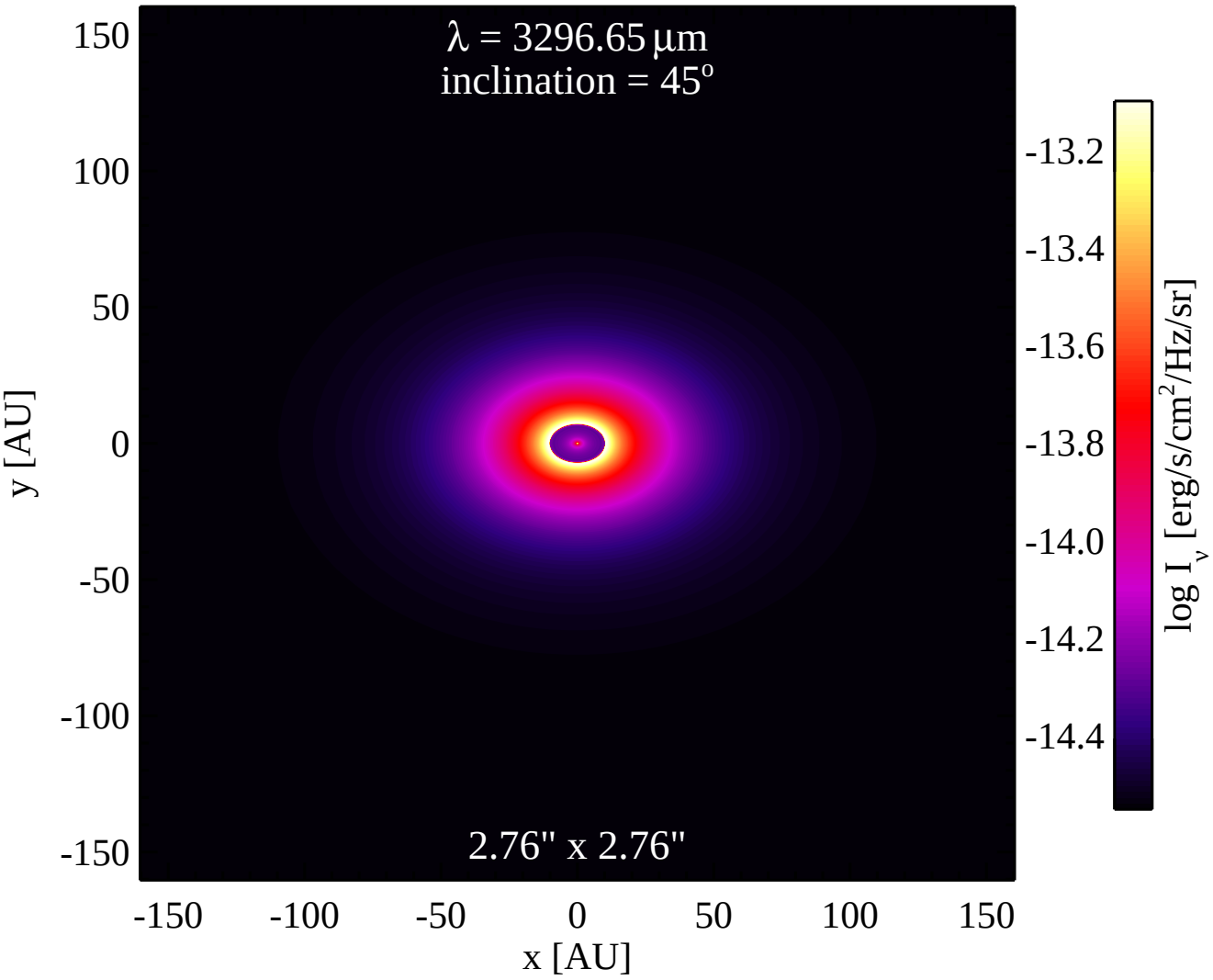

λ = 1037.68 μm
inclination = 45°
2.48" x 2.48"
100
50
0
-50
-100
y [AU]
-100
-50
0
50
100
x [AU]
-12.0
-12.5
-13.0
-13.5
-14.0
log I_ν [erg/s/cm²/Hz/sr]

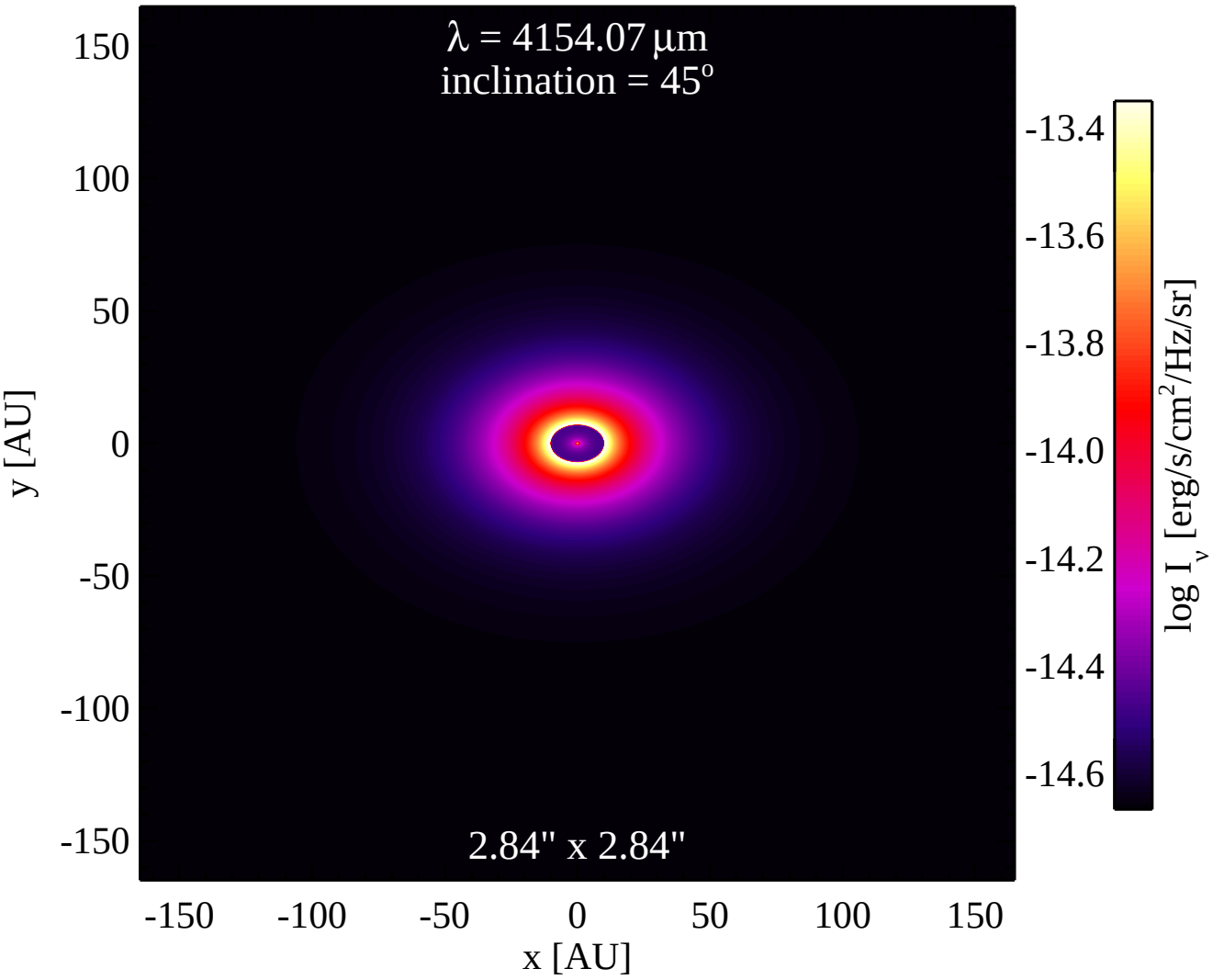

λ = 1307.57 μm
inclination = 45°
2.56" x 2.56"
100
50
0
-50
-100
y [AU]
-100
-50
0
50
100
x [AU]
-12.5
-13.0
-13.5
-14.0
log I_ν [erg/s/cm²/Hz/sr]

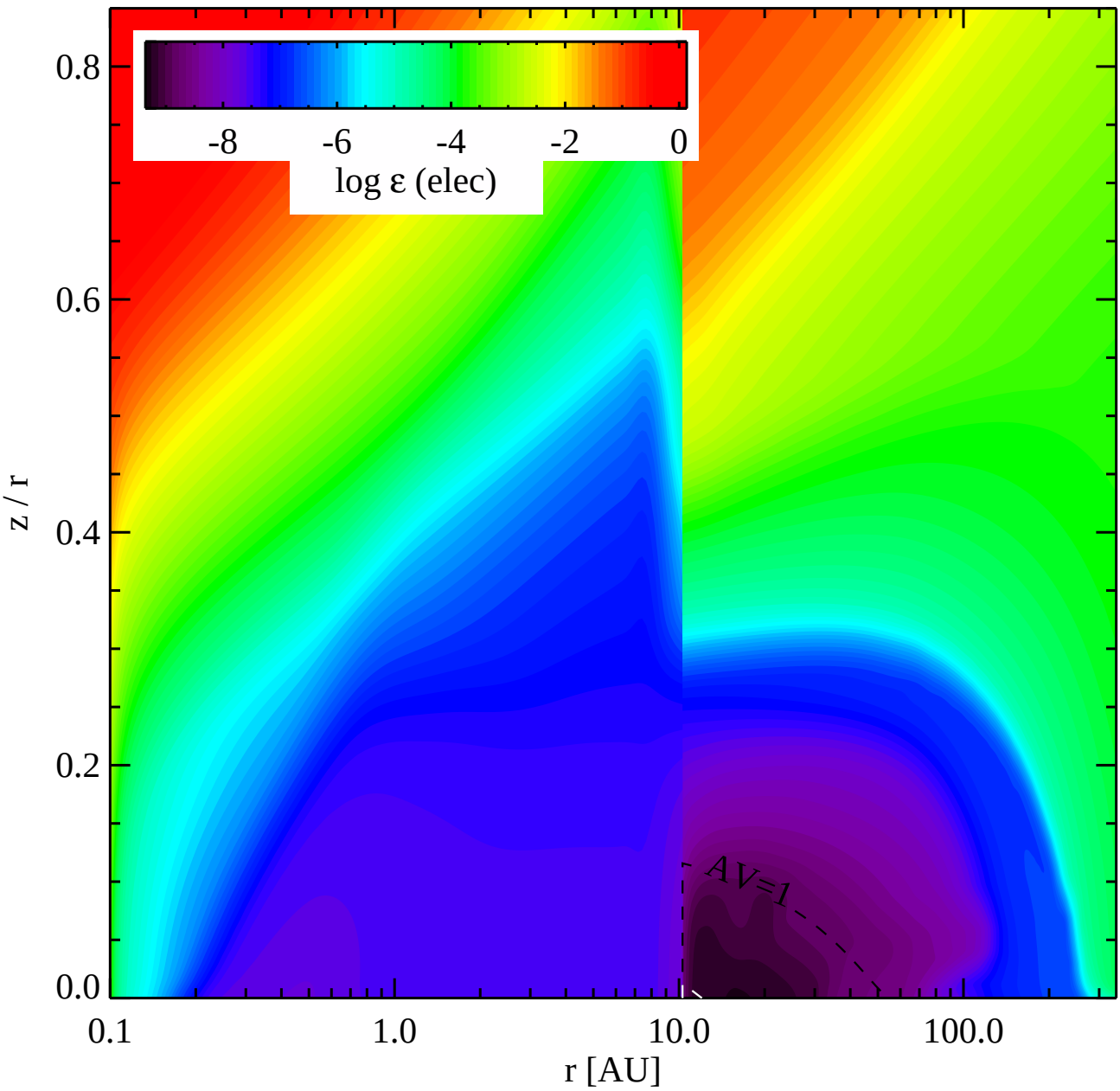

λ = 1647.66 μm
inclination = 45°
2.63" x 2.63"
150
100
50
0
-50
-100
-150
y [AU]
-150
-100
-50
0
50
100
150
x [AU]
-12.5
-13.0
-13.5
-14.0
log I_ν [erg/s/cm²/Hz/sr]

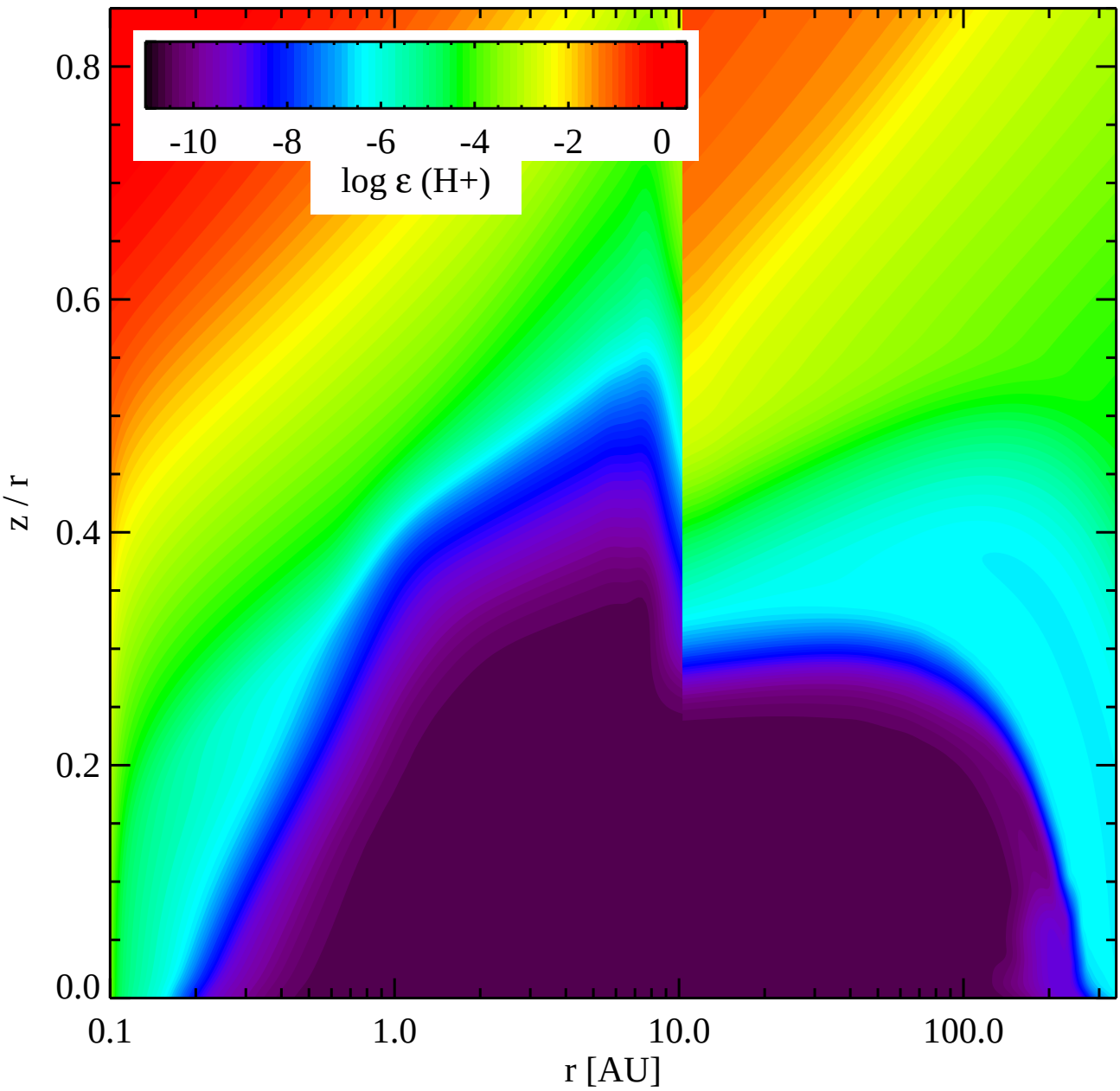

λ = 2076.20 μm
inclination = 45°
2.66" x 2.66"
150
100
50
0
-50
-100
-150
y [AU]
-150
-100
-50
0
50
100
150
x [AU]
-13.0
-13.5
-14.0
log I_ν [erg/s/cm²/Hz/sr]

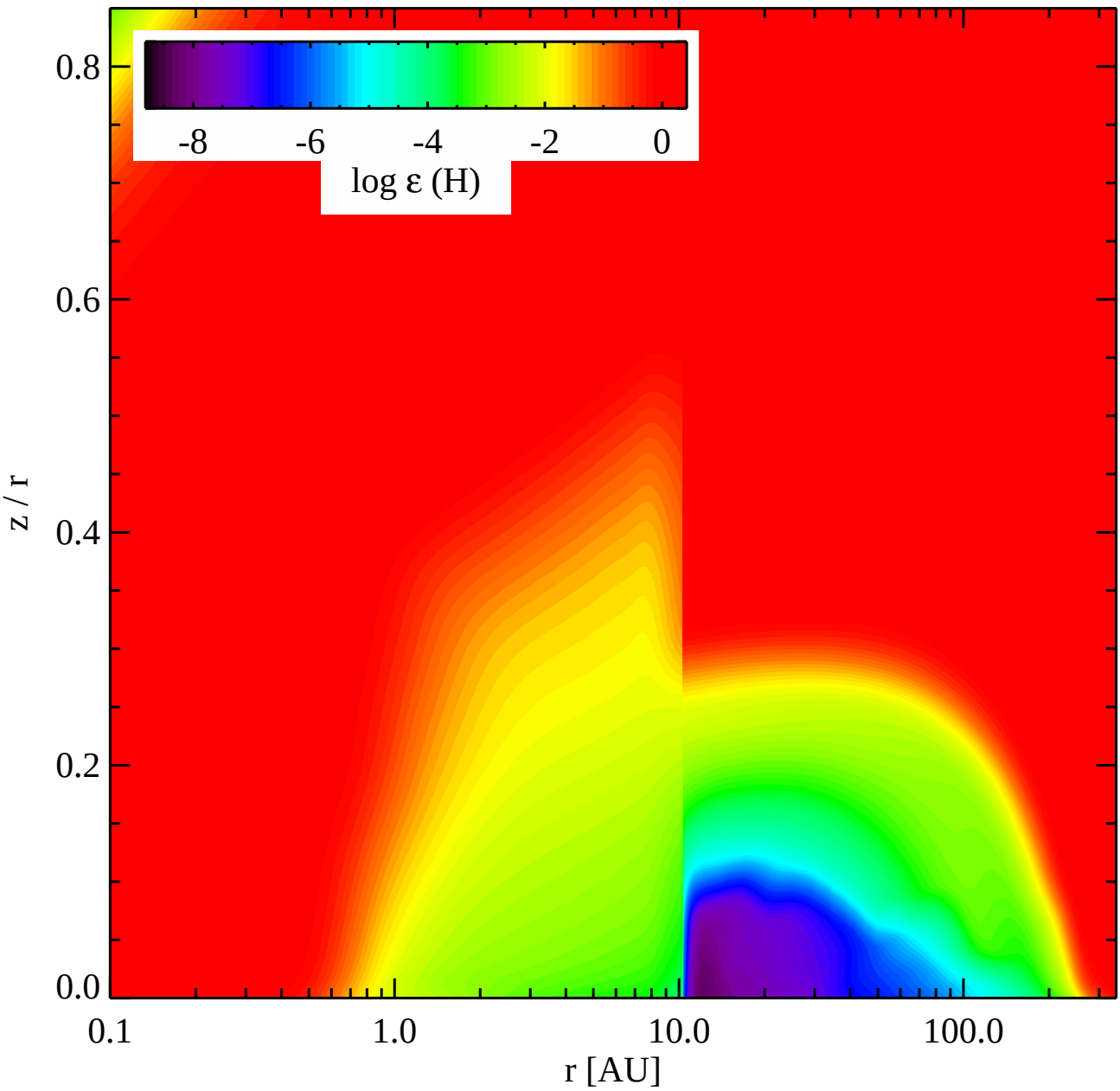

λ = 2616.20 μm
inclination = 45°
2.72" x 2.72"
150
100
50
0
-50
-100
-150
y [AU]
-150
-100
-50
0
50
100
150
x [AU]
-13.0
-13.5
-14.0
log I_ν [erg/s/cm²/Hz/sr]

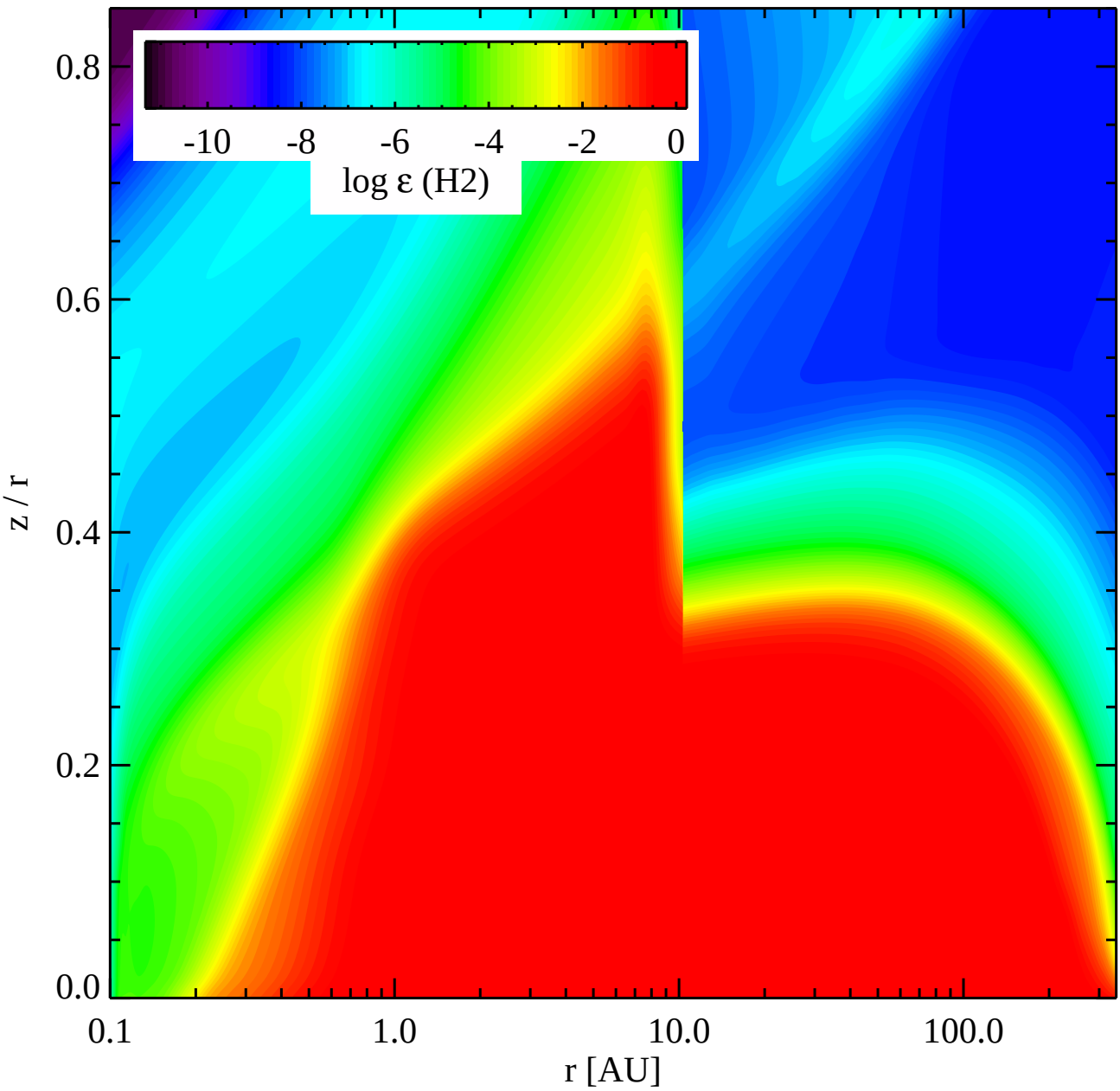

λ = 3296.65 μm
inclination = 45°
2.76" x 2.76"
150
100
50
0
-50
-100
-150
y [AU]
-150
-100
-50
0
50
100
150
x [AU]
-13.2
-13.4
-13.6
-13.8
-14.0
-14.2
-14.4
log I_ν [erg/s/cm²/Hz/sr]

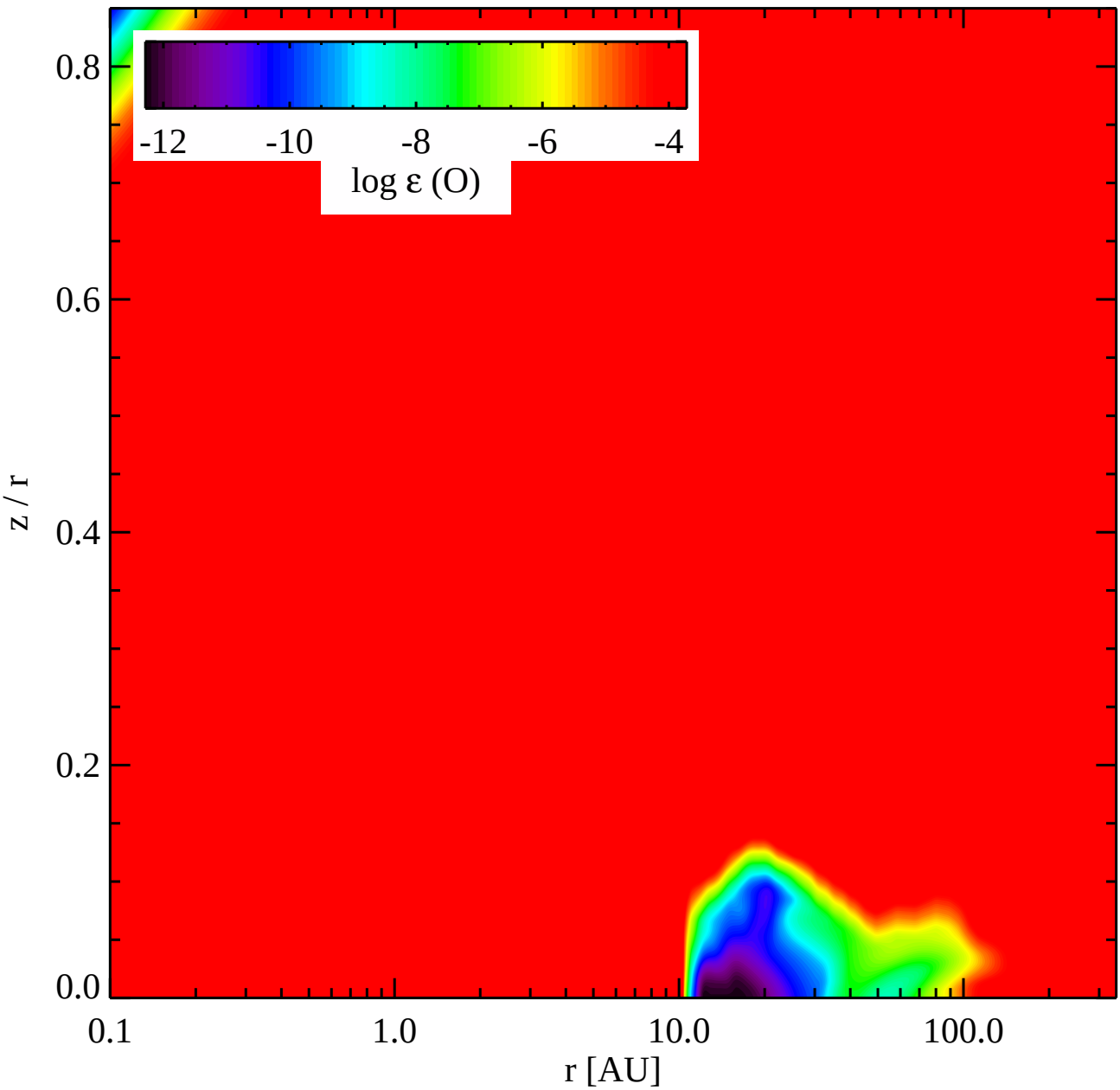

λ = 4154.07 μm
inclination = 45°
2.84" x 2.84"
150
100
50
0
-50
-100
-150
y [AU]
-150
-100
-50
0
50
100
150
x [AU]
-13.4
-13.6
-13.8
-14.0
-14.2
-14.4
-14.6
log I_ν [erg/s/cm²/Hz/sr]

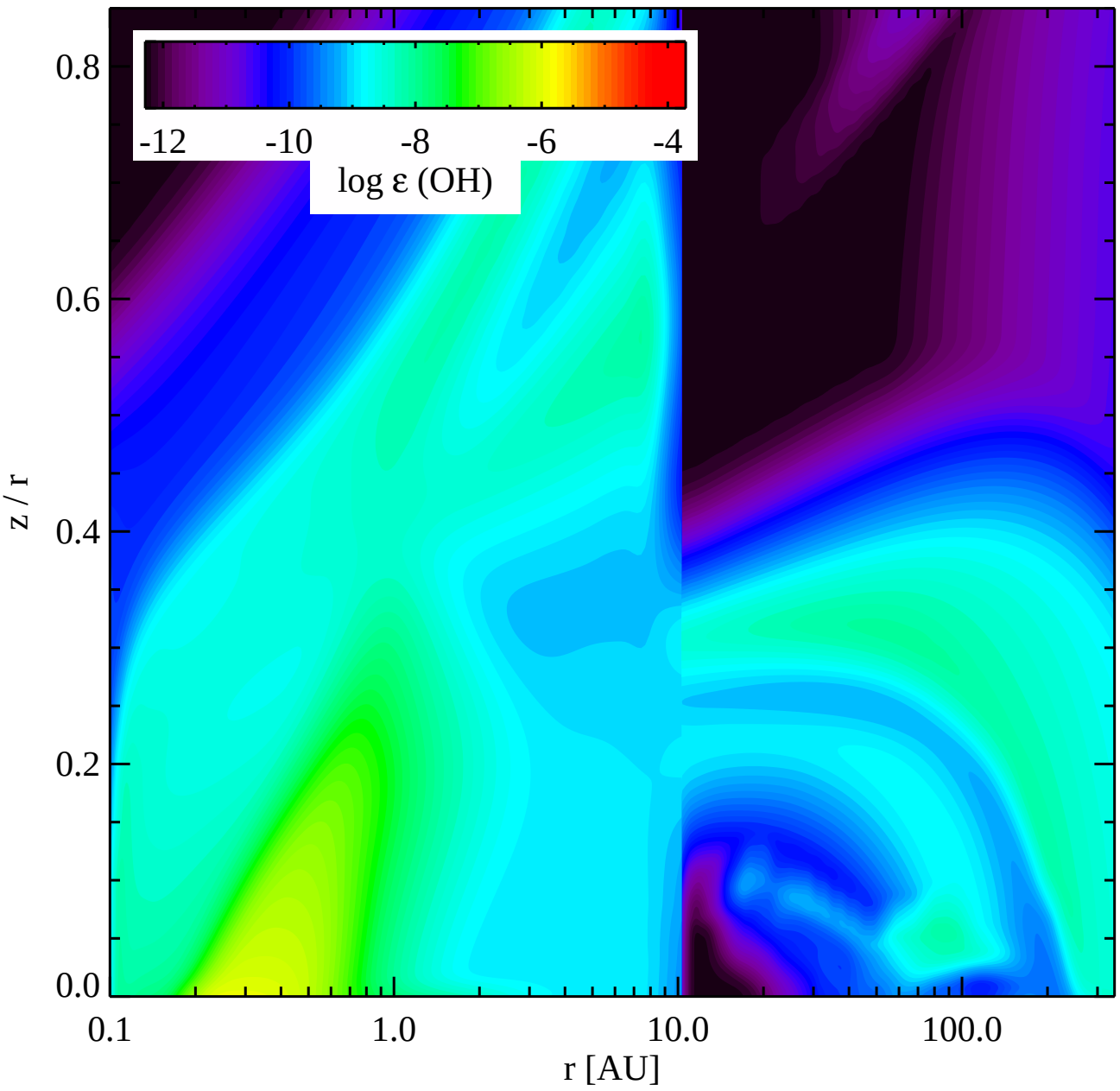

-8
-6
-4
-2
0
log ε (elec)
0.8
0.6
0.4
0.2
0.0
z / r
AV=1
0.1
1.0
10.0
100.0
r [AU]

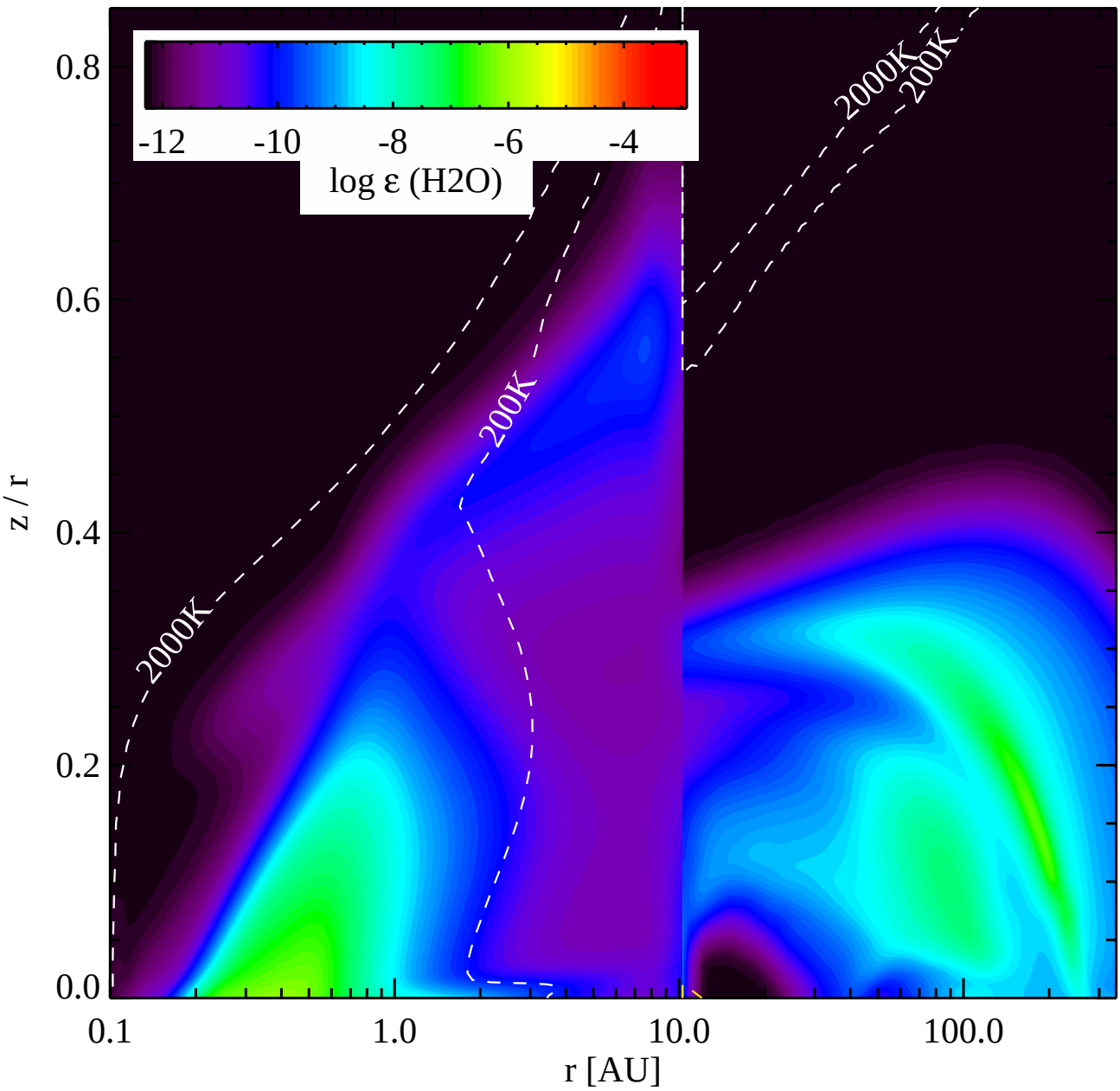

-10
-8
-6
-4
-2
0
log ε (H+)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

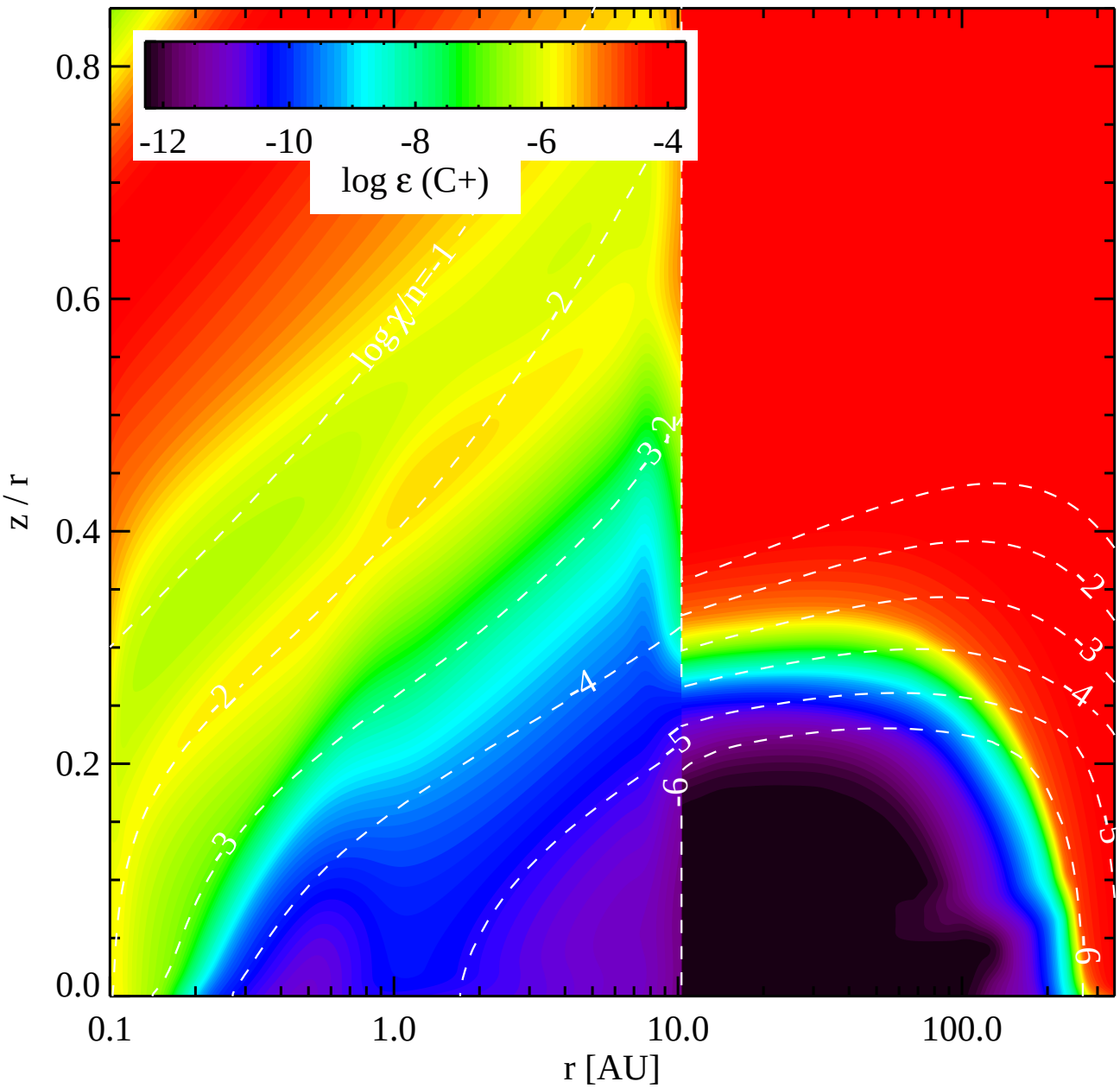

-8
-6
-4
-2
0
log ε (H)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

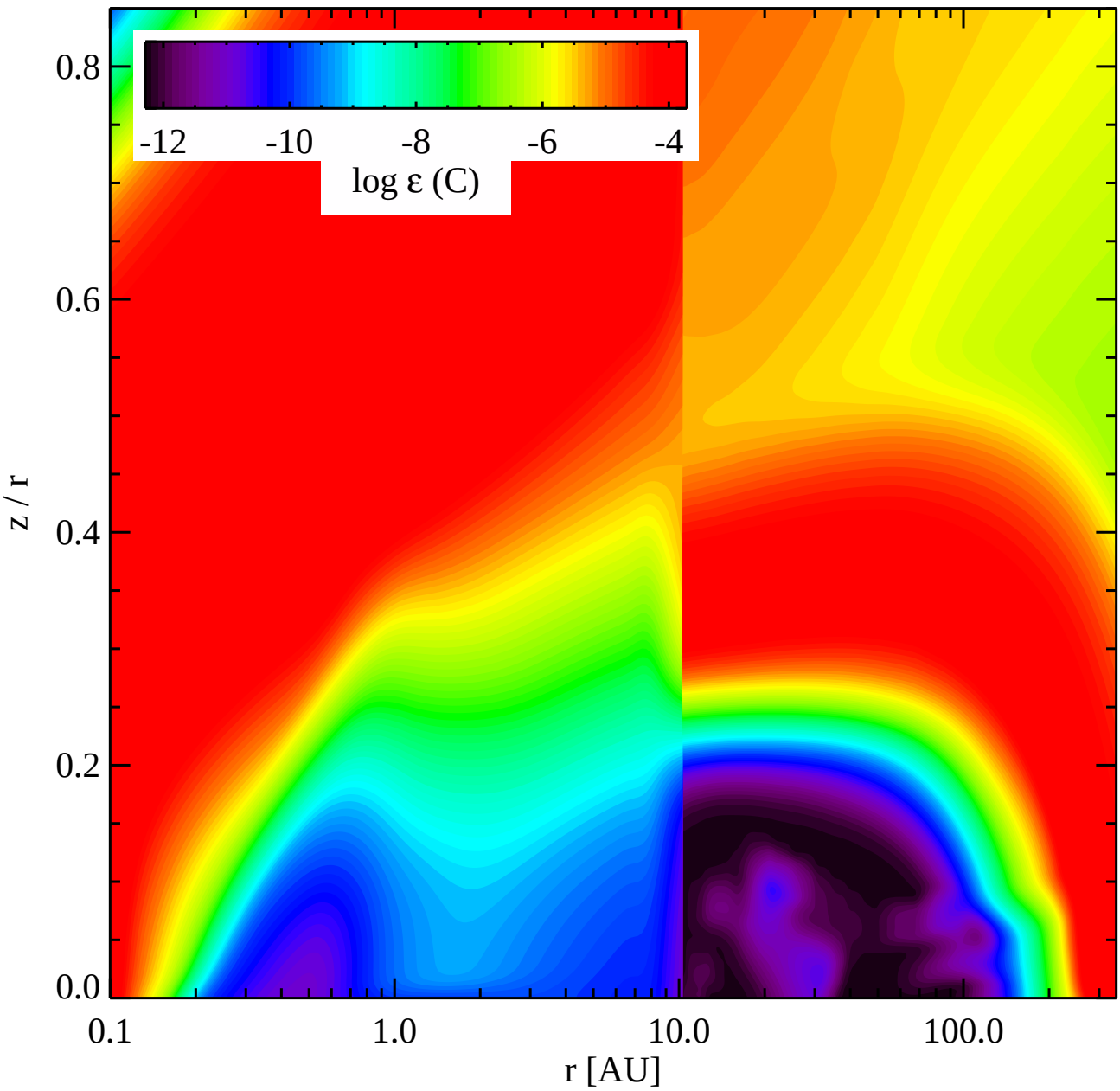

-10
-8
-6
-4
-2
0
log ε (H2)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

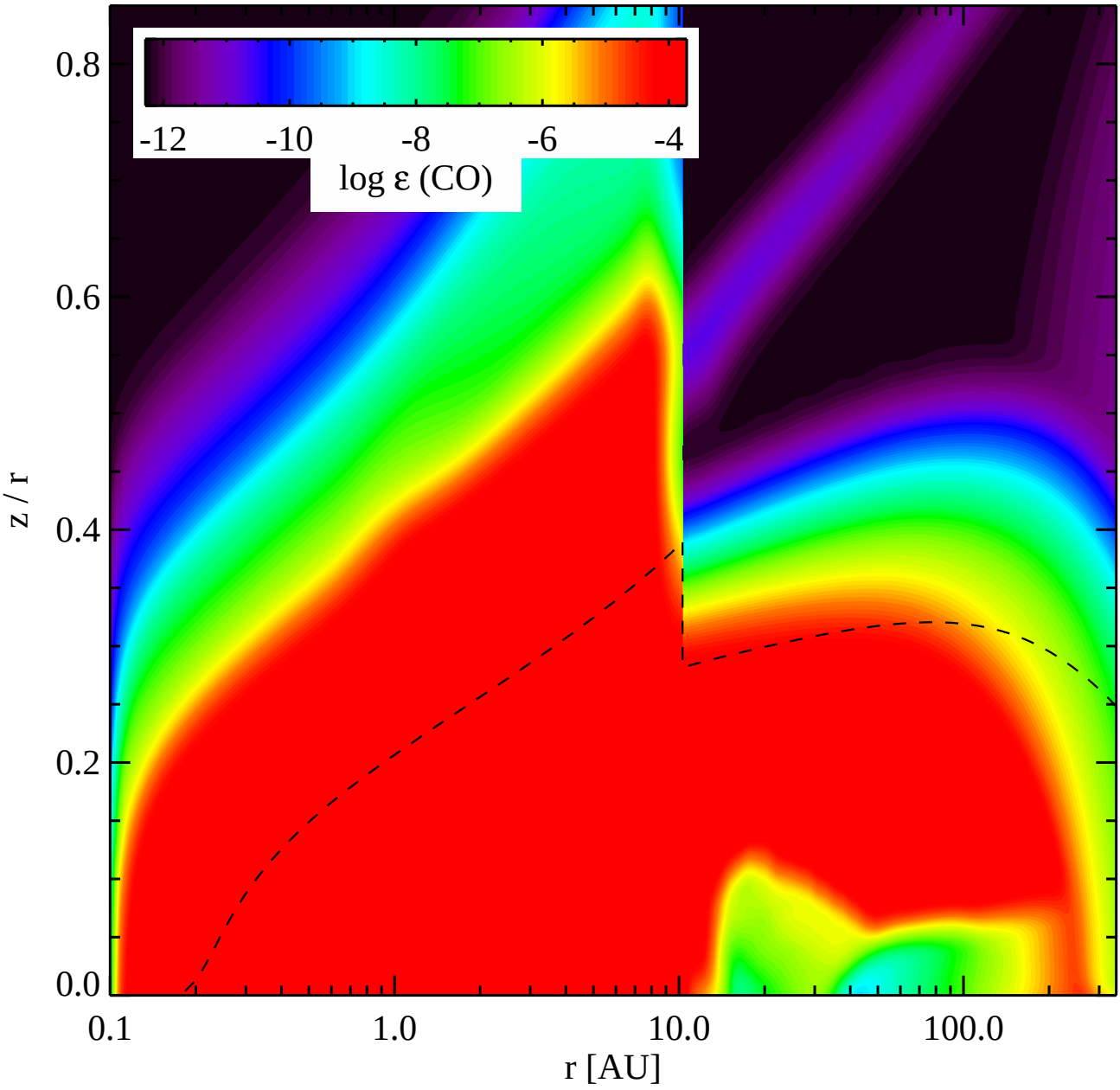

-12
-10
-8
-6
-4
log ε (O)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

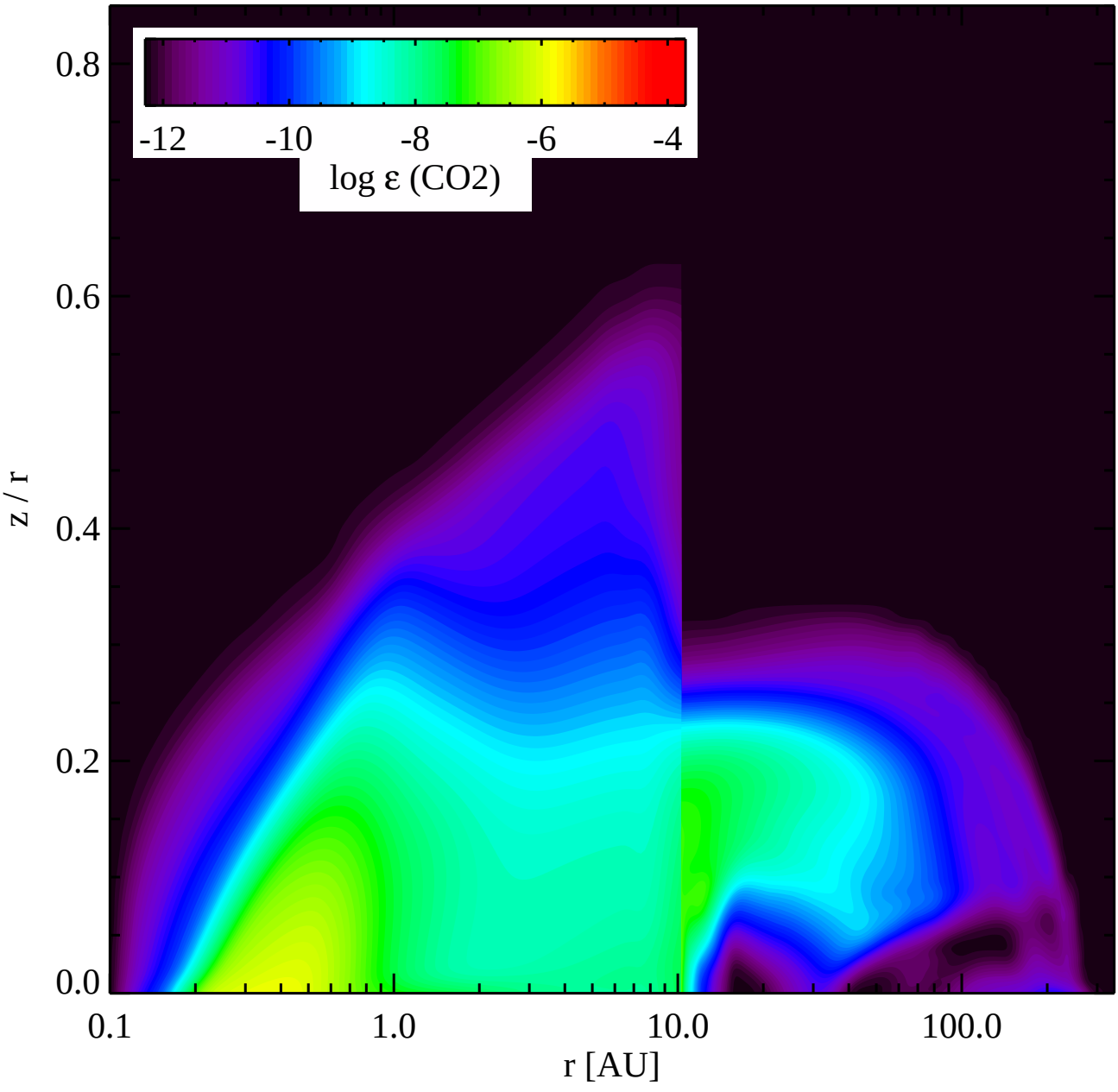

-12
-10
-8
-6
-4
log ε (OH)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

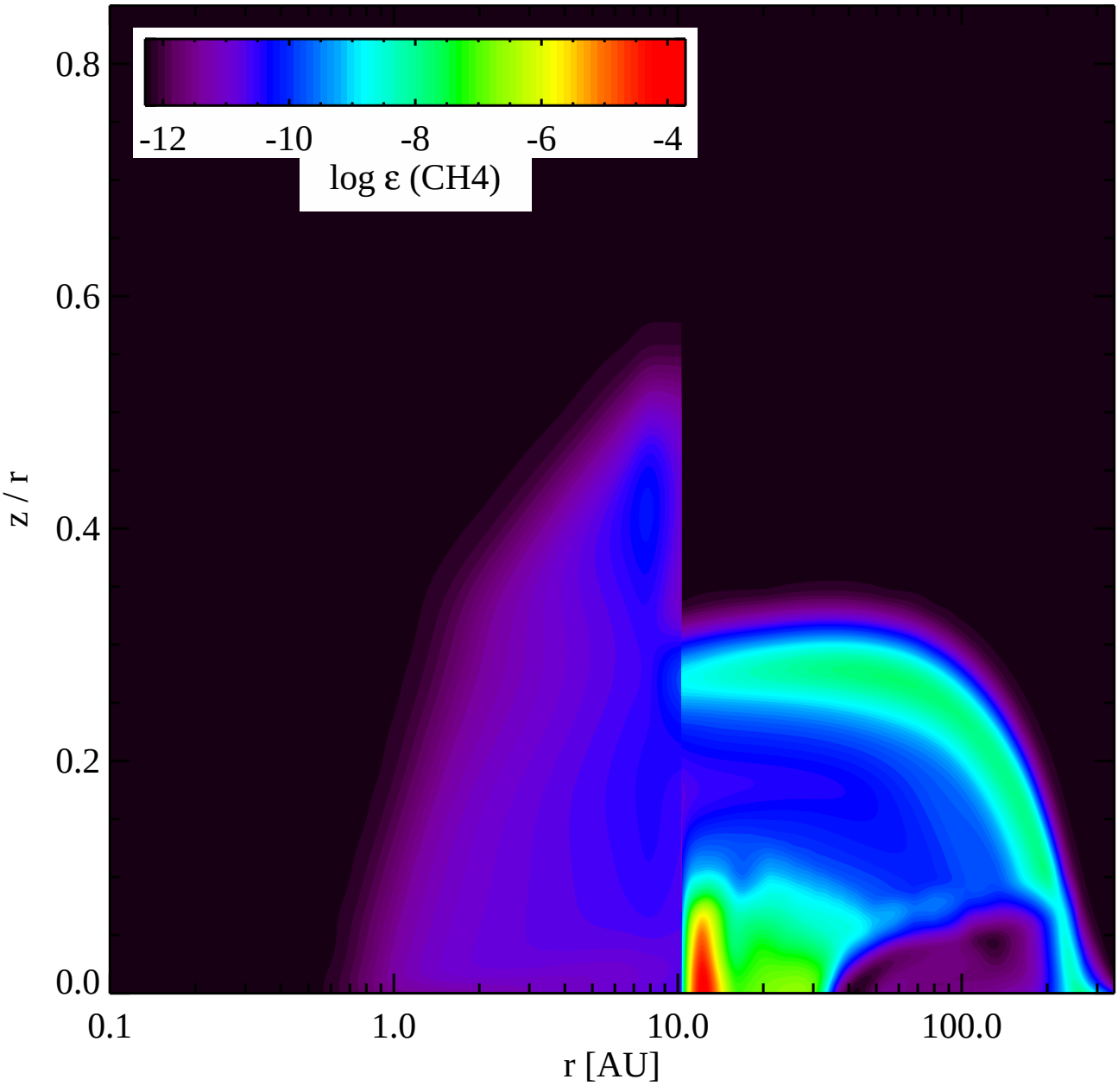

-12
-10
-8
-6
-4
log ε (H2O)
2000K
200K
2000K
200K
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

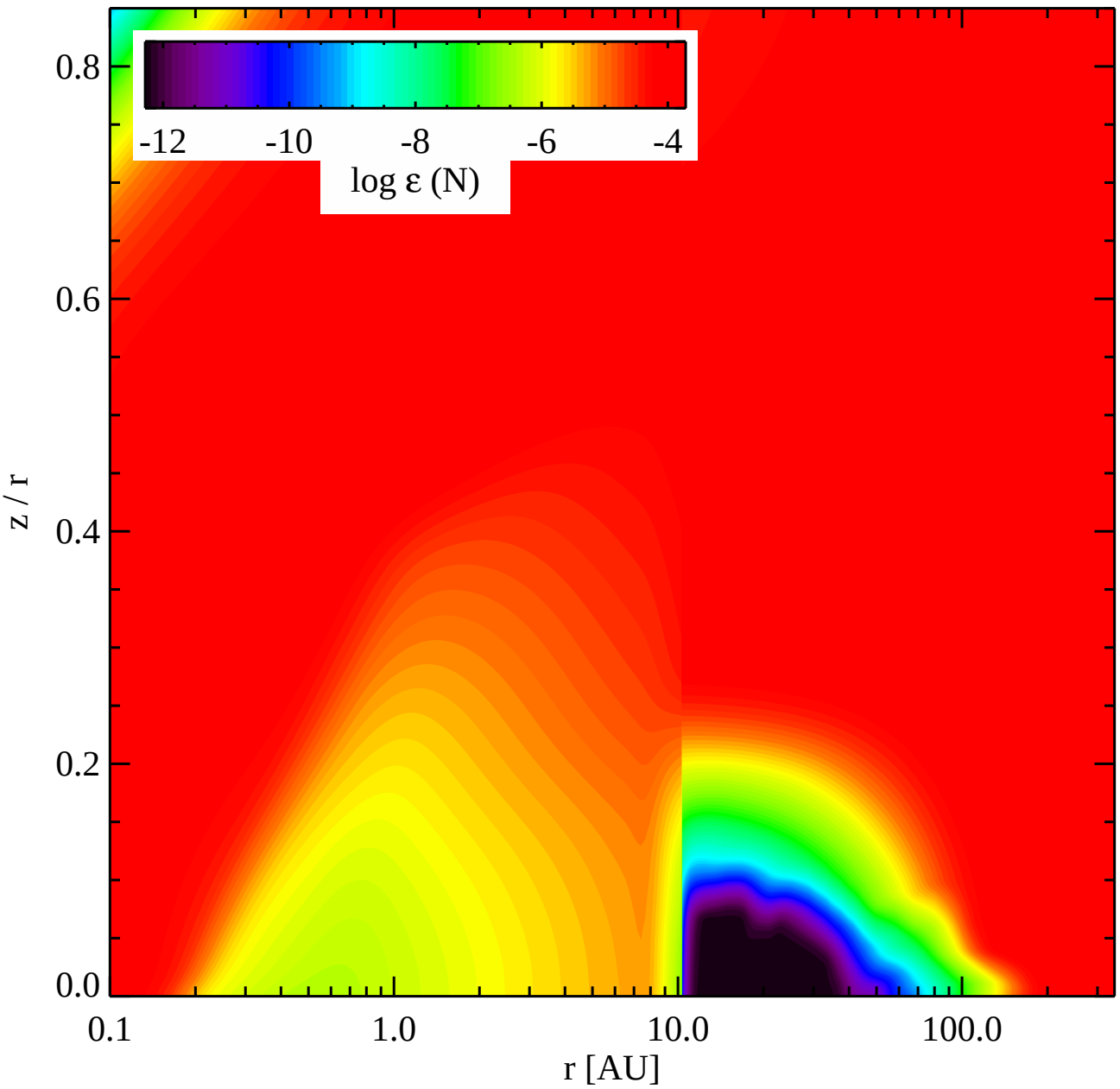

-12
-10
-8
-6
-4
log ε (C+)
log χ/n=-1
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

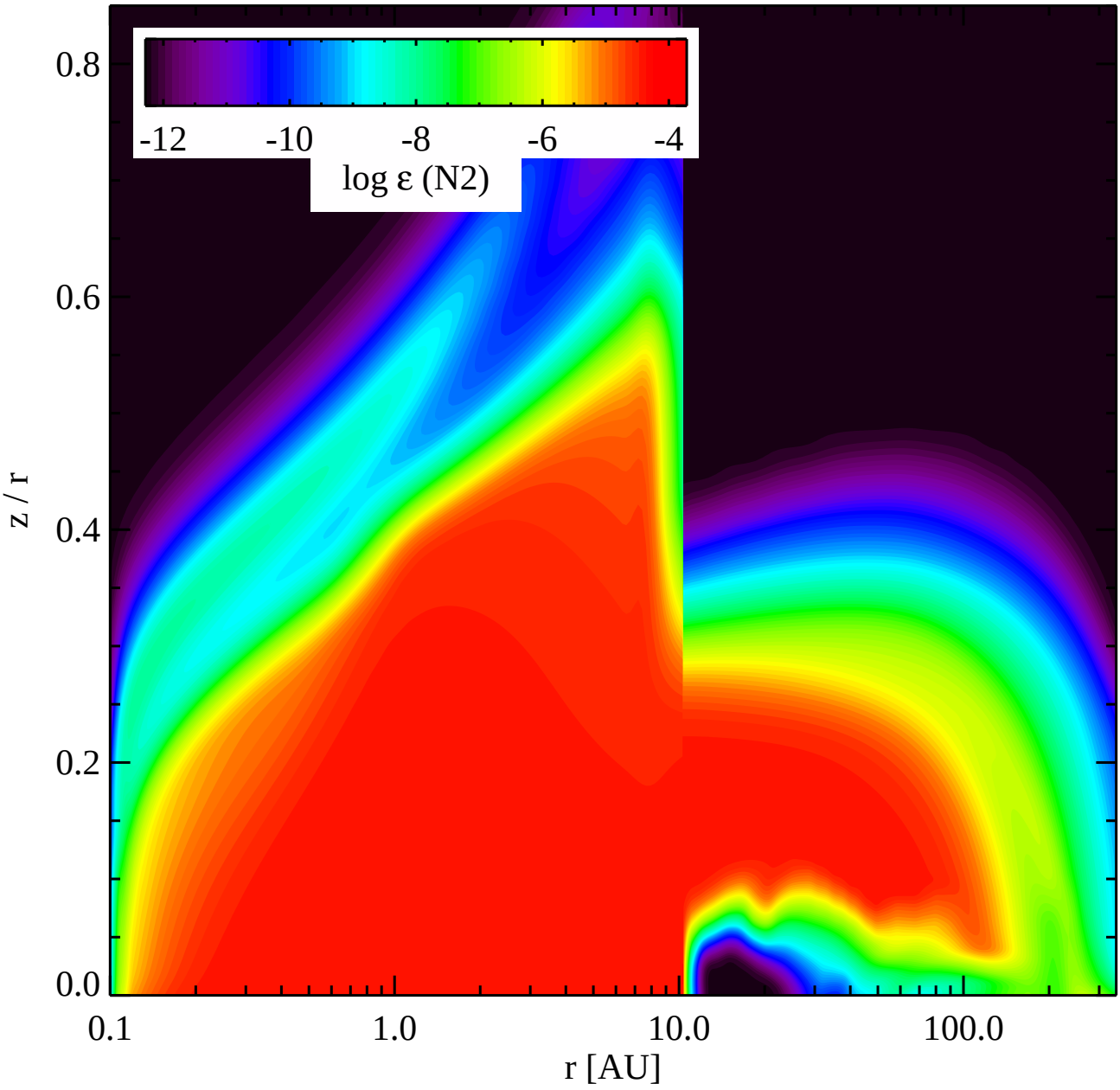

-12
-10
-8
-6
-4
log ε (C)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

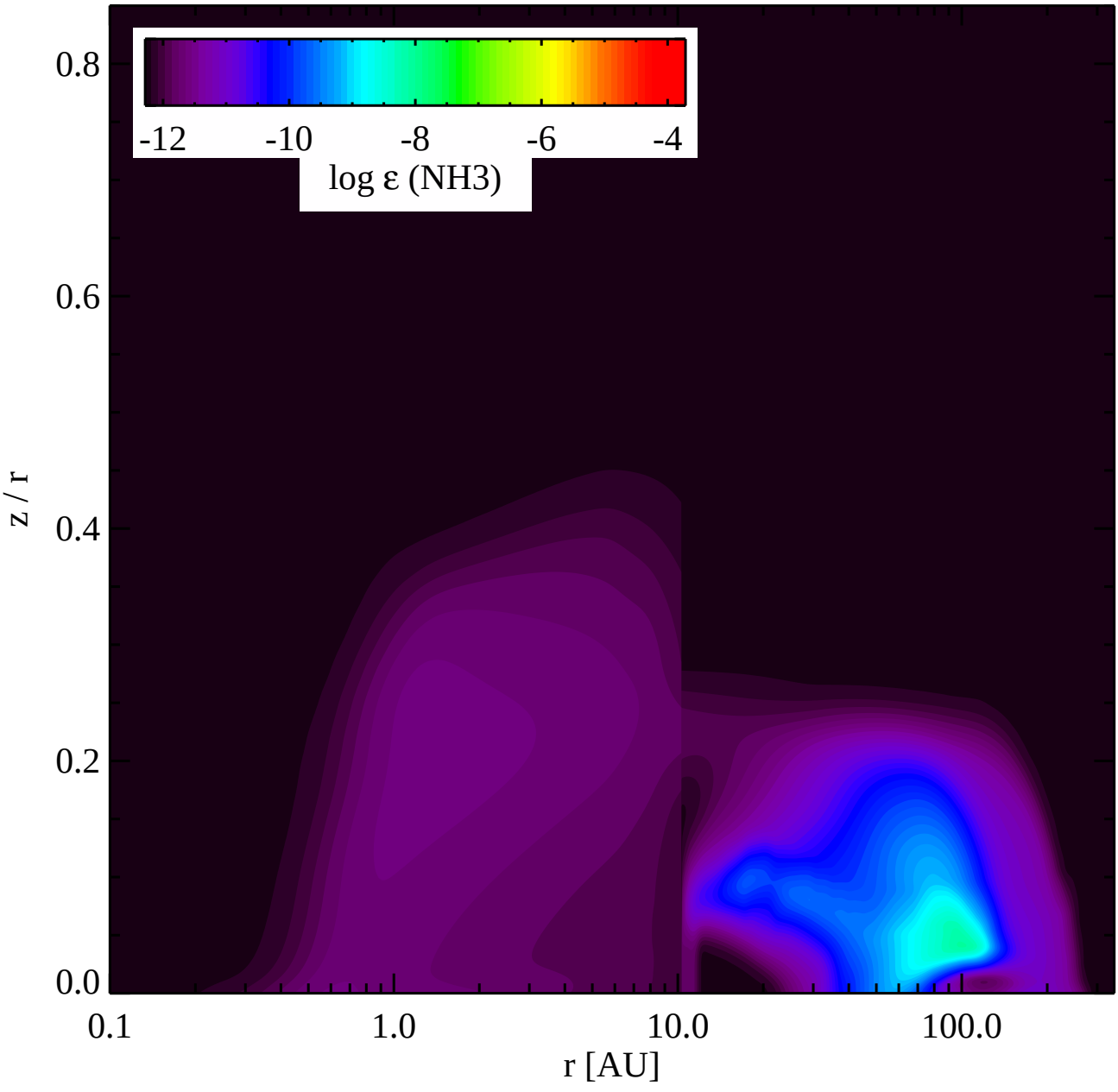

-12
-10
-8
-6
-4
log ε (CO)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

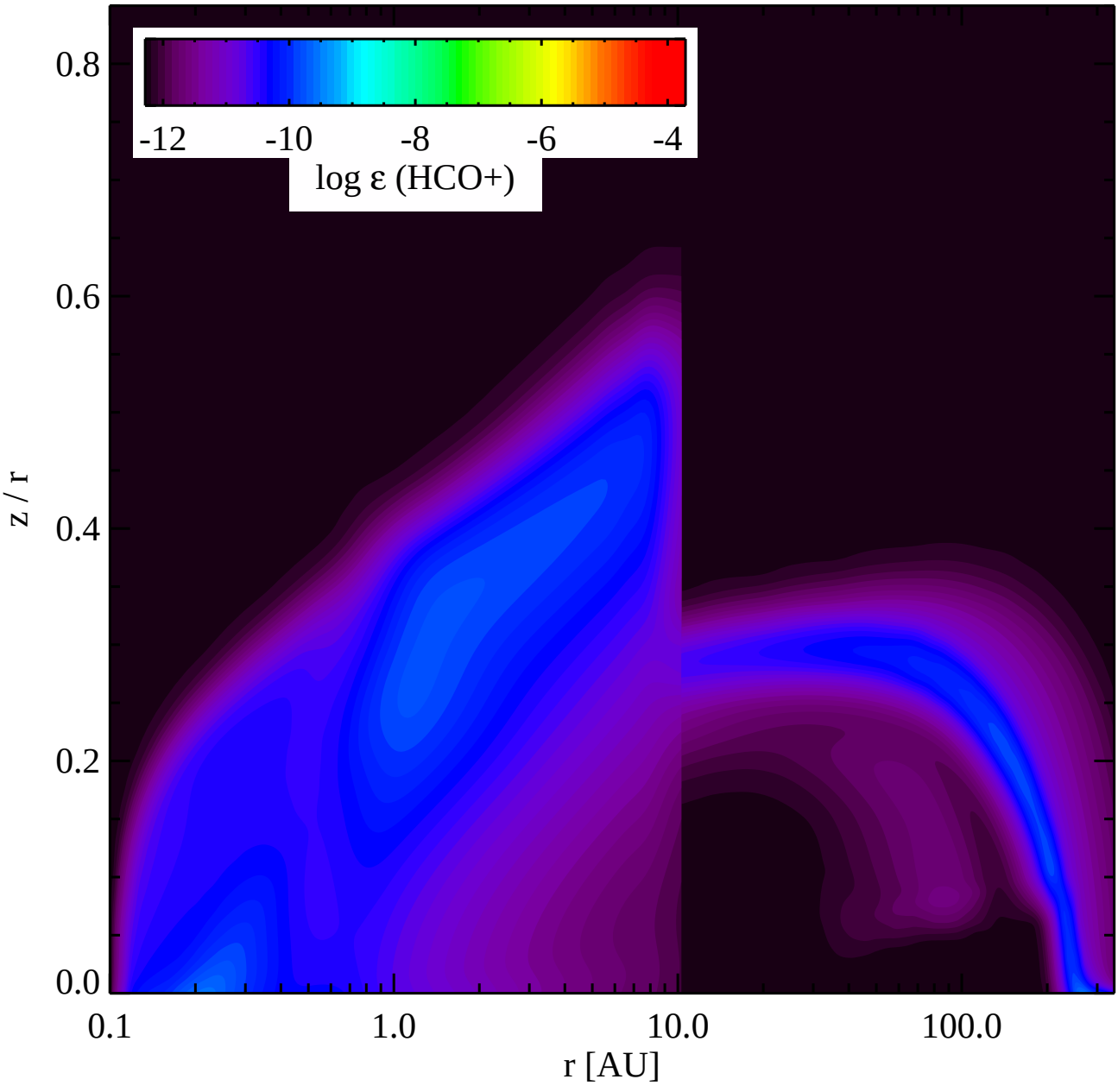

-12
-10
-8
-6
-4
log ε (CO2)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

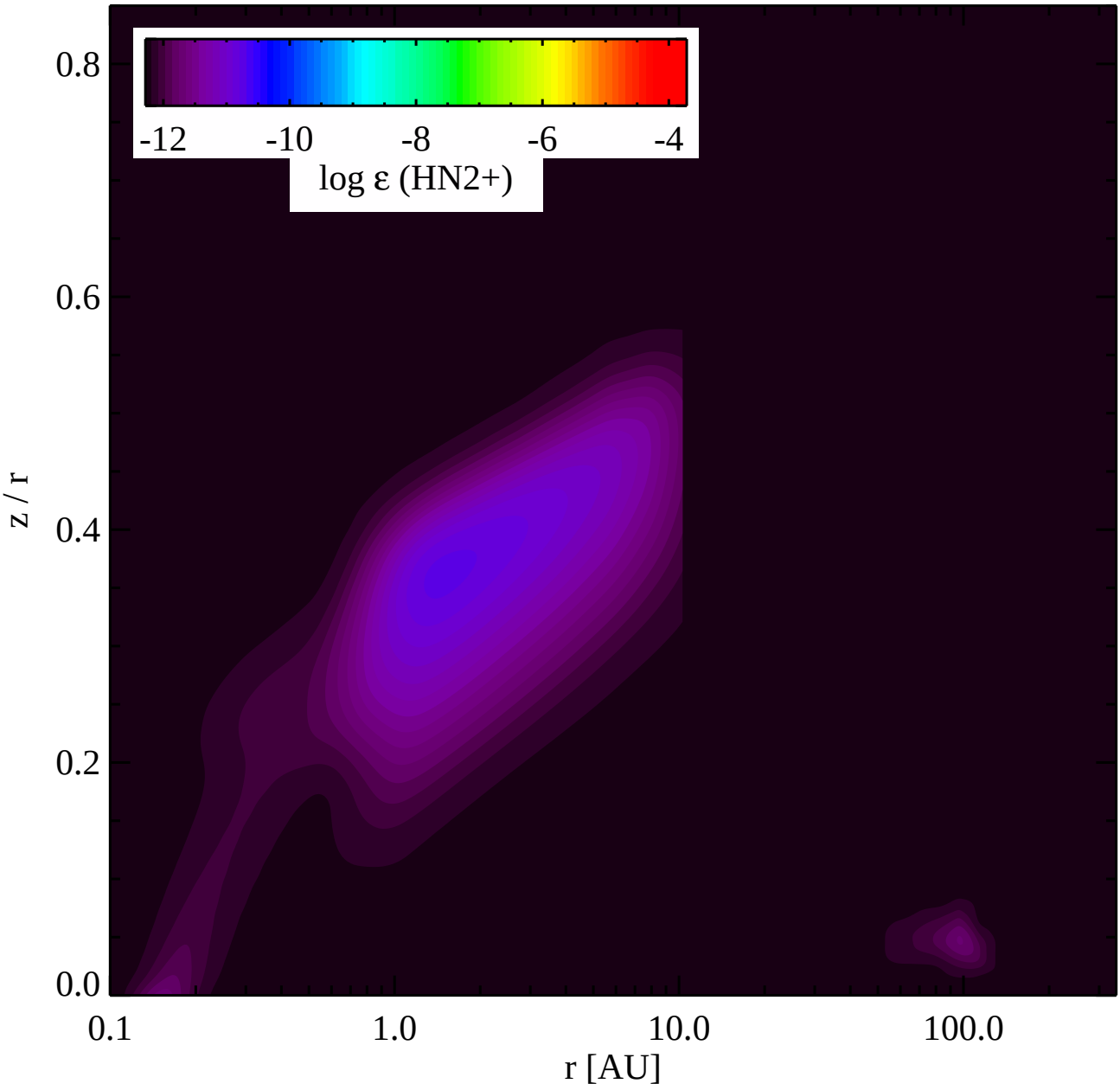

-12
-10
-8
-6
-4
log ε (CH4)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

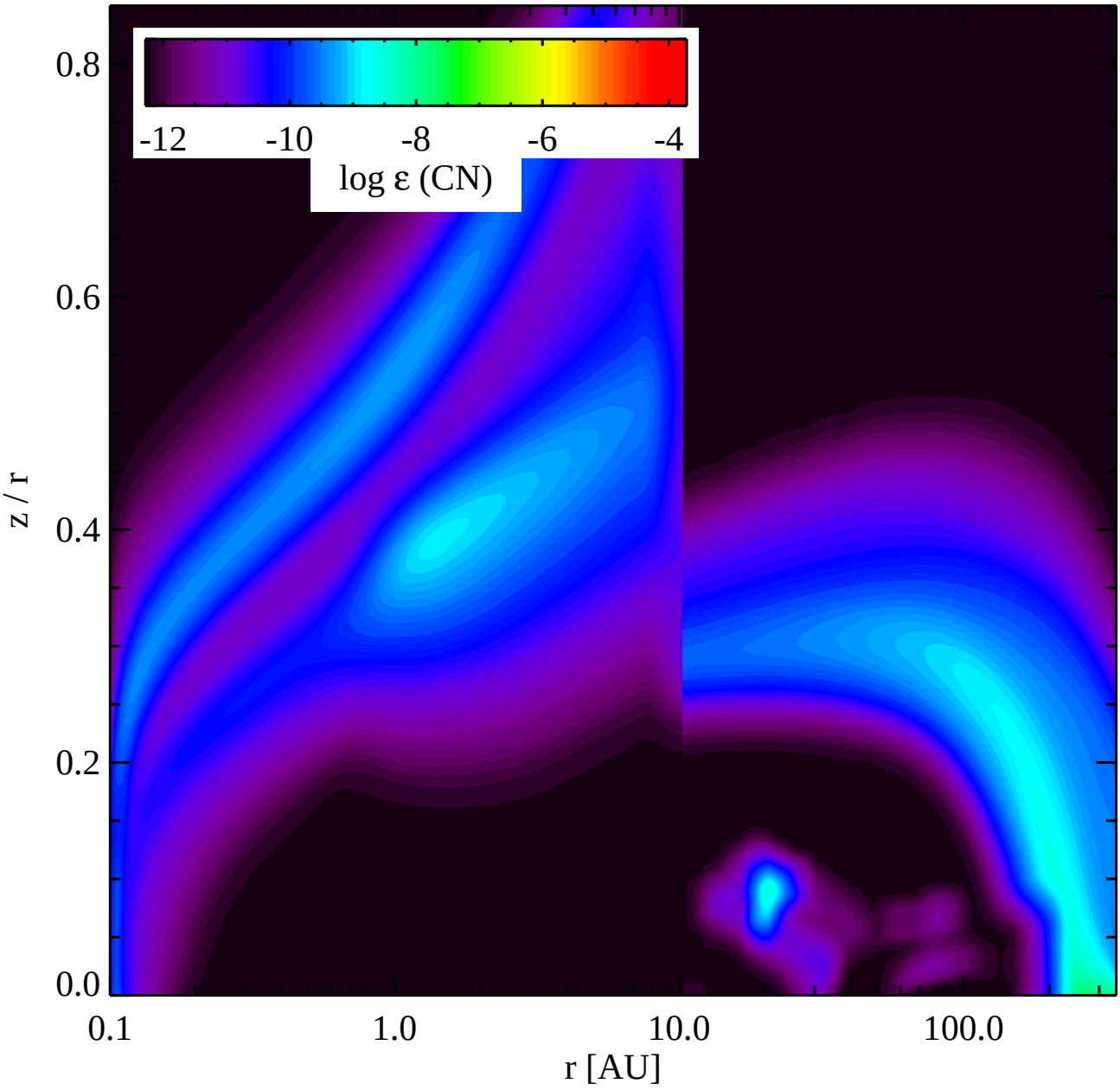

-12
-10
-8
-6
-4
log ε (N)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

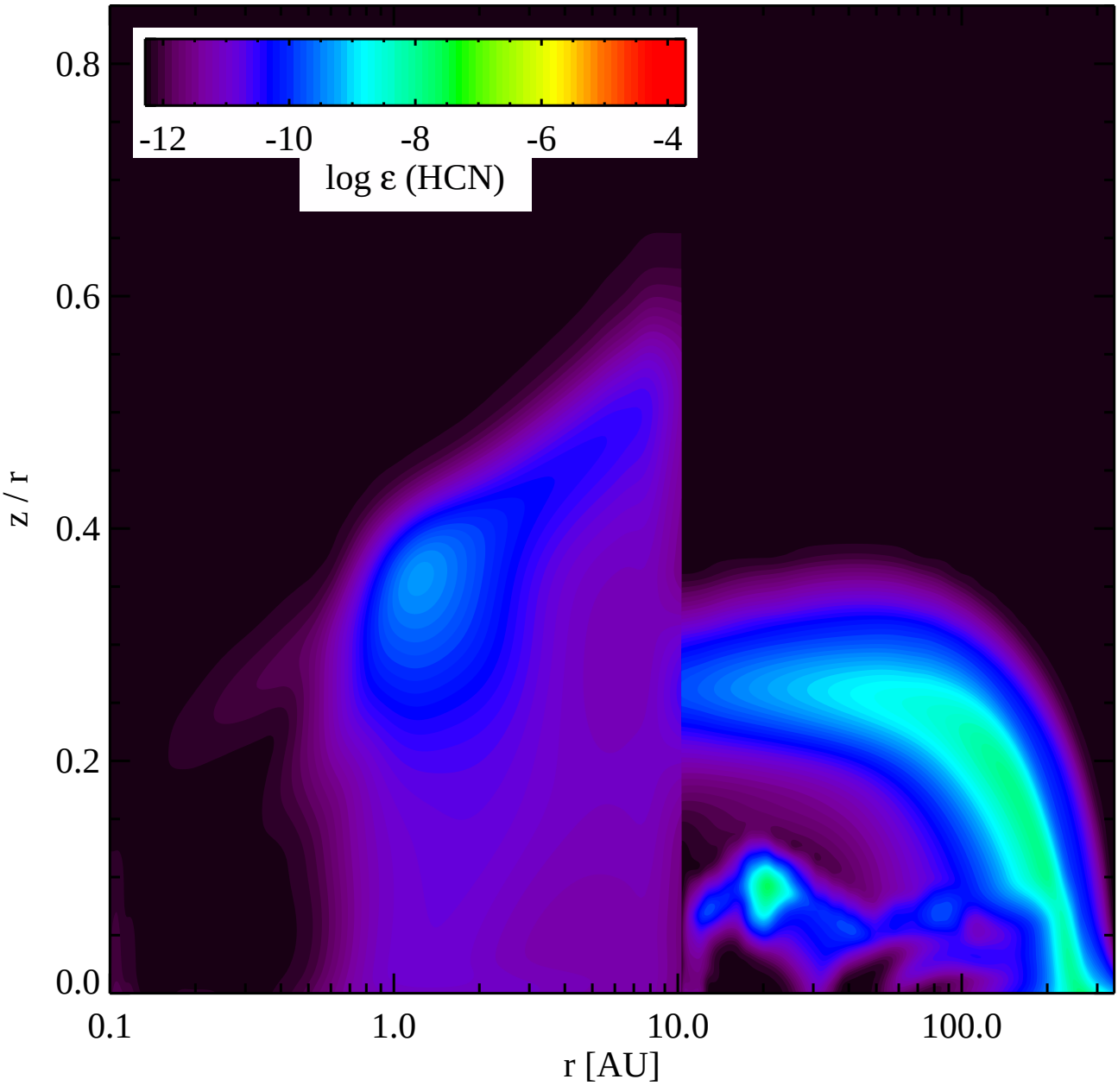

-12
-10
-8
-6
-4
log ε (N2)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

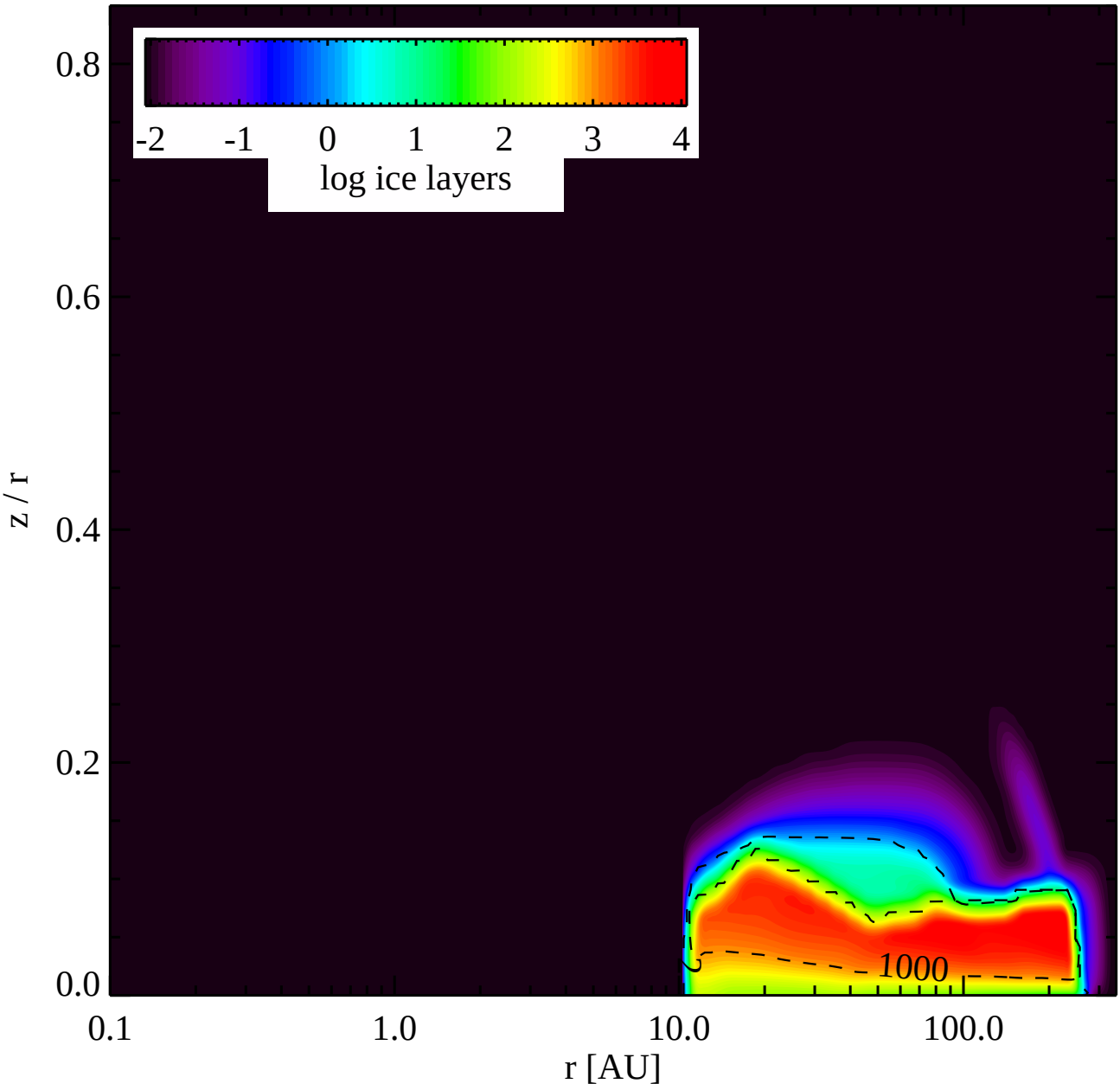

-12
-10
-8
-6
-4
log ε (NH3)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

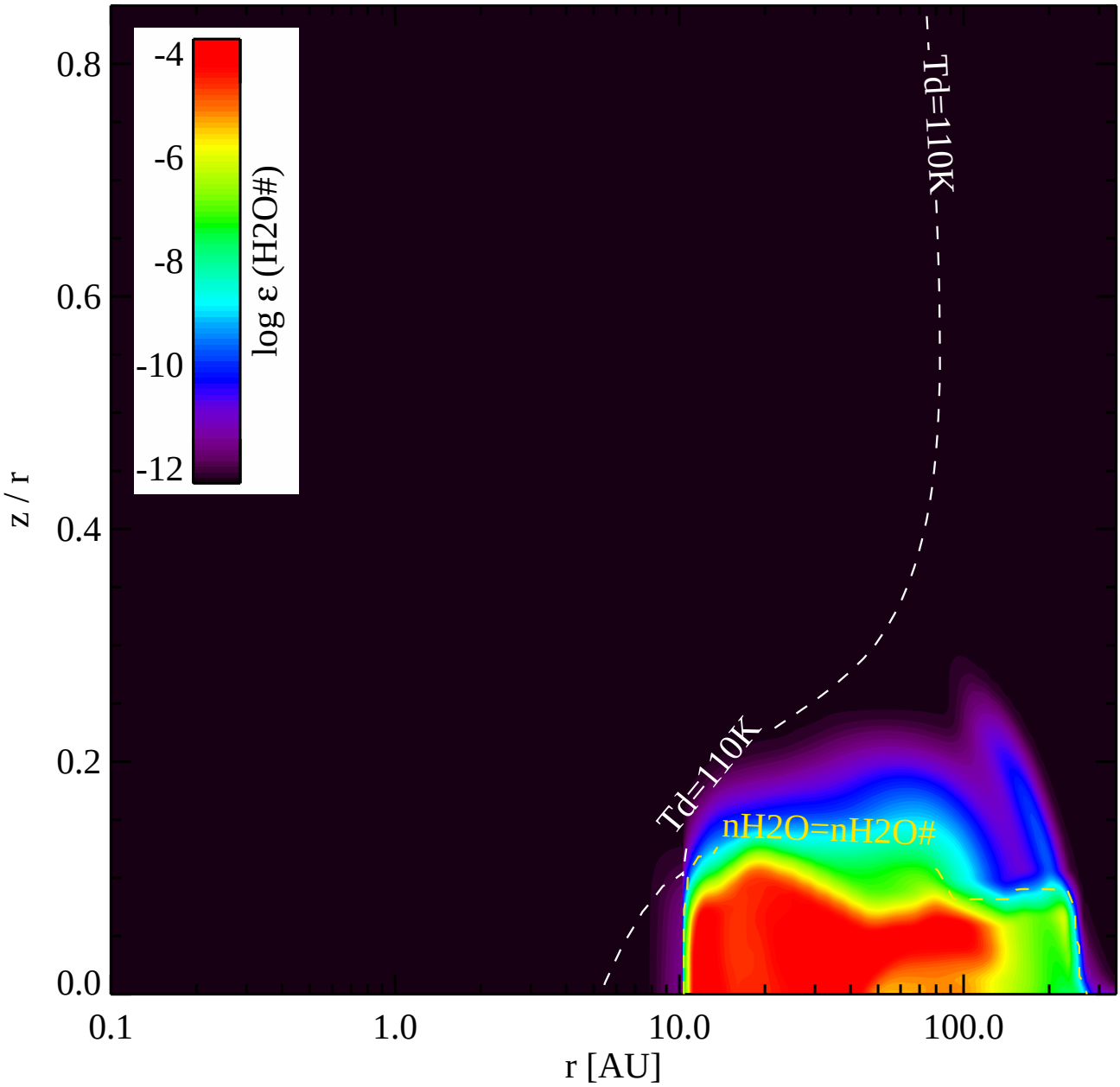

-12
-10
-8
-6
-4
log ε (HCO+)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

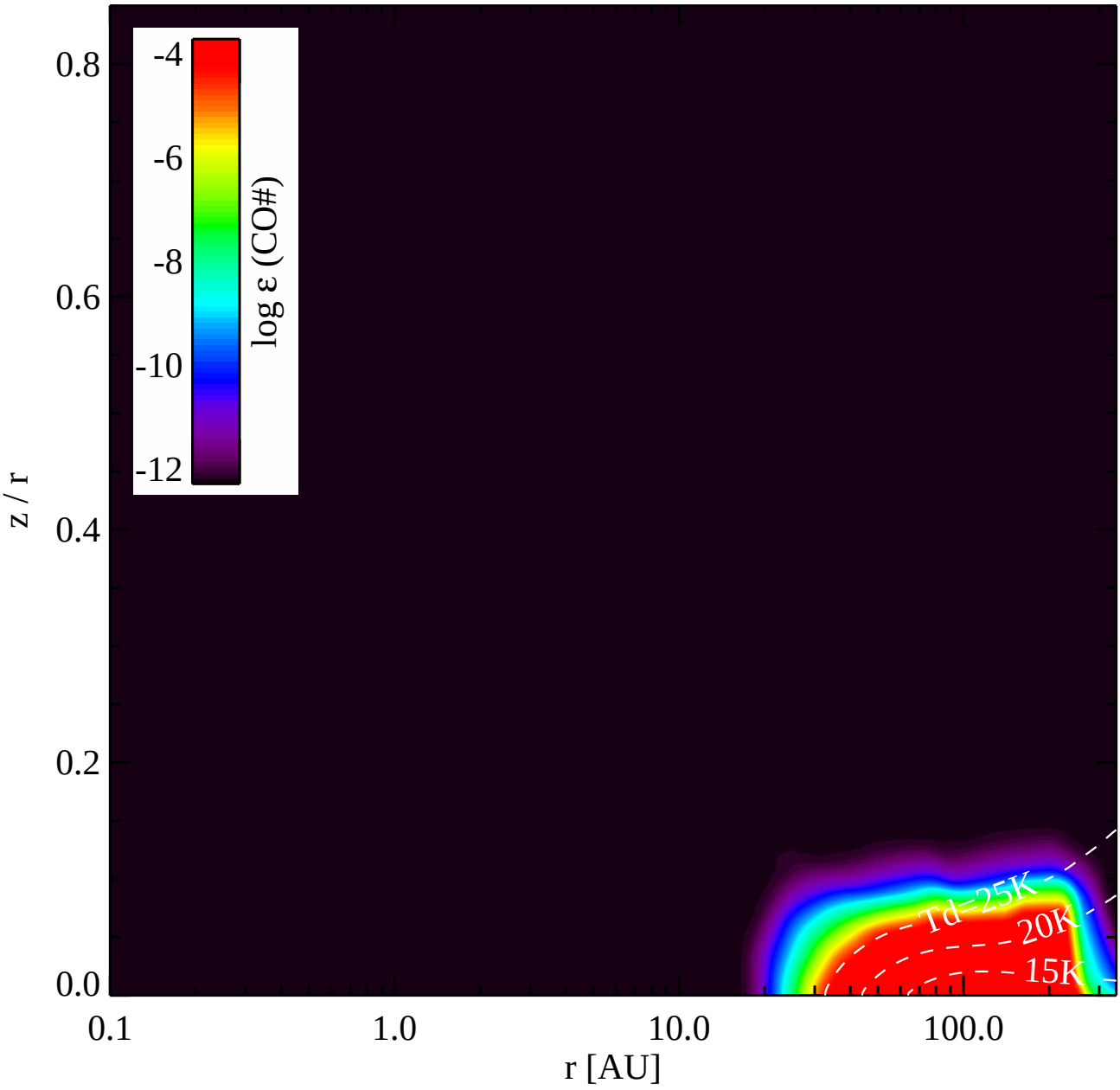

-12
-10
-8
-6
-4
log ε (HN2+)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

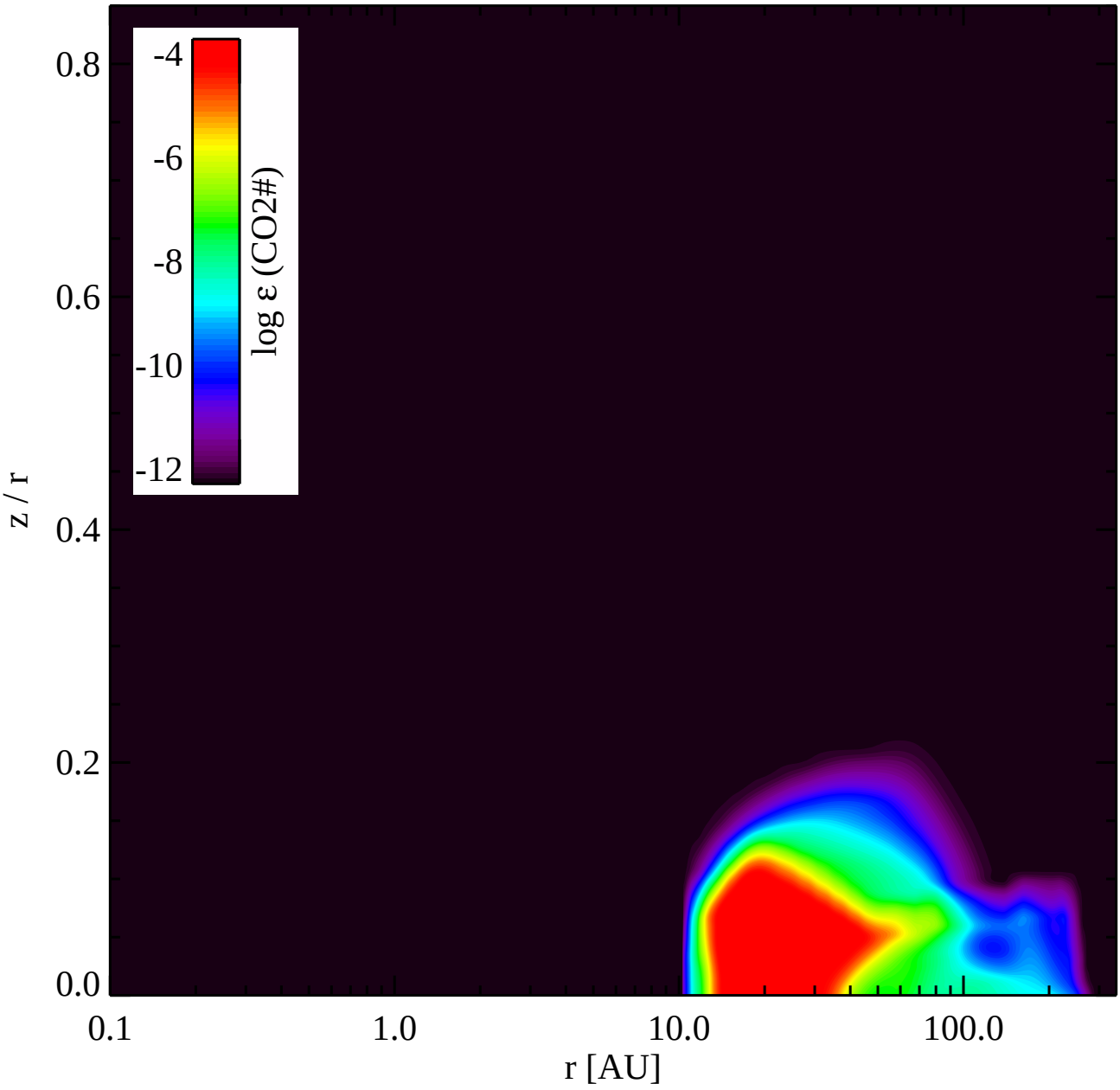

-12
-10
-8
-6
-4
log ε (CN)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

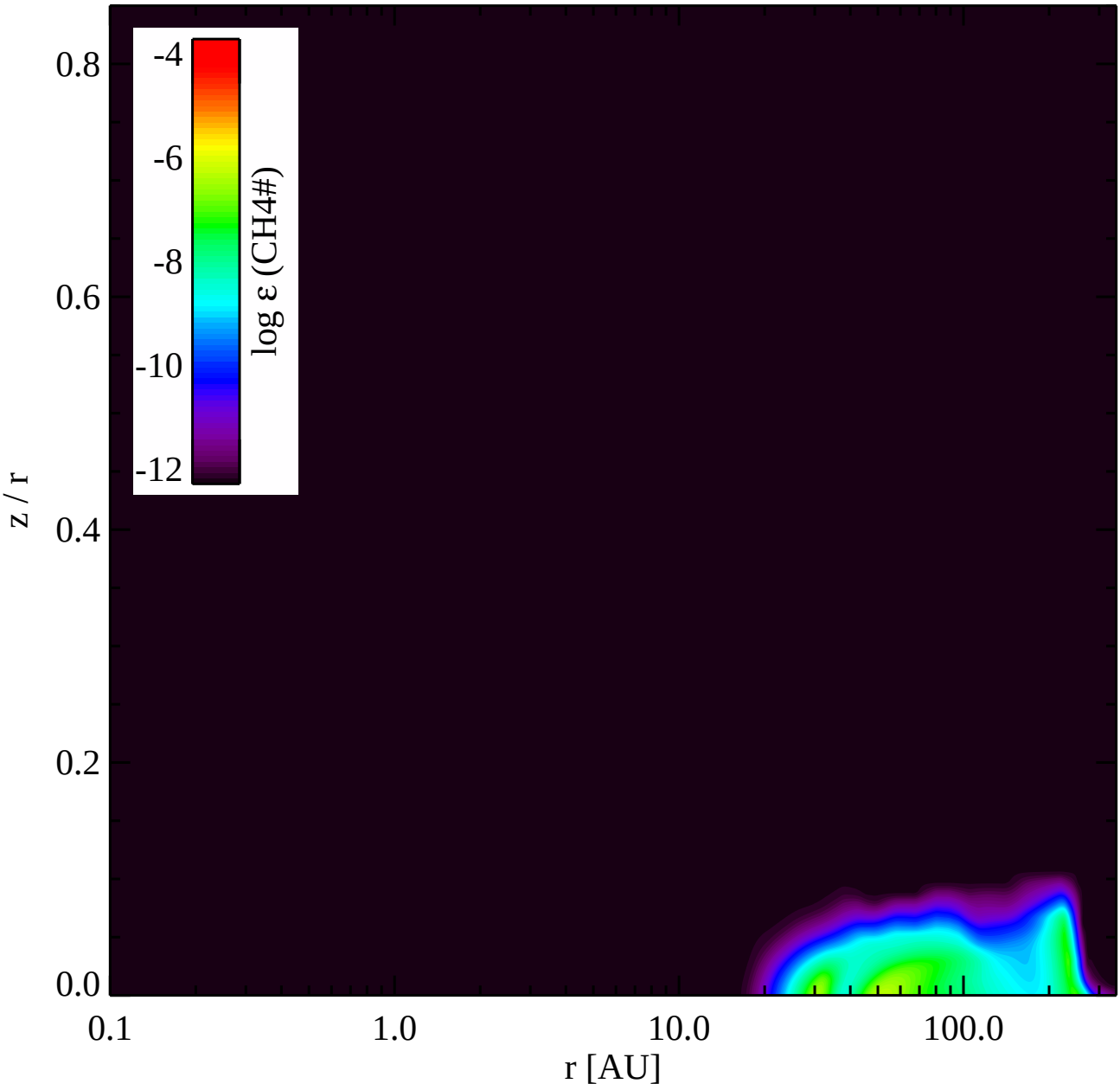

-12
-10
-8
-6
-4
log ε (HCN)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

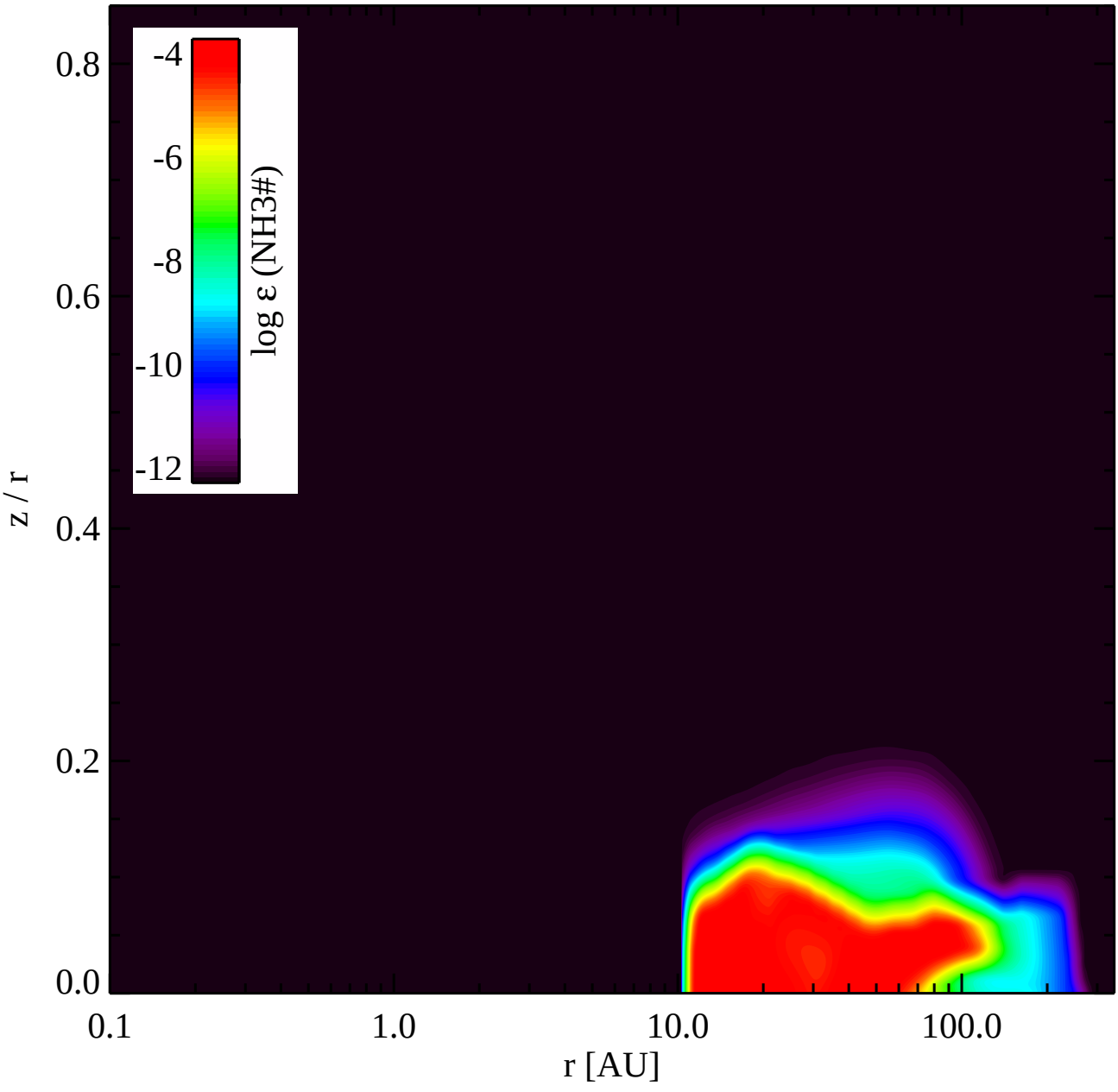

-2
-1
0
1
2
3
4
log ice layers
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]
1000

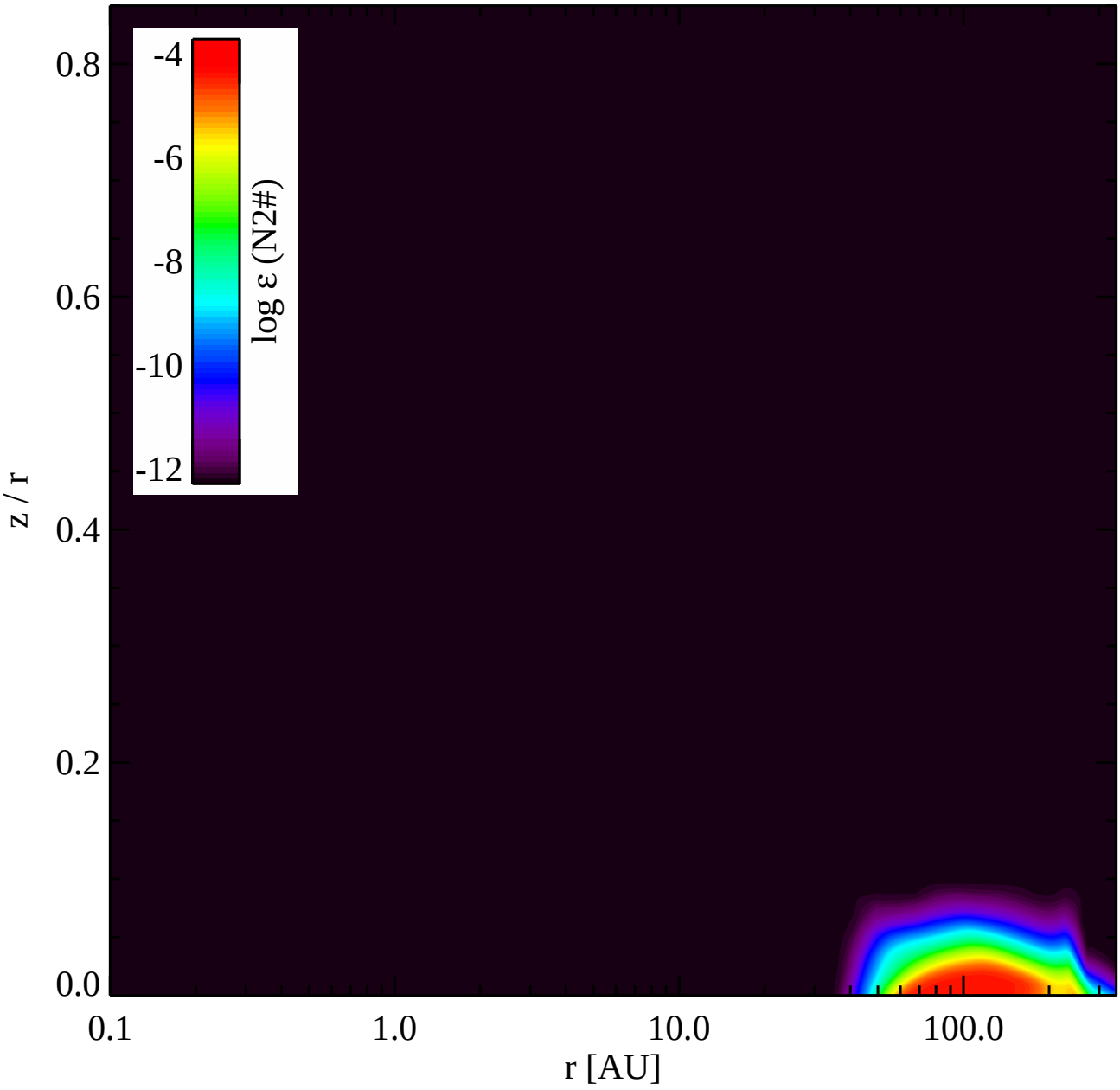

-4
-6
-8
-10
-12
log ε (H2O#)
Td=110K
Td=110K
nH2O=nH2O#
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

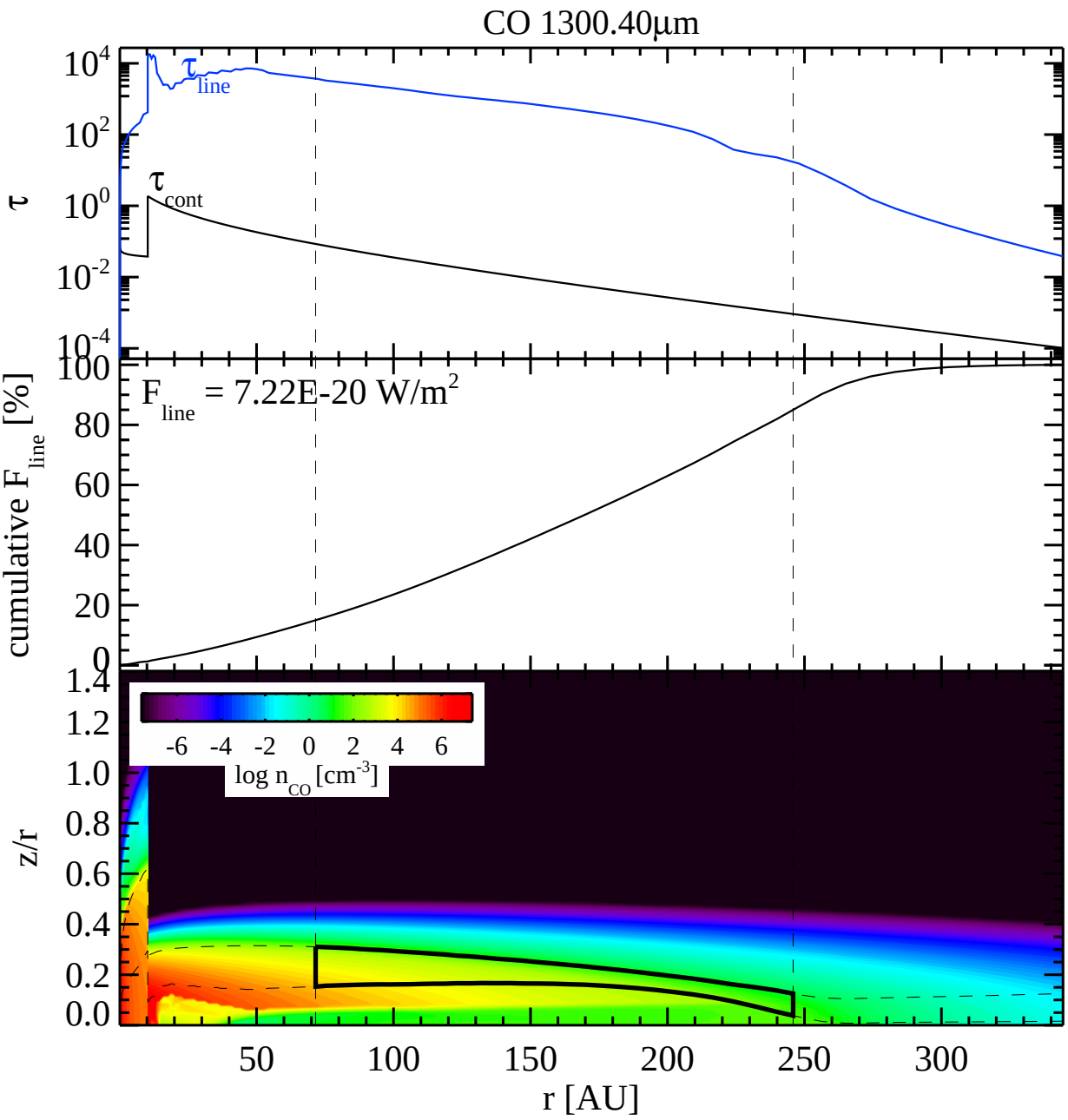

-4
-6
-8
-10
-12
log ε (CO#)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]
Td=25K
20K
15K

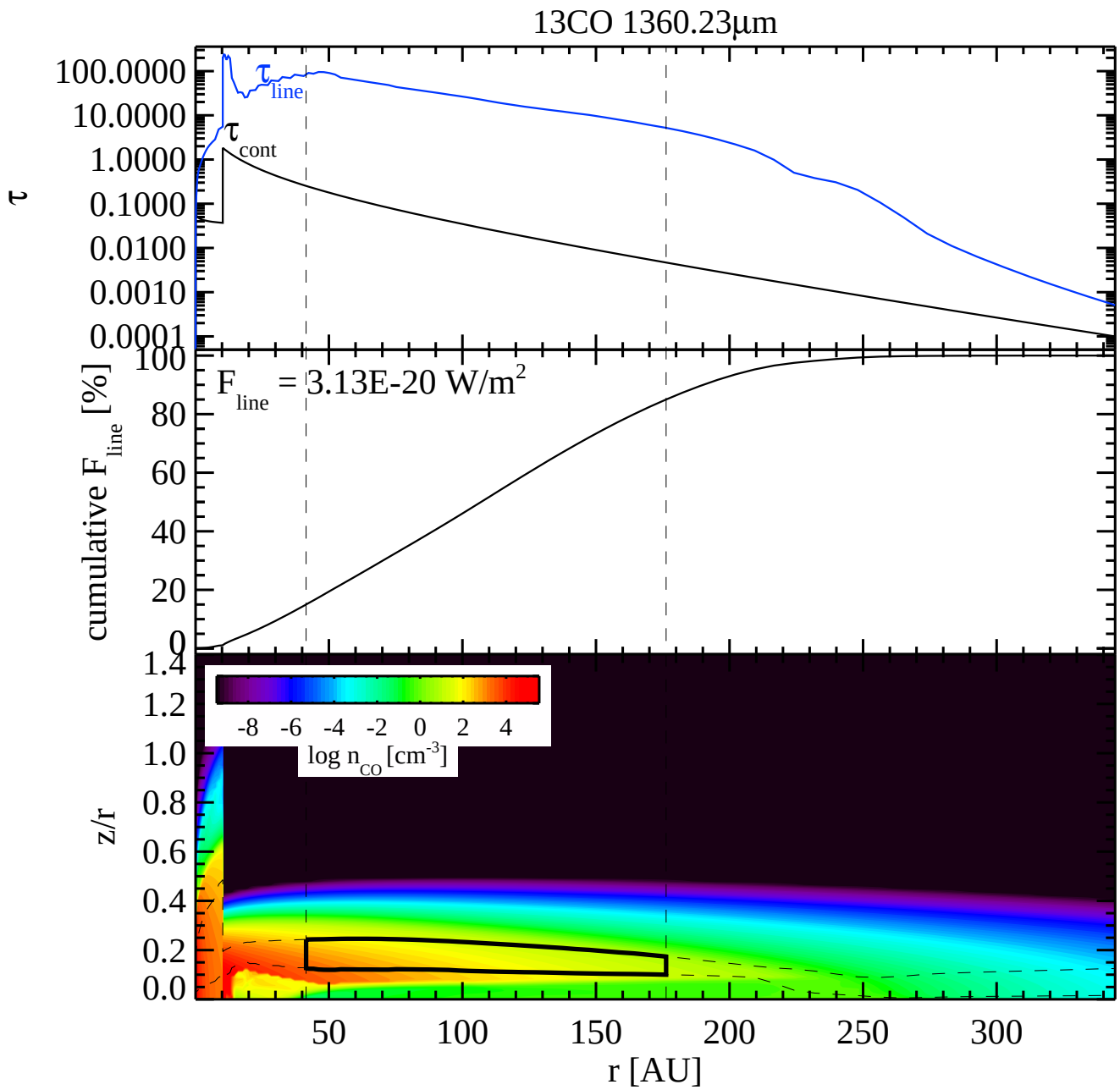

-4
-6
-8
-10
-12
log ε (CO2#)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

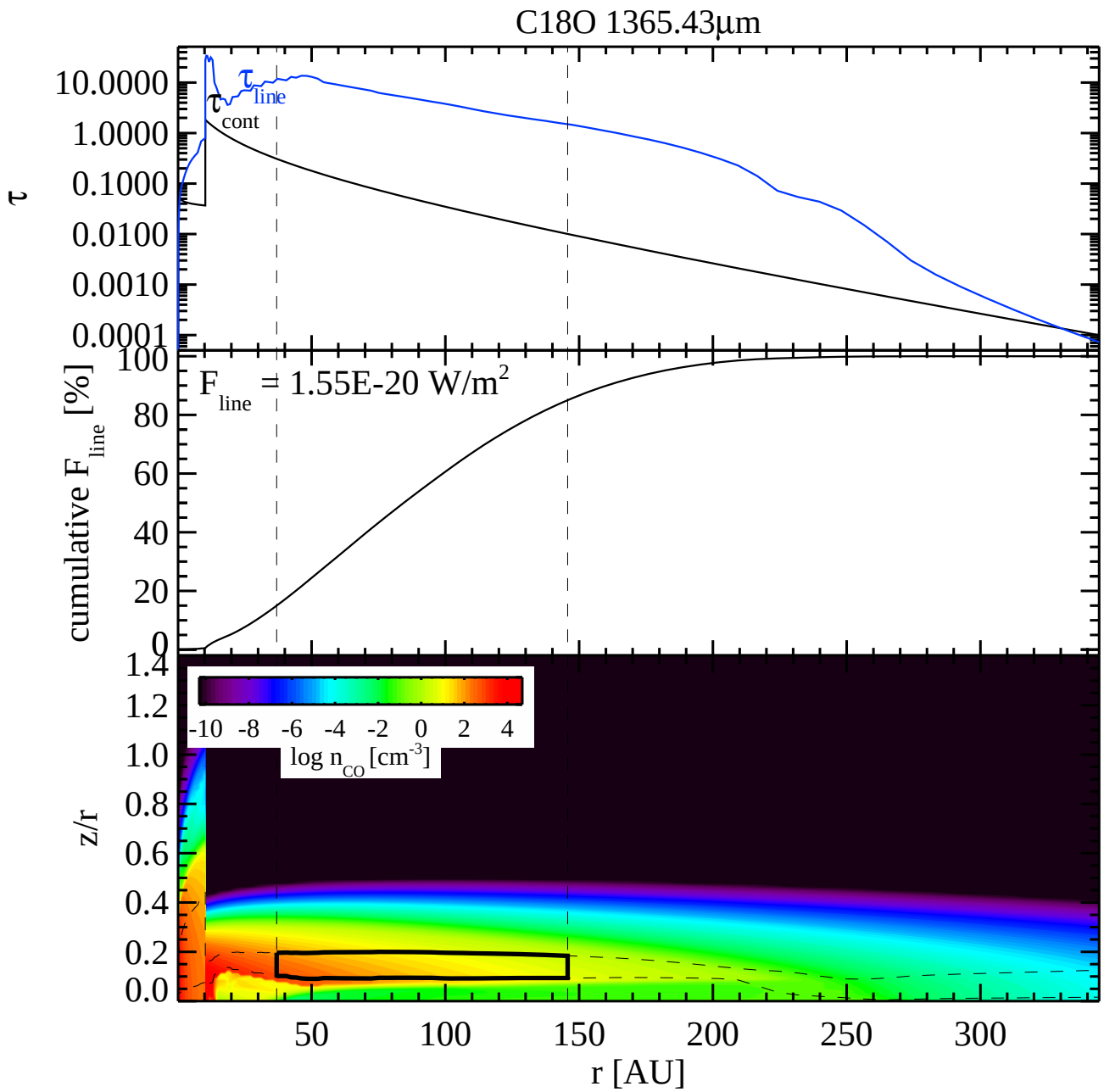

-4
-6
-8
-10
-12
log ε (CH4#)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

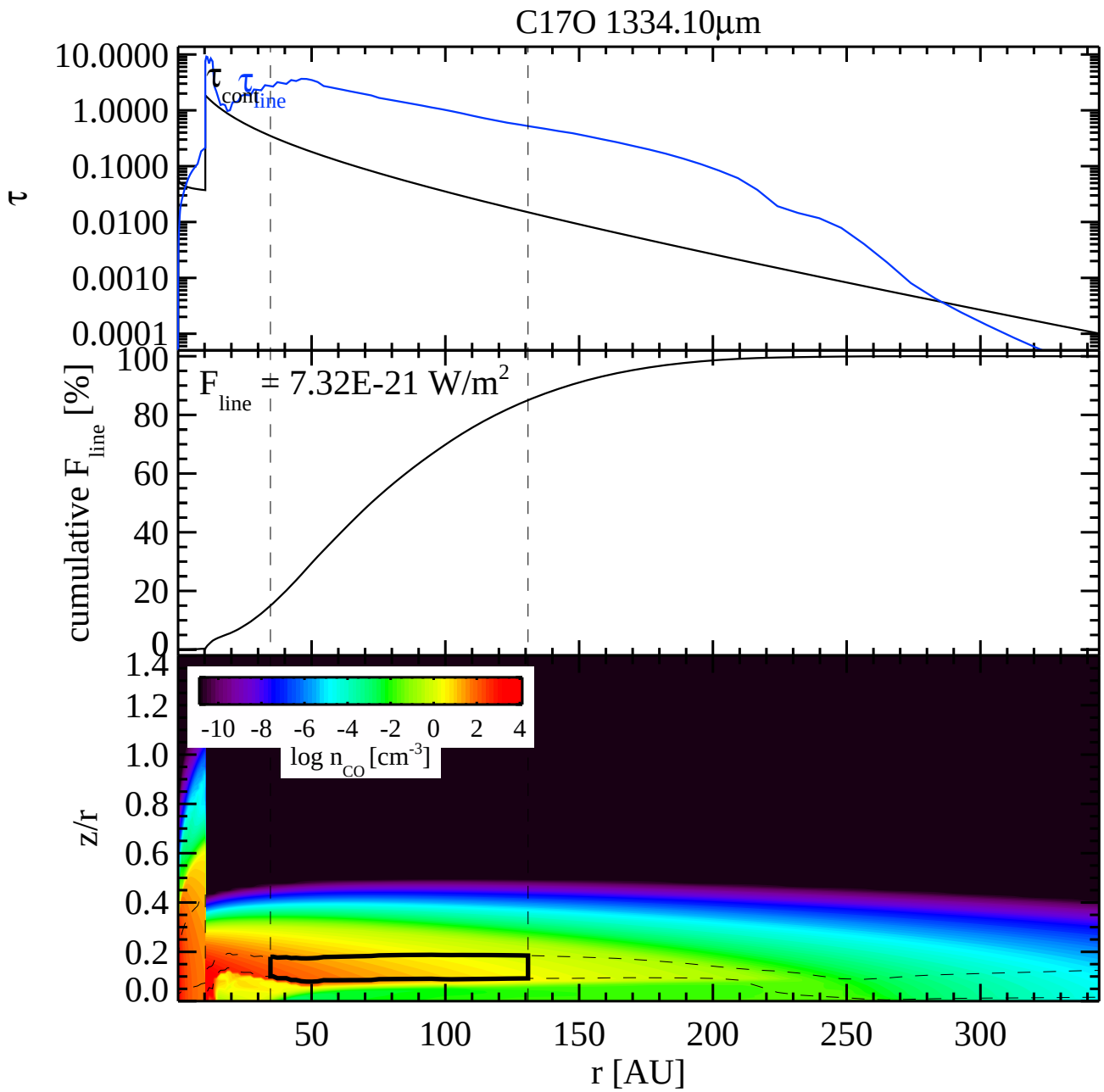

-4
-6
-8
-10
-12
log ε (NH3#)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

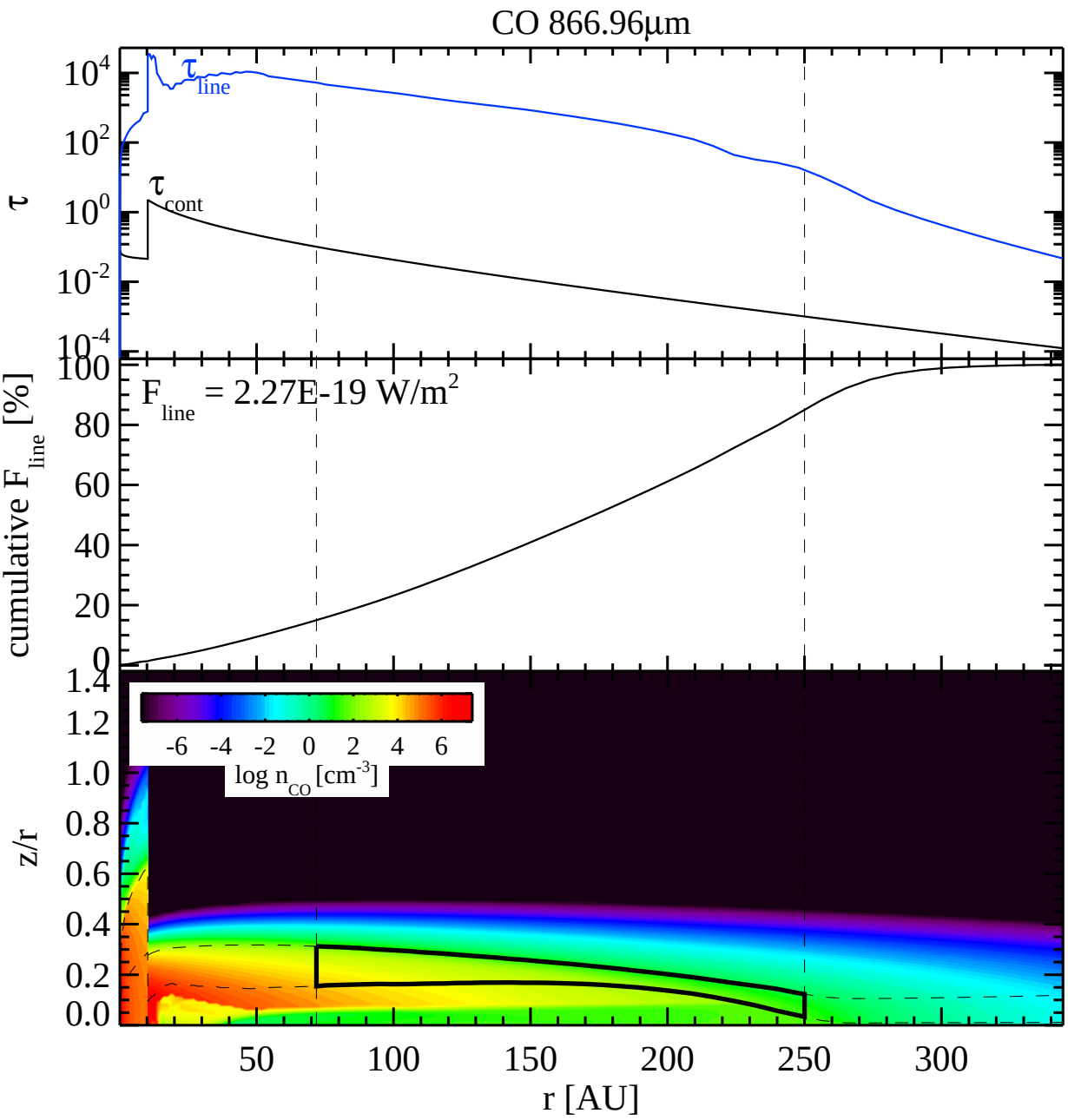

-4
-6
-8
-10
-12
log ε (N2#)
0.8
0.6
0.4
0.2
0.0
z / r
0.1
1.0
10.0
100.0
r [AU]

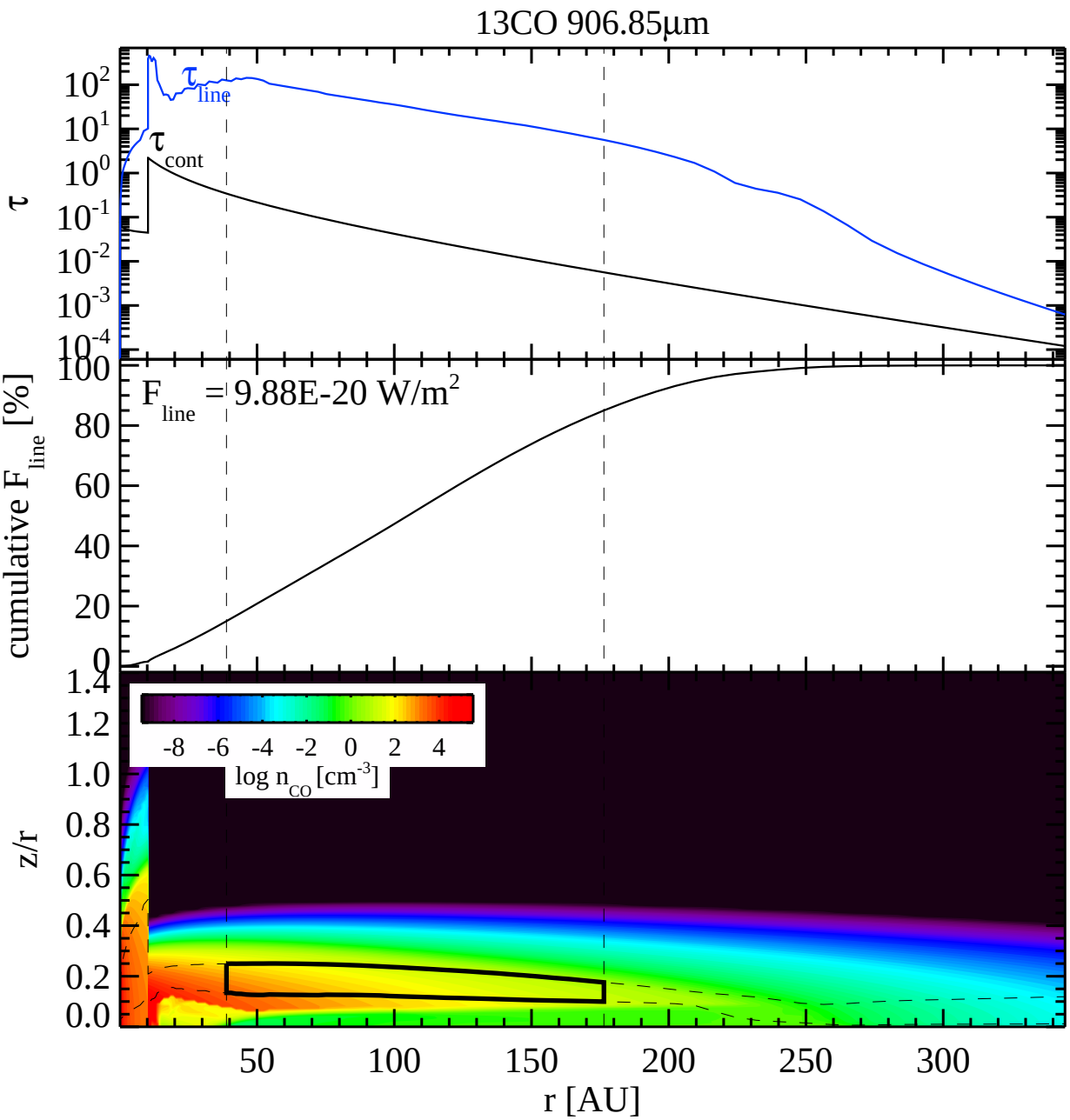

CO 1300.40µm
τ
τ line
τ cont
cumulative F line [%]
F line = 7.22E-20 W/m2
log n CO [cm-3]
z/r
r [AU]

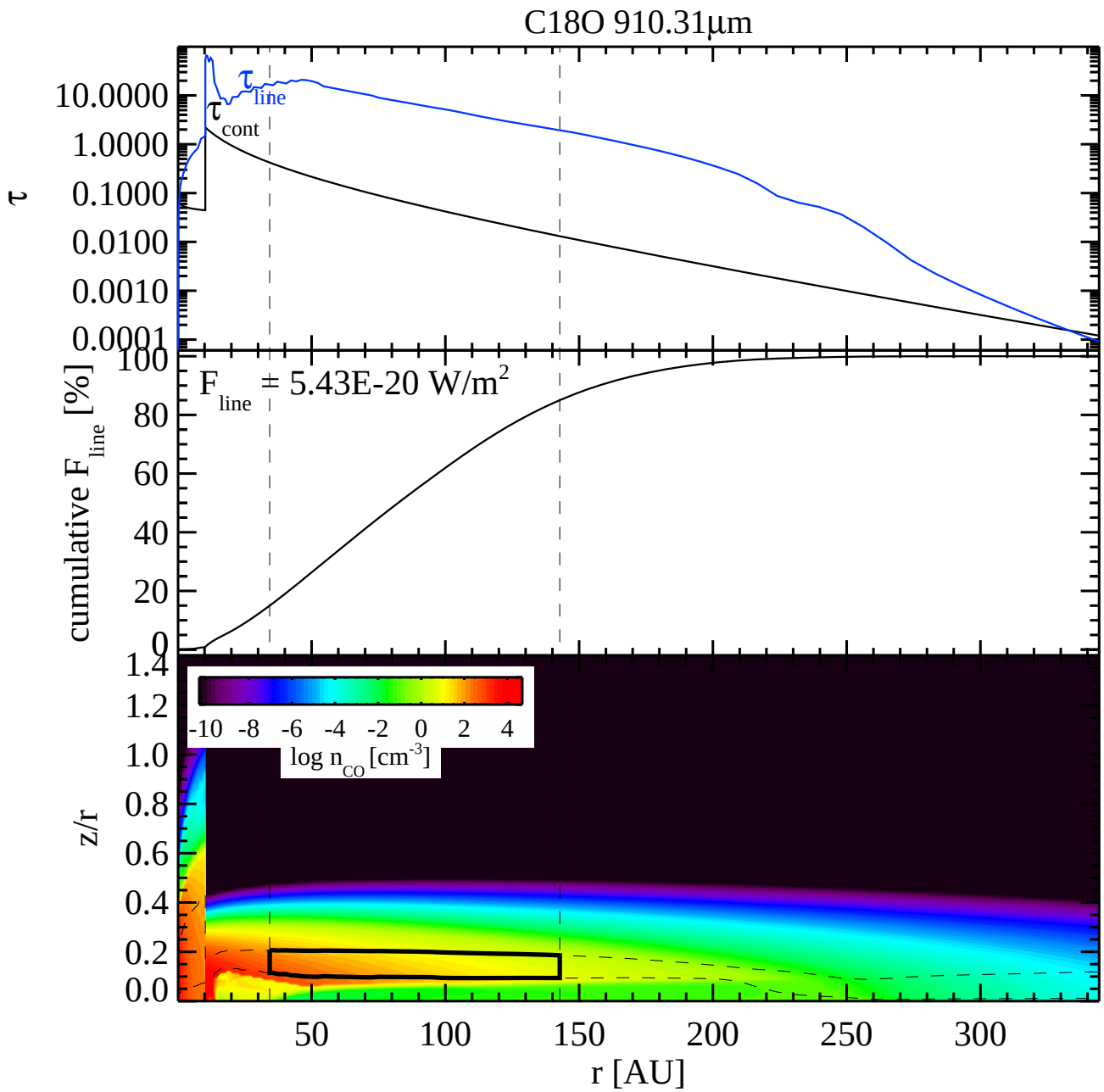

13CO 1360.23µm
τ
100.0000
10.0000
1.0000
0.1000
0.0100
0.0010
0.0001
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 3.13E-20 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-8 -6 -4 -2 0 2 4
log n CO [cm-3]
50
100
150
200
250
300
r [AU]

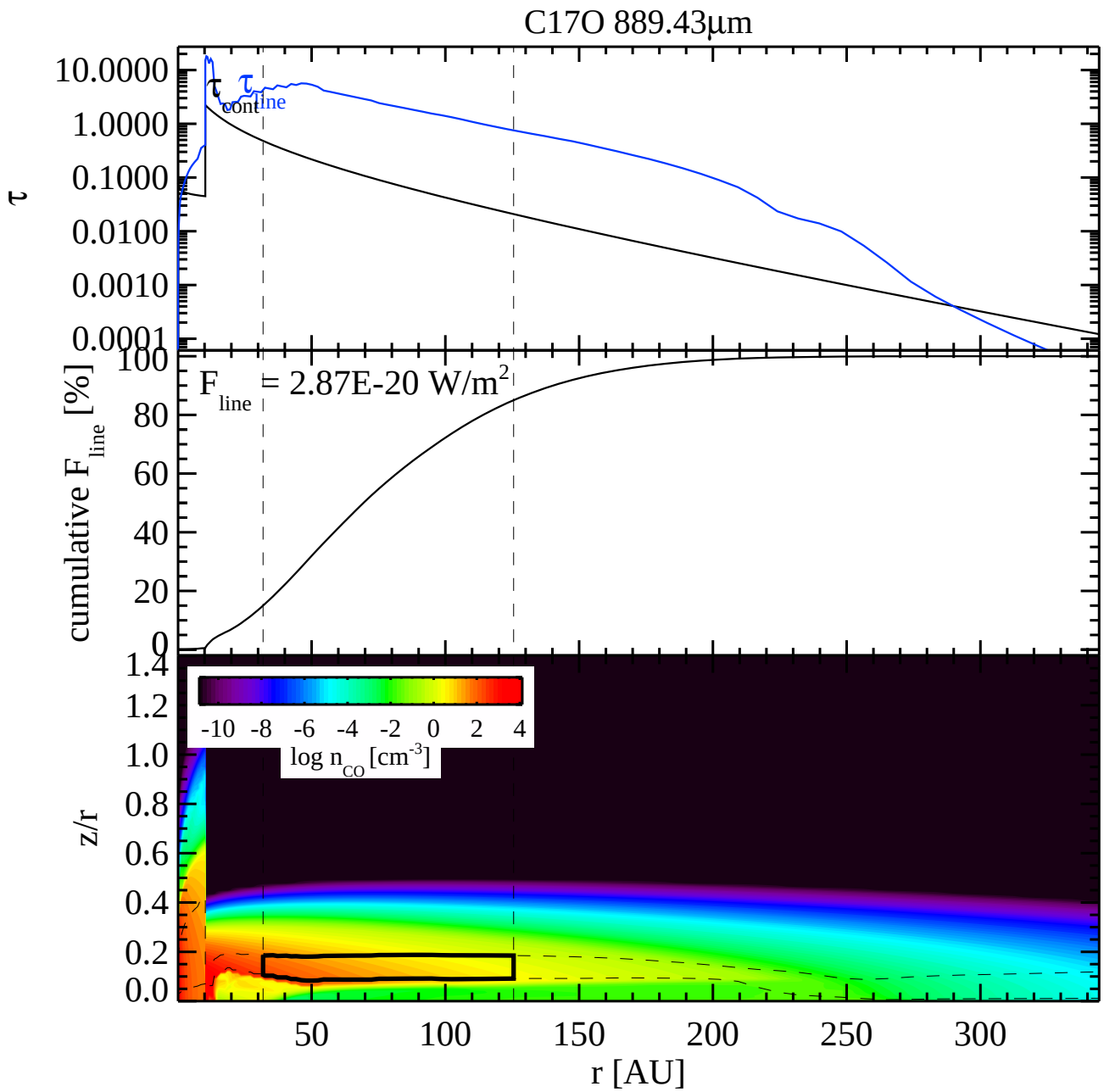

C18O 1365.43µm
τ
10.0000
1.0000
0.1000
0.0100
0.0010
0.0001
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 1.55E-20 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n CO [cm-3]
50
100
150
200
250
300
r [AU]

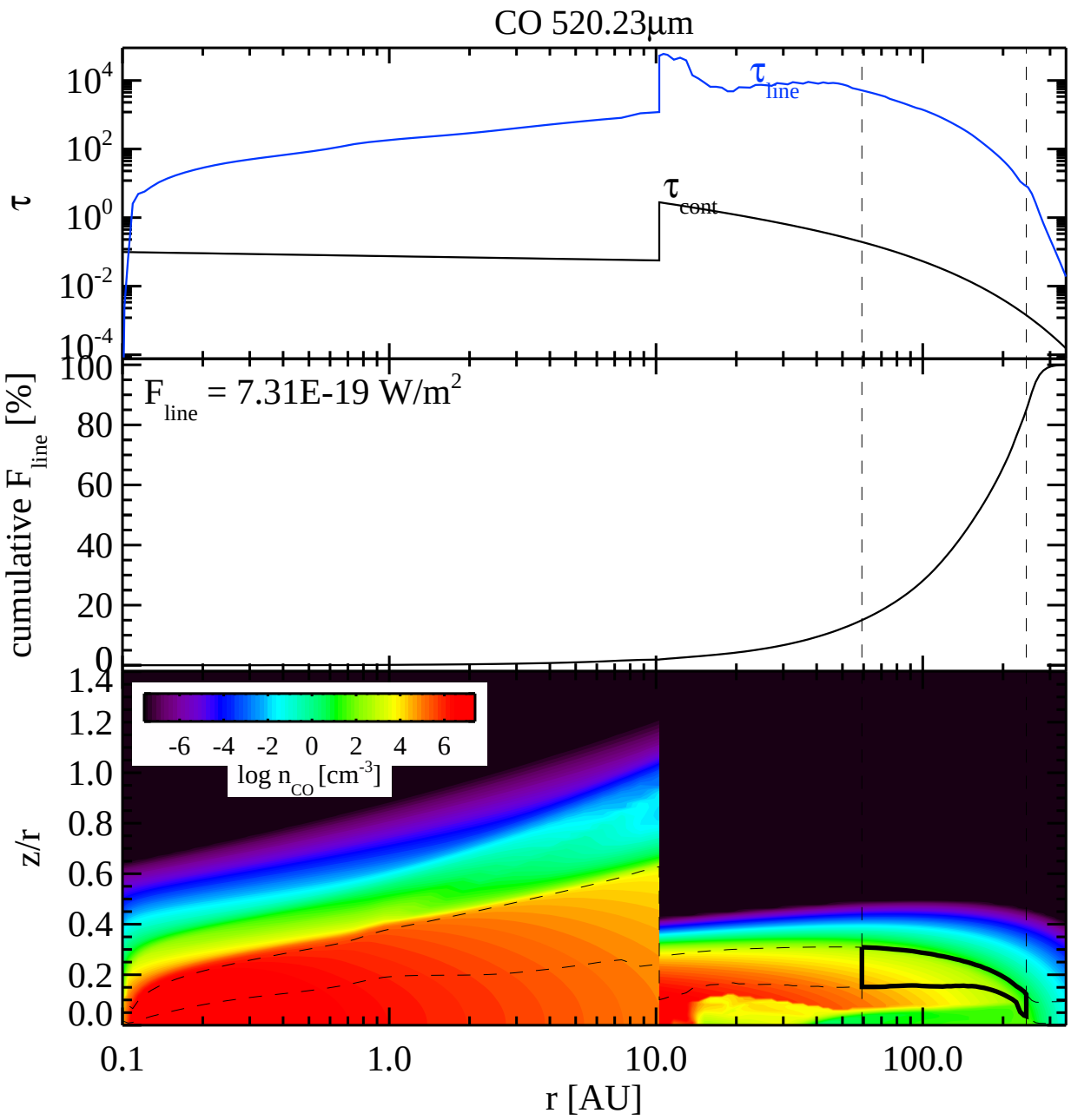

C17O 1334.10µm
τ
10.0000
1.0000
0.1000
0.0100
0.0010
0.0001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 7.32E-21 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n CO [cm-3]
50
100
150
200
250
300
r [AU]

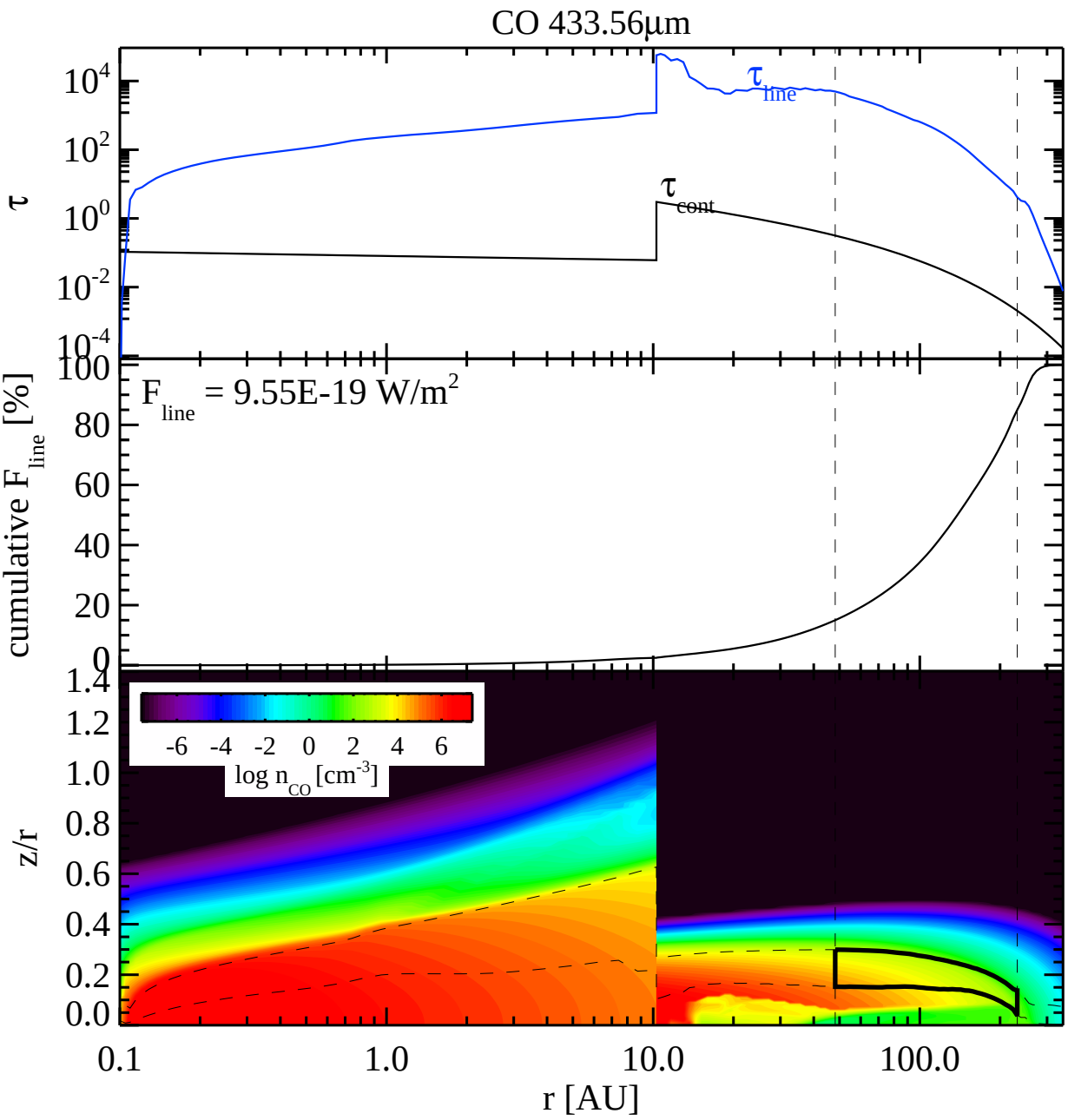

CO 866.96µm
τ
τ line
τ cont
cumulative F line [%]
F line = 2.27E-19 W/m2
log n CO [cm-3]
z/r
r [AU]

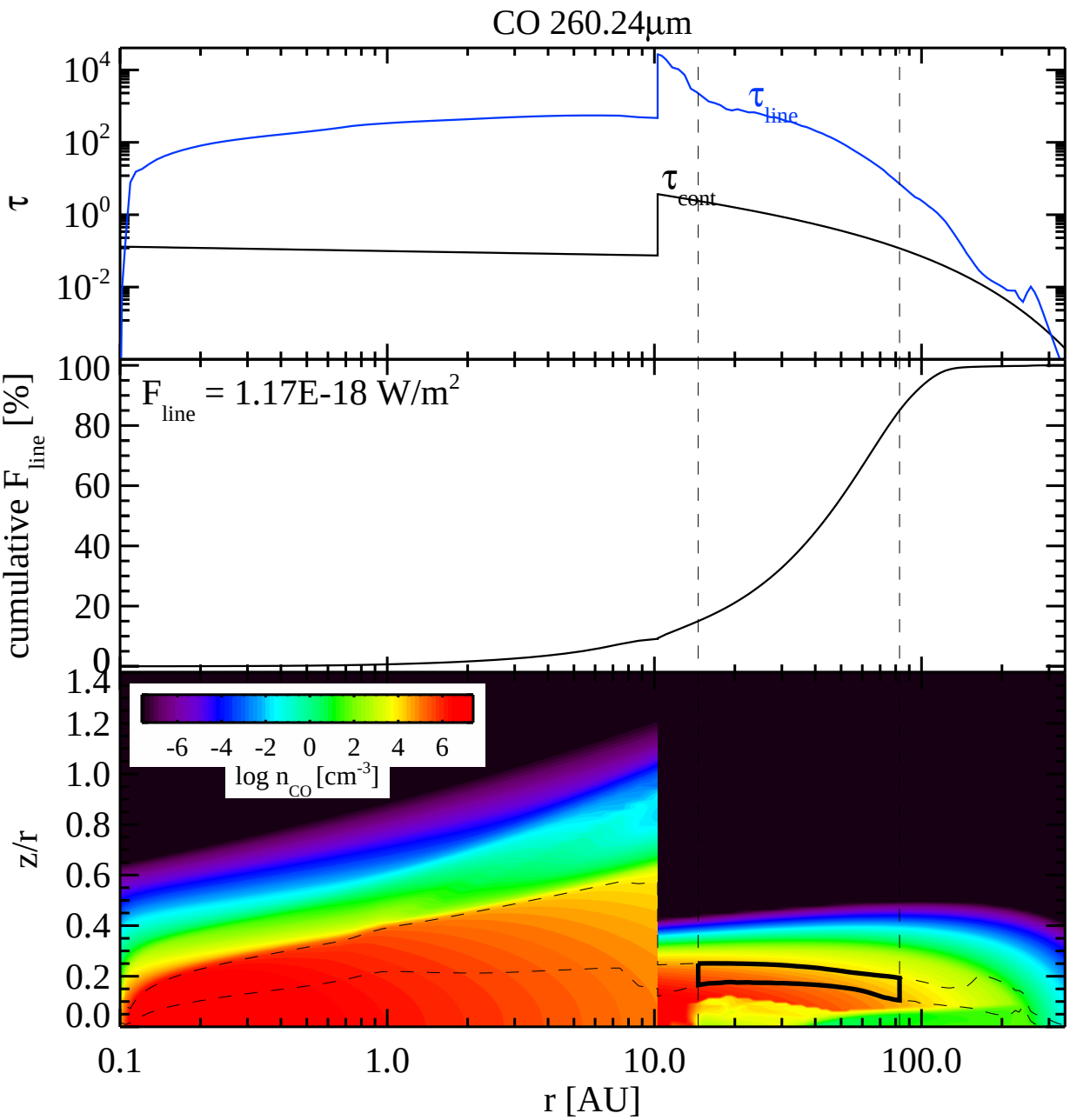

13CO 906.85µm
τ
τ line
τ cont
cumulative F line [%]
F line = 9.88E-20 W/m2
log n CO [cm-3]
-8 -6 -4 -2 0 2 4
z/r
r [AU]
50 100 150 200 250 300

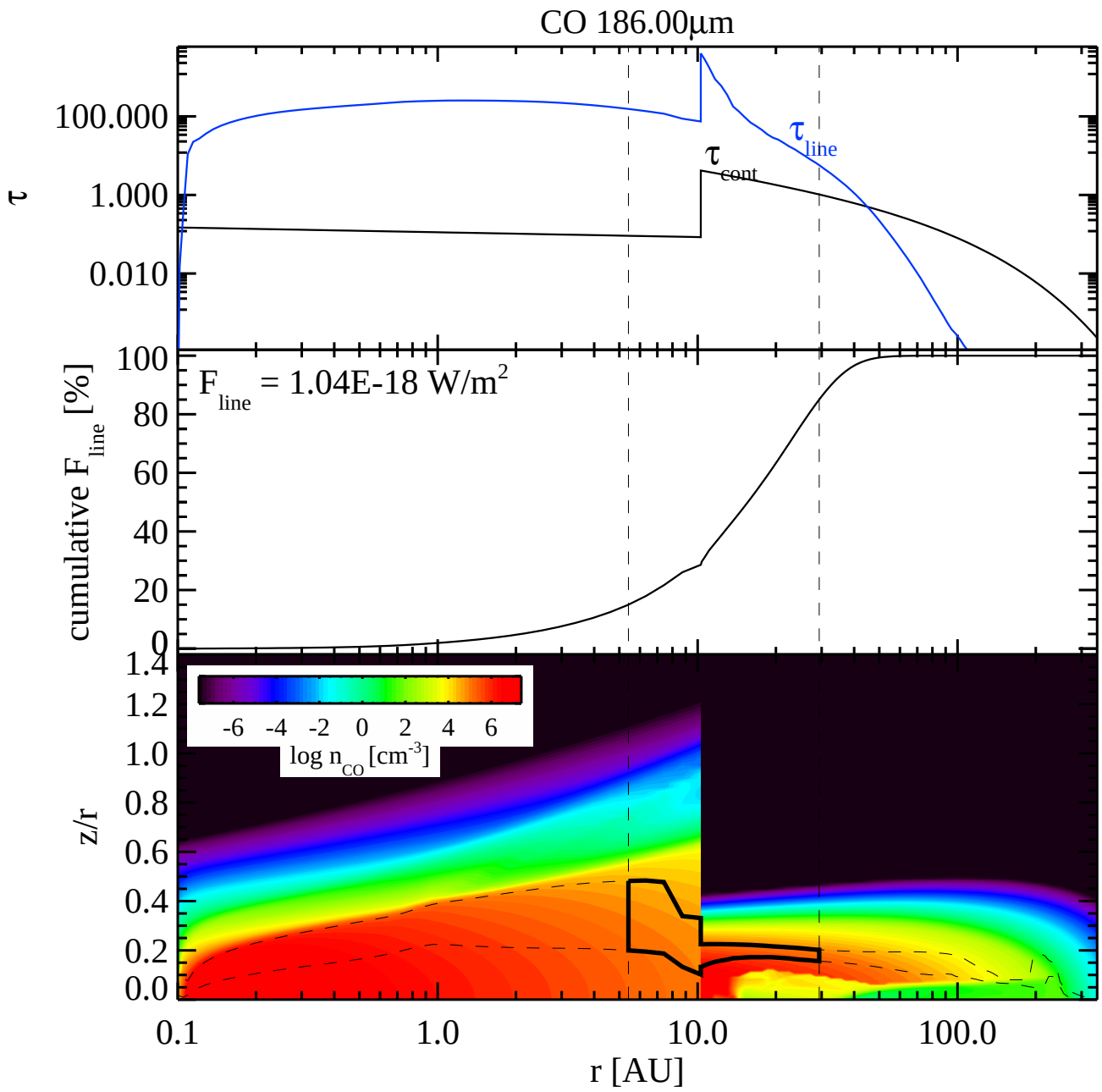

C18O 910.31µm
τ
10.0000
1.0000
0.1000
0.0100
0.0010
0.0001
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 5.43E-20 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n CO [cm-3]
50
100
150
200
250
300
r [AU]

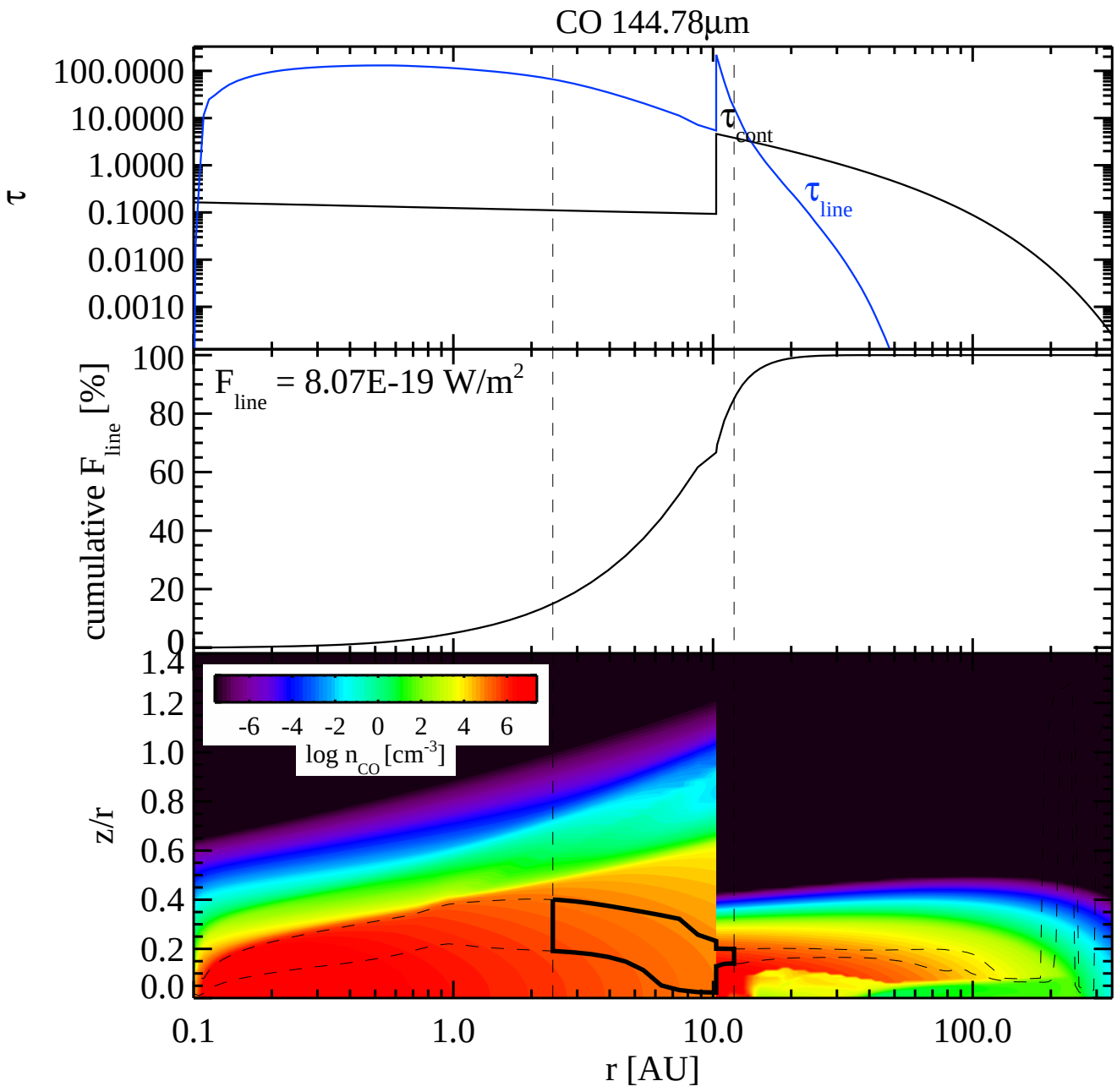

C17O 889.43µm
τ
10.0000
1.0000
0.1000
0.0100
0.0010
0.0001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 2.87E-20 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n CO [cm-3]
50
100
150
200
250
300
r [AU]

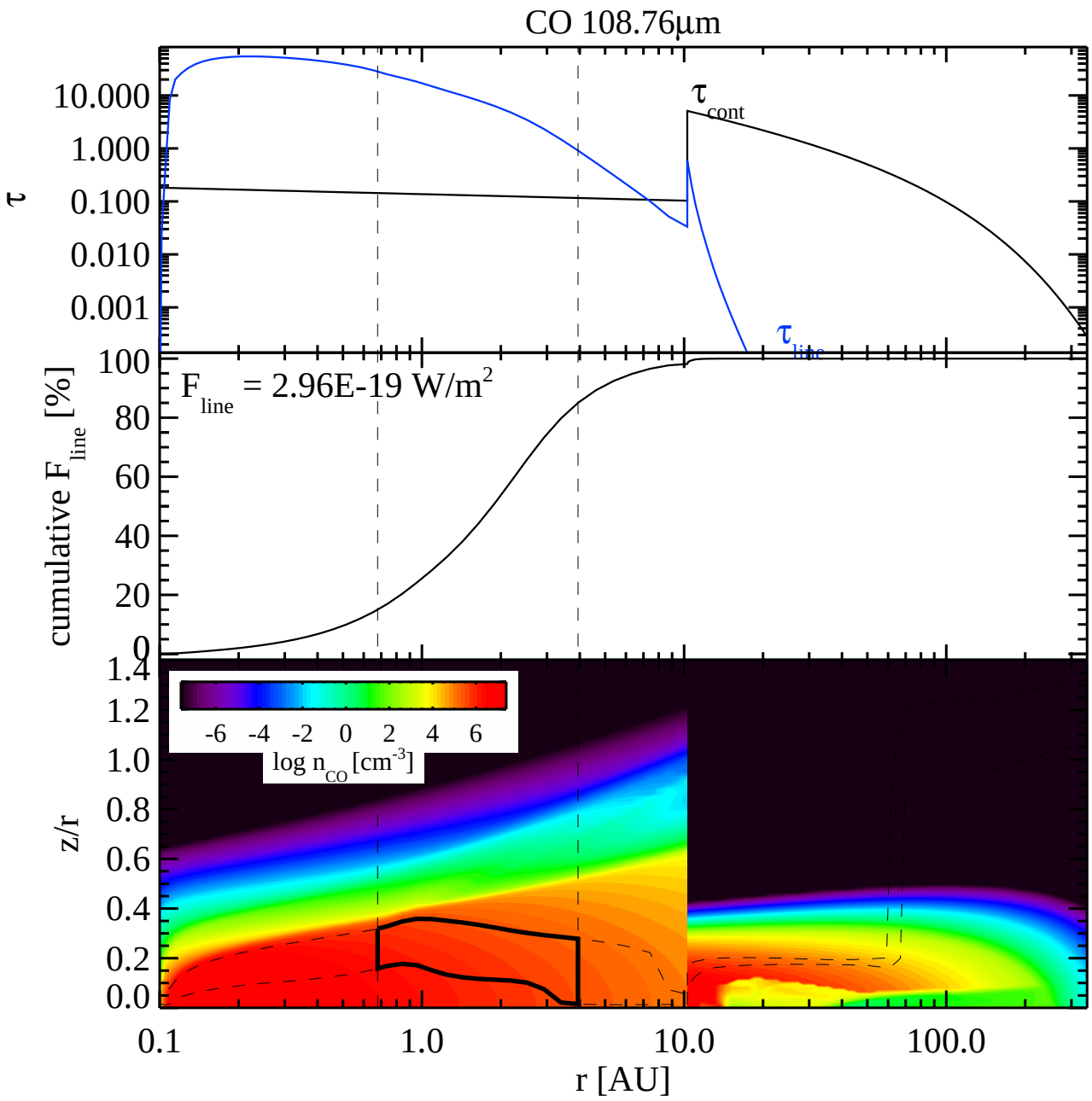

CO 520.23µm
τ
τ line
τ cont
cumulative F line [%]
F line = 7.31E-19 W/m2
log n CO [cm-3]
z/r
r [AU]

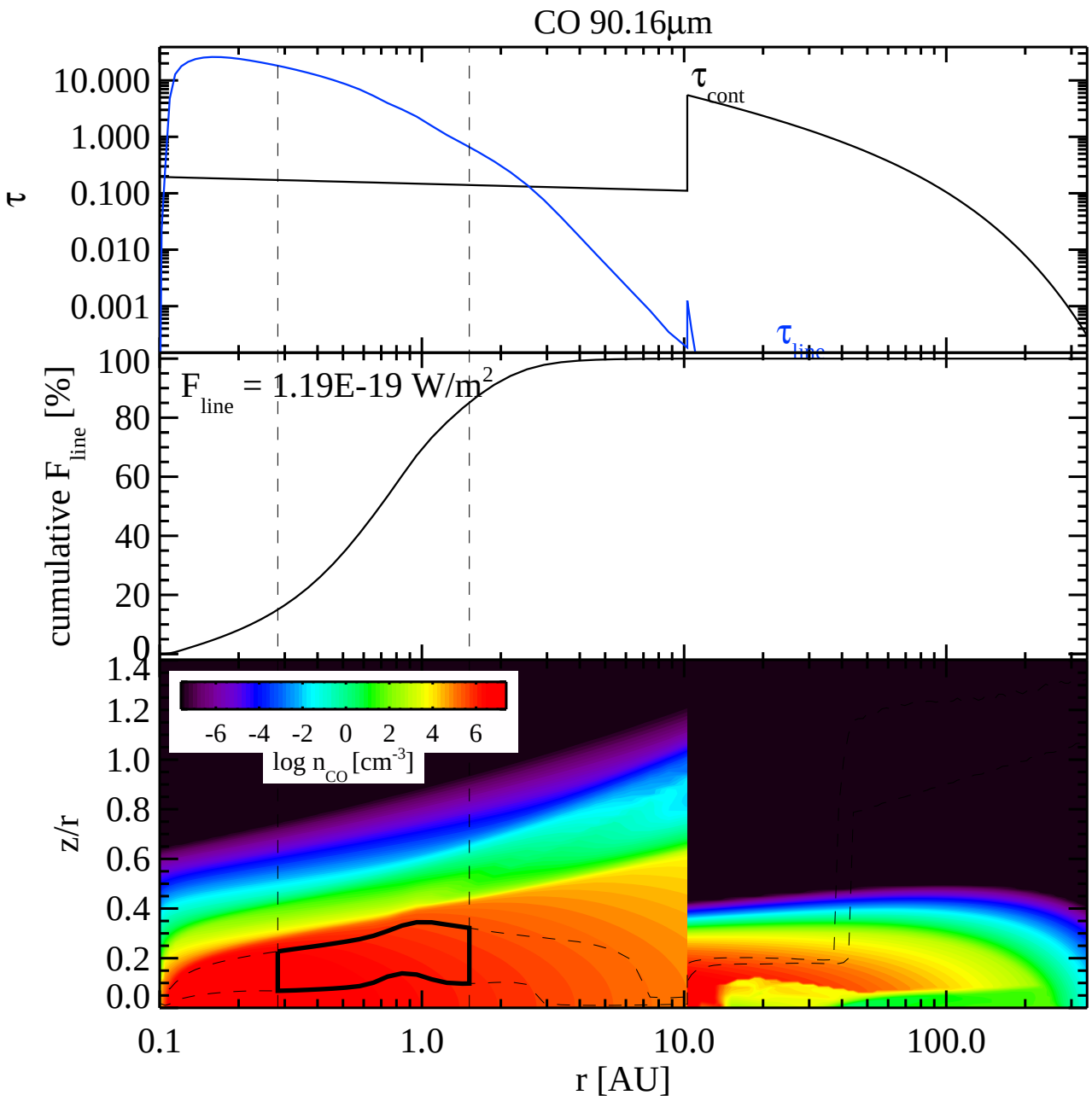

CO 433.56µm
τ
$10^4$
$10^2$
$10^0$
$10^{-2}$
$10^{-4}$
$\tau_{line}$
$\tau_{cont}$
cumulative $F_{line}$ [%]
100
80
60
40
20
0
$F_{line}$ = 9.55E-19 W/m$^2$
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log $n_{CO}$ [cm$^{-3}$]
0.1
1.0
10.0
100.0
r [AU]

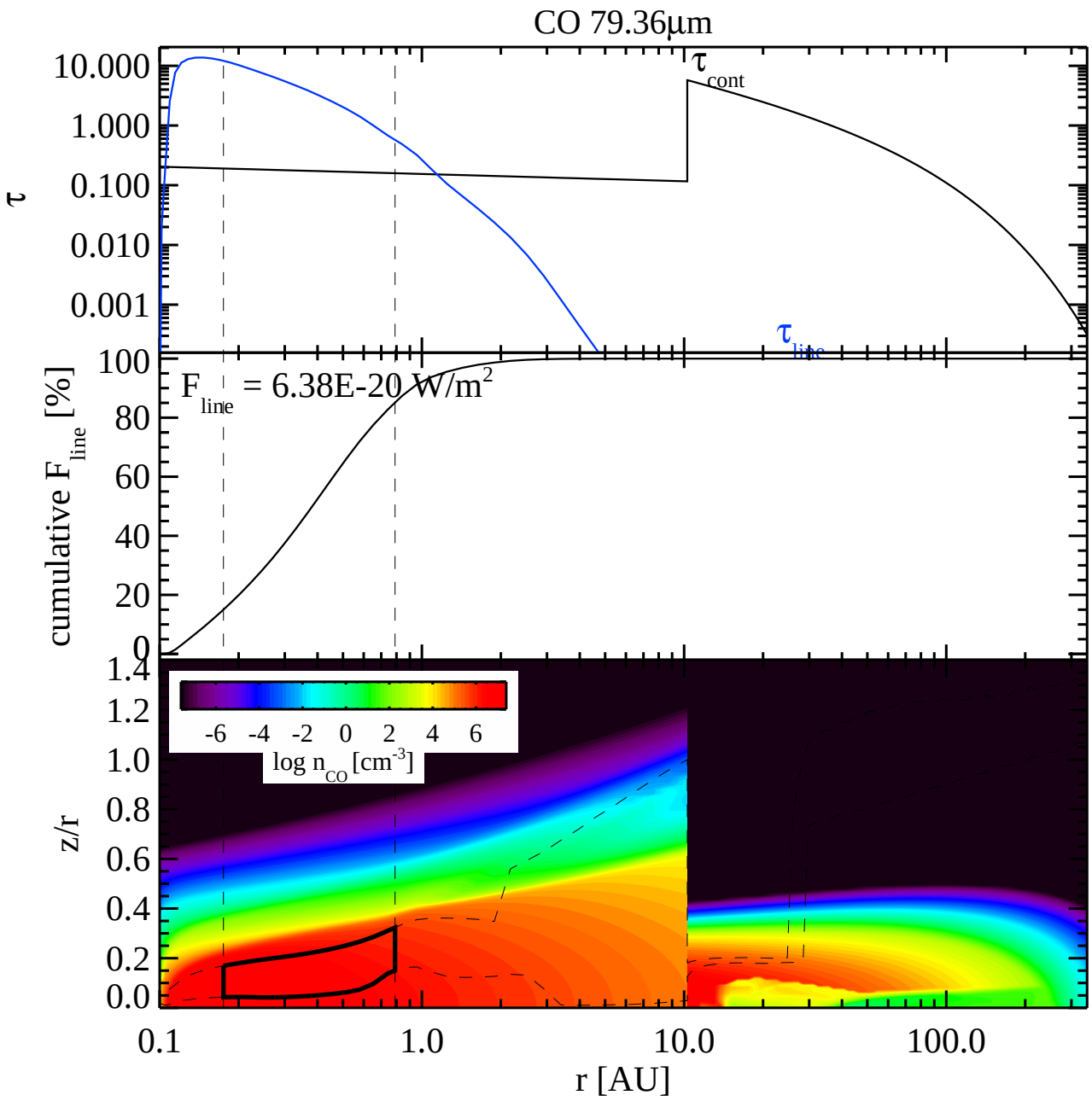

CO 260.24μm
τ
$10^4$
$10^2$
$10^0$
$10^{-2}$
$\tau_{line}$
$\tau_{cont}$
cumulative $F_{line}$ [%]
100
80
60
40
20
0
$F_{line}$ = 1.17E-18 W/m$^2$
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log $n_{CO}$ [cm$^{-3}$]
0.1
1.0
10.0
100.0
r [AU]

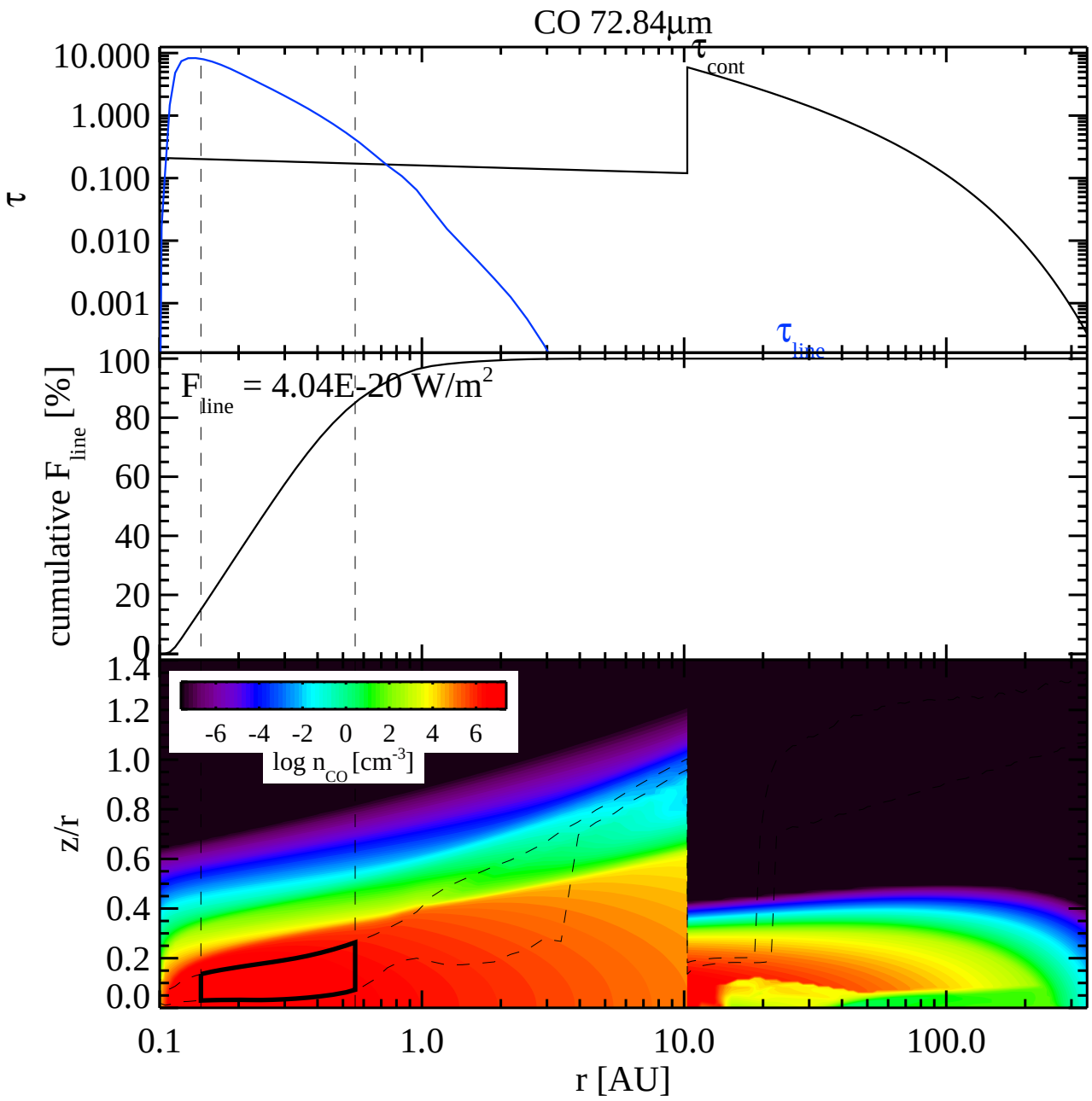

CO 186.00µm
τ
100.000
1.000
0.010
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 1.04E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

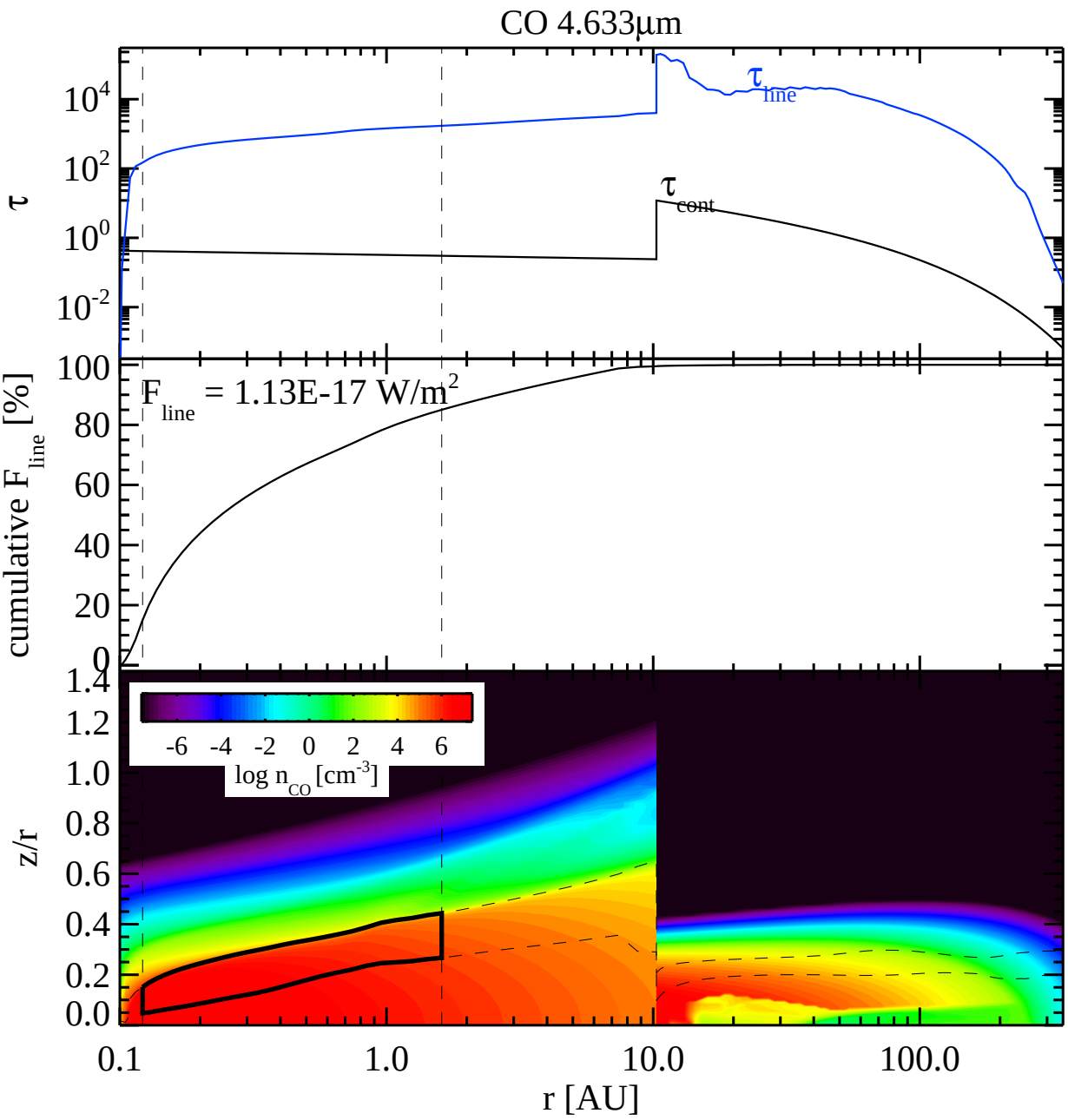

CO 144.78µm
τ
100.0000
10.0000
1.0000
0.1000
0.0100
0.0010
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 8.07E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

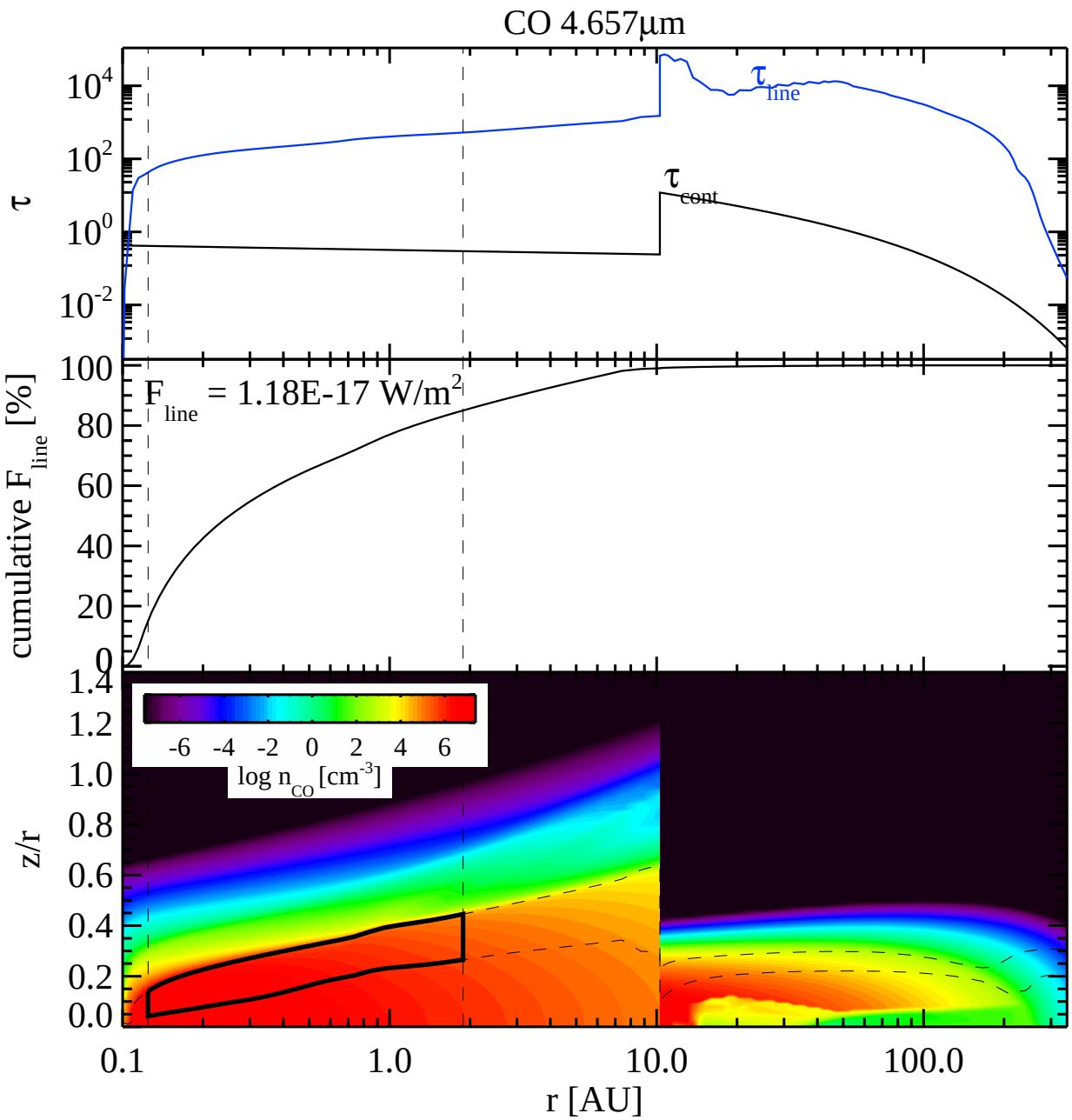

CO 108.76µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 2.96E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

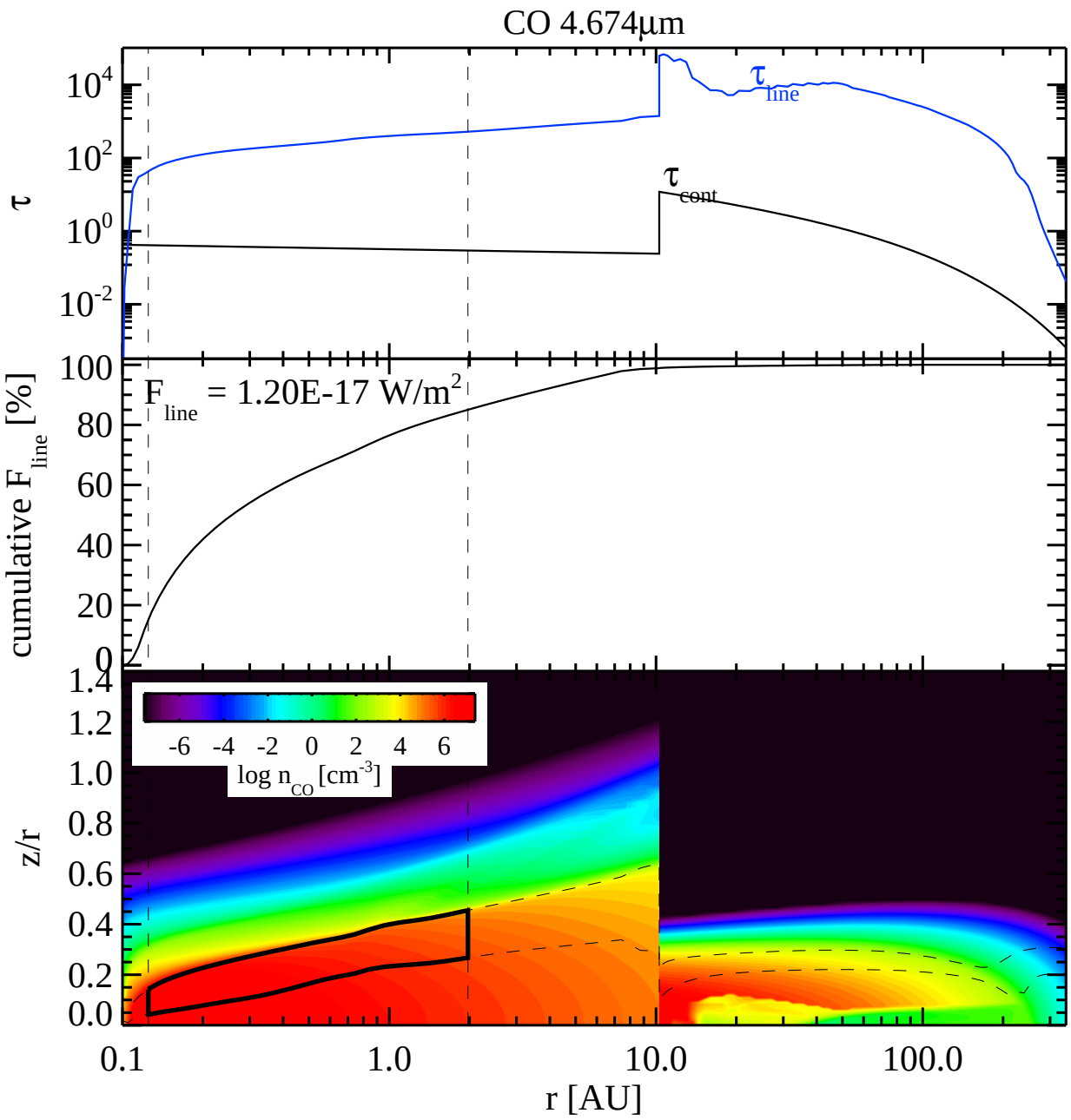

CO 90.16µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 1.19E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

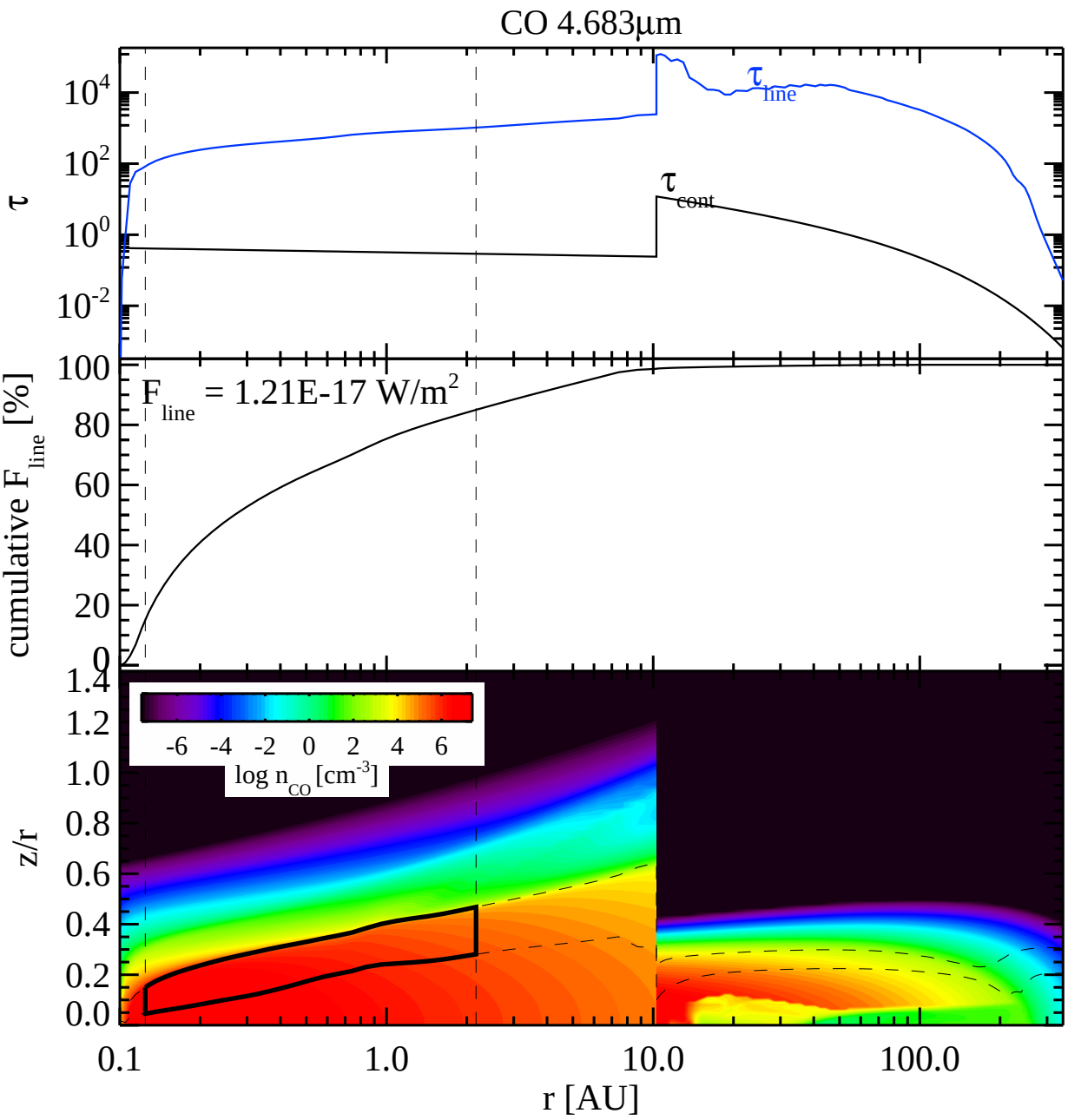

CO 79.36µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 6.38E-20 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

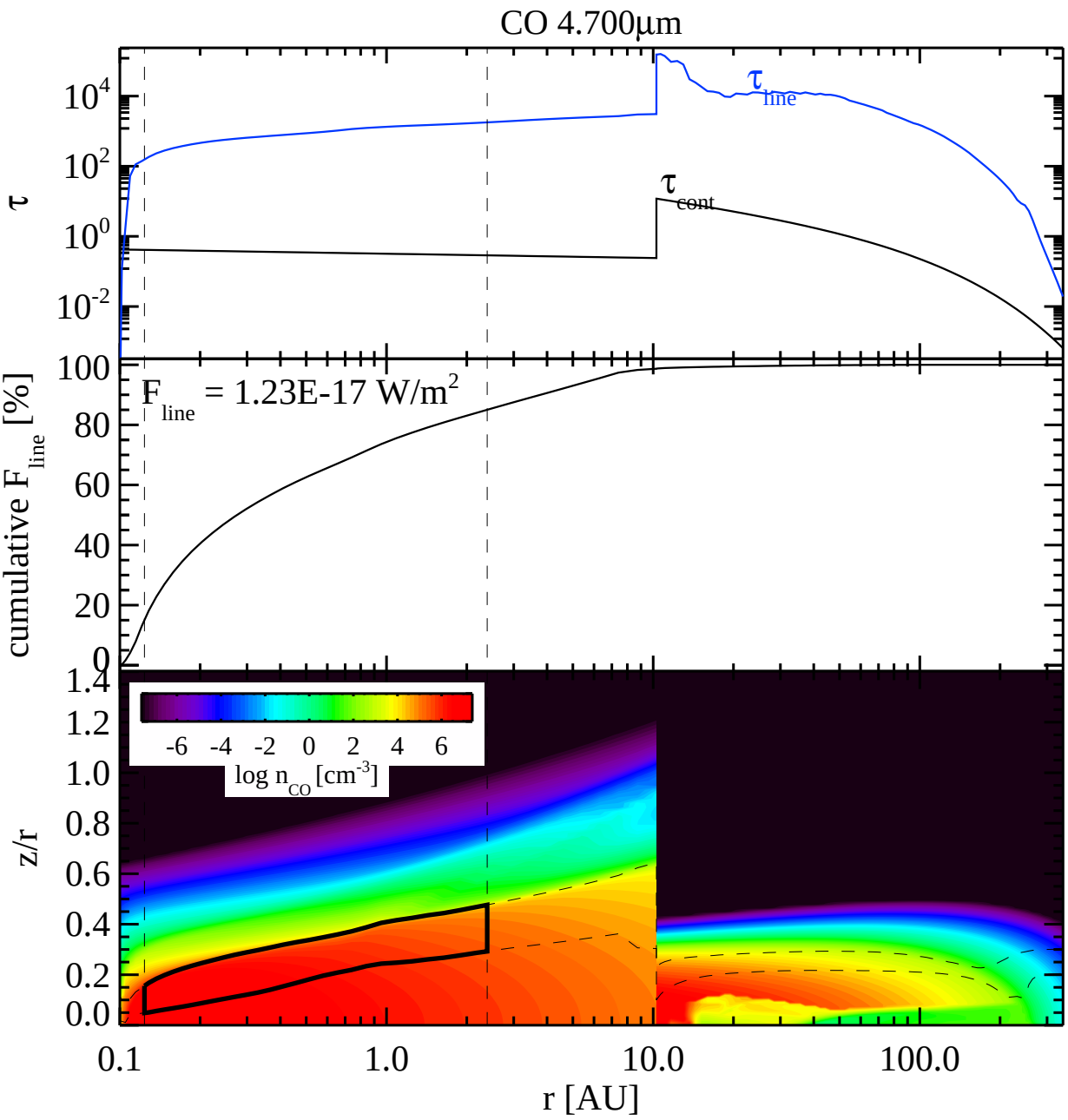

CO 72.84μm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 4.04E-20 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

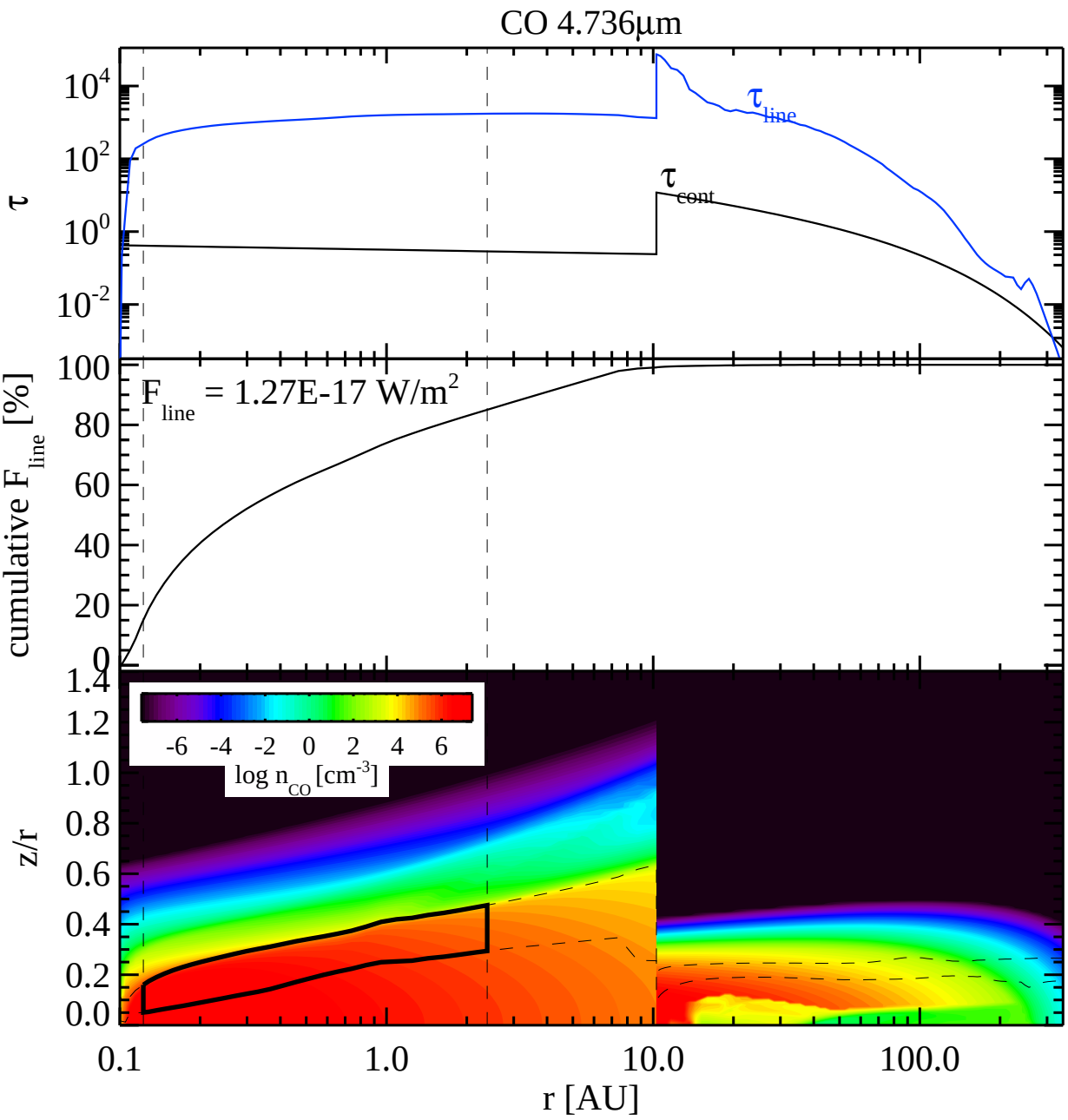

CO 4.633µm
τ
$10^4$
$10^2$
$10^0$
$10^{-2}$
$\tau_{line}$
$\tau_{cont}$
cumulative $F_{line}$ [%]
100
80
60
40
20
0
$F_{line}$ = 1.13E-17 W/m$^2$
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log $n_{CO}$ [cm$^{-3}$]
0.1
1.0
10.0
100.0
r [AU]

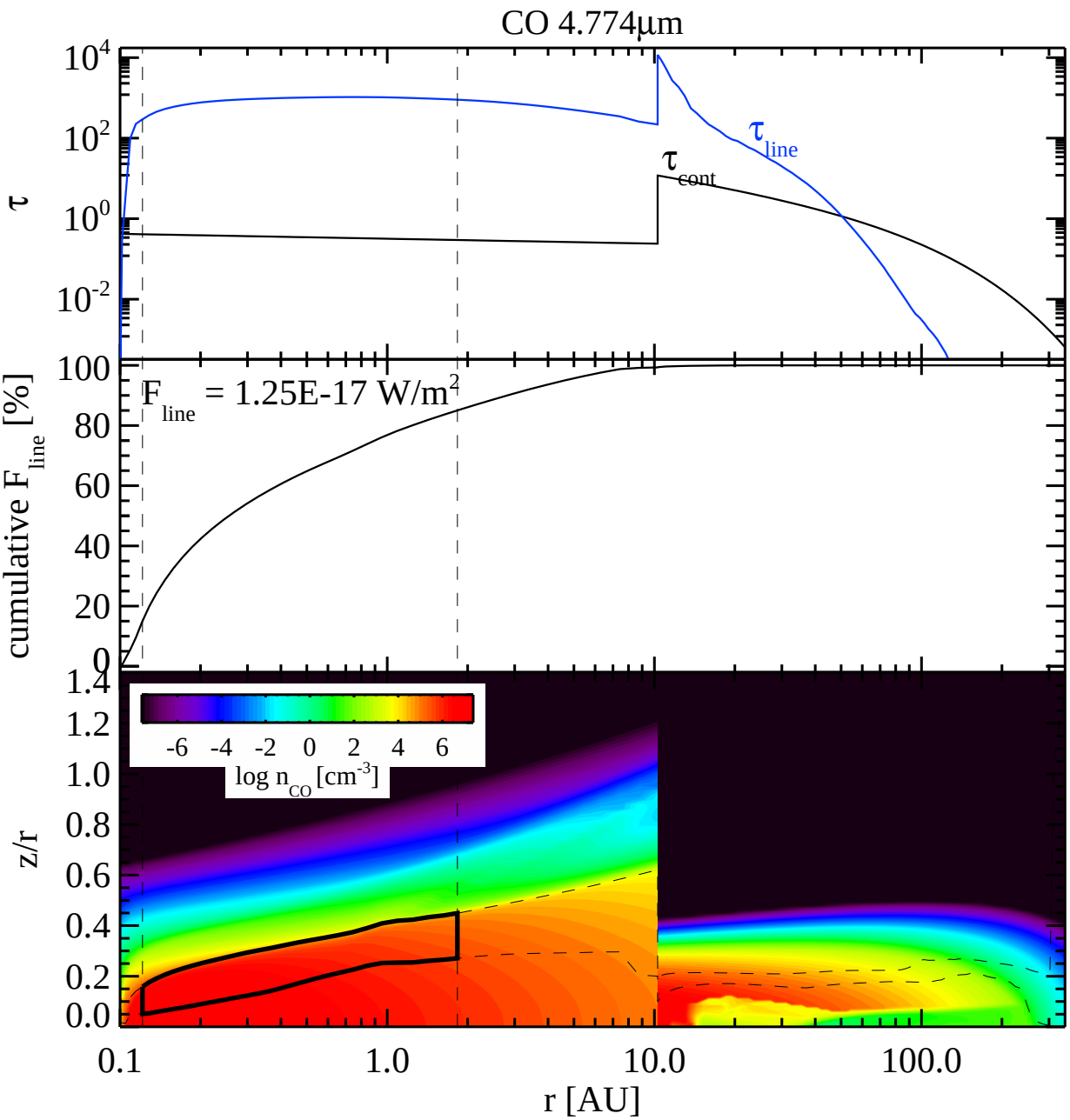

CO 4.657µm
τ
$10^4$
$10^2$
$10^0$
$10^{-2}$
$\tau_{line}$
$\tau_{cont}$
cumulative $F_{line}$ [%]
100
80
60
40
20
0
$F_{line}$ = 1.18E-17 W/m$^2$
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log $n_{CO}$ [cm$^{-3}$]
0.1
1.0
10.0
100.0
r [AU]

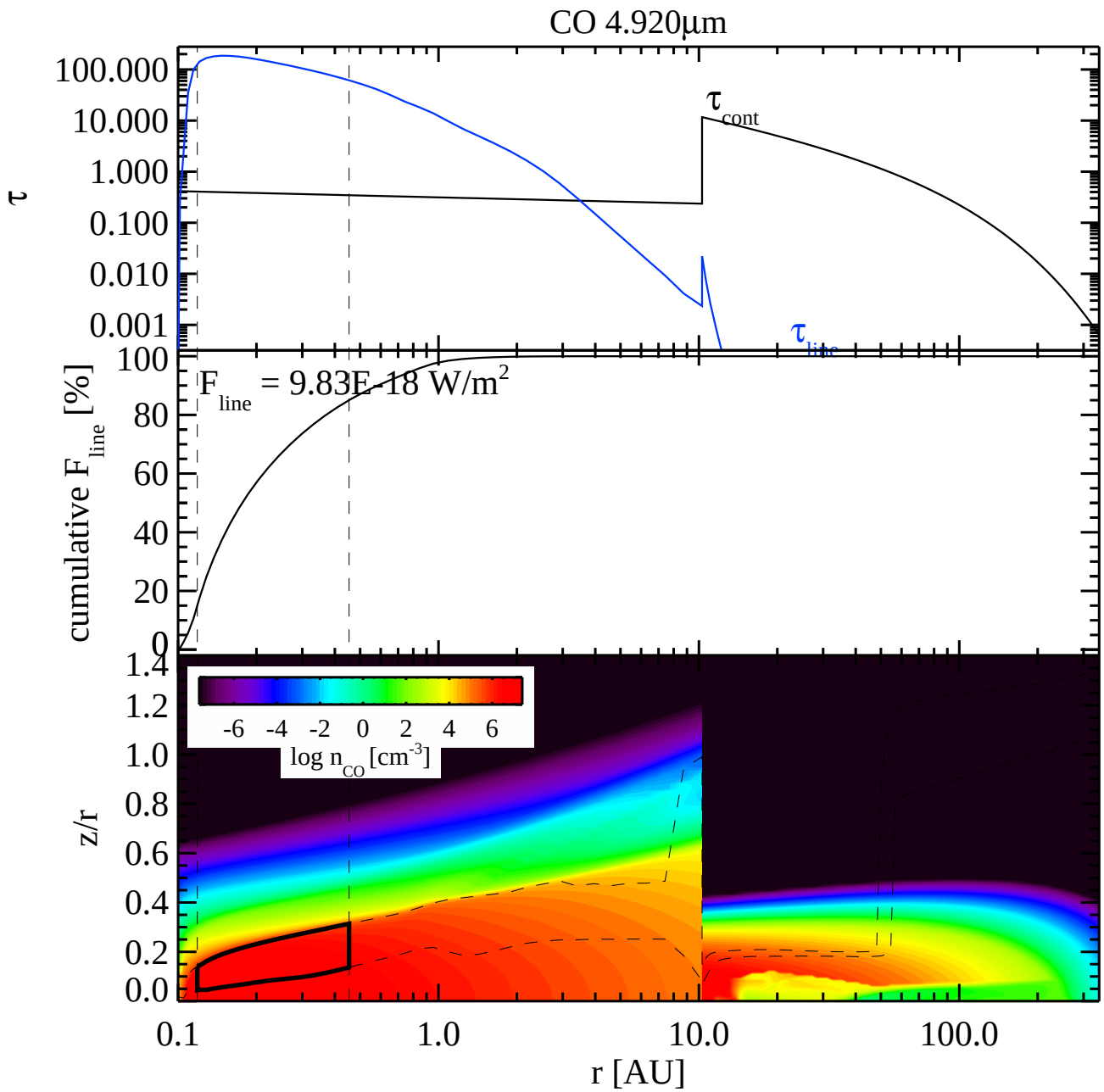

CO 4.674µm
τ
$10^4$
$10^2$
$10^0$
$10^{-2}$
$\tau_{line}$
$\tau_{cont}$
cumulative $F_{line}$ [%]
100
80
60
40
20
0
$F_{line}$ = 1.20E-17 W/m$^2$
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log $n_{CO}$ [cm$^{-3}$]
0.1
1.0
10.0
100.0
r [AU]

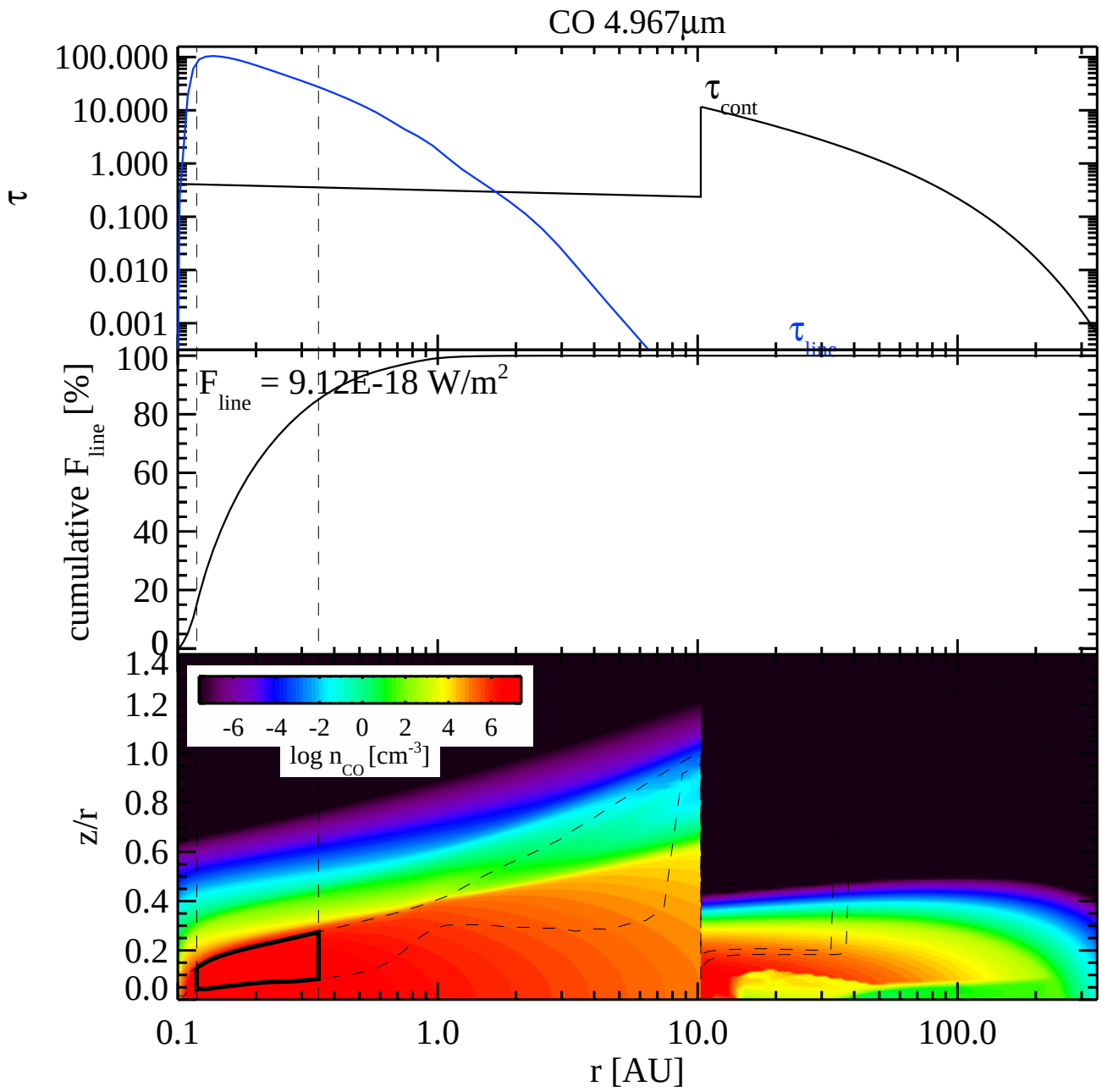

CO 4.683µm
τ
$10^4$
$10^2$
$10^0$
$10^{-2}$
$\tau_{line}$
$\tau_{cont}$
cumulative $F_{line}$ [%]
100
80
60
40
20
0
$F_{line}$ = 1.21E-17 W/m$^2$
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log $n_{CO}$ [cm$^{-3}$]
0.1
1.0
10.0
100.0
r [AU]

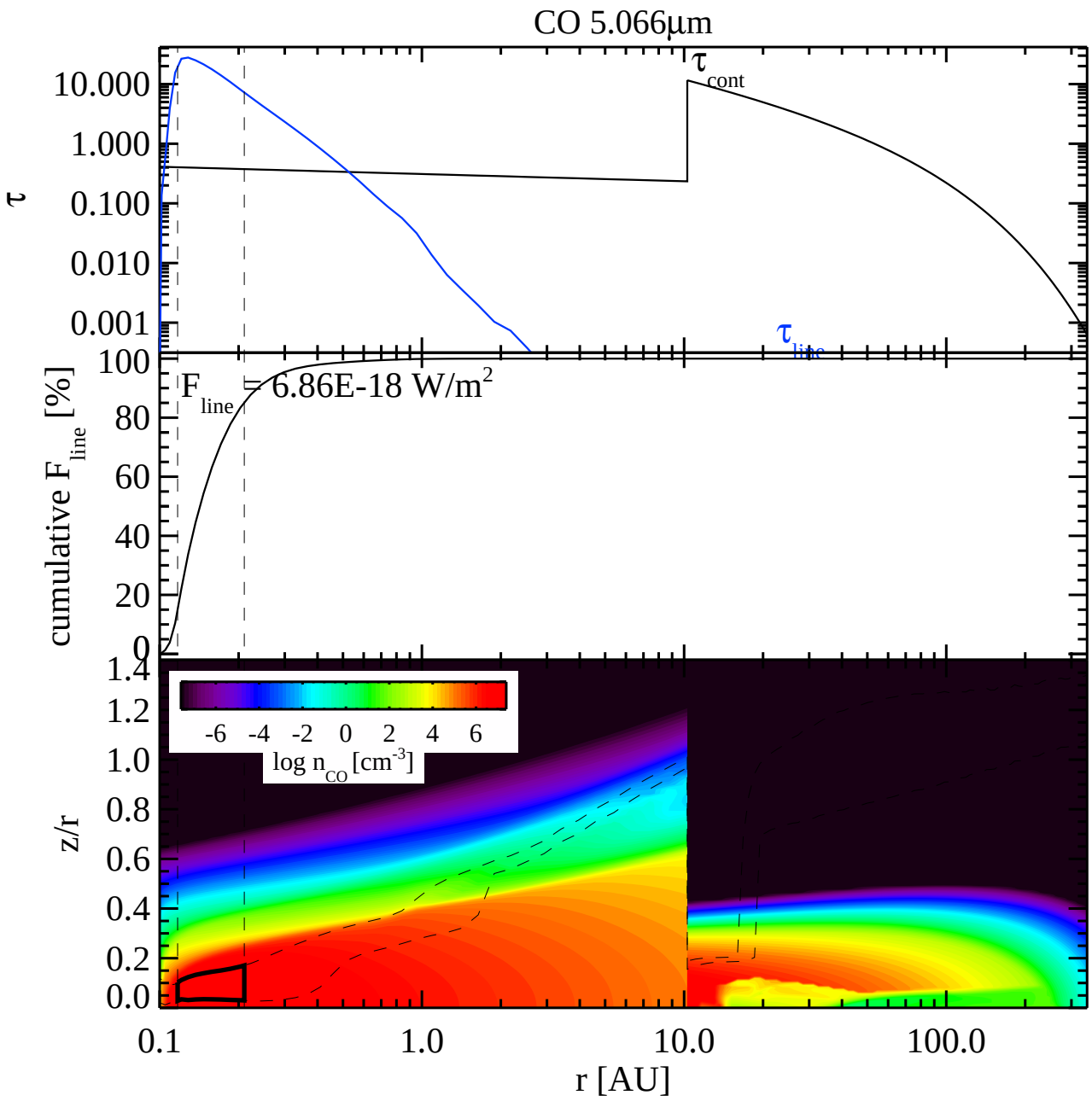

CO 4.700µm
τ
$10^4$
$10^2$
$10^0$
$10^{-2}$
$\tau_{line}$
$\tau_{cont}$
cumulative $F_{line}$ [%]
100
80
60
40
20
0
$F_{line}$ = 1.23E-17 W/m$^2$
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log $n_{CO}$ [cm$^{-3}$]
0.1
1.0
10.0
100.0
r [AU]

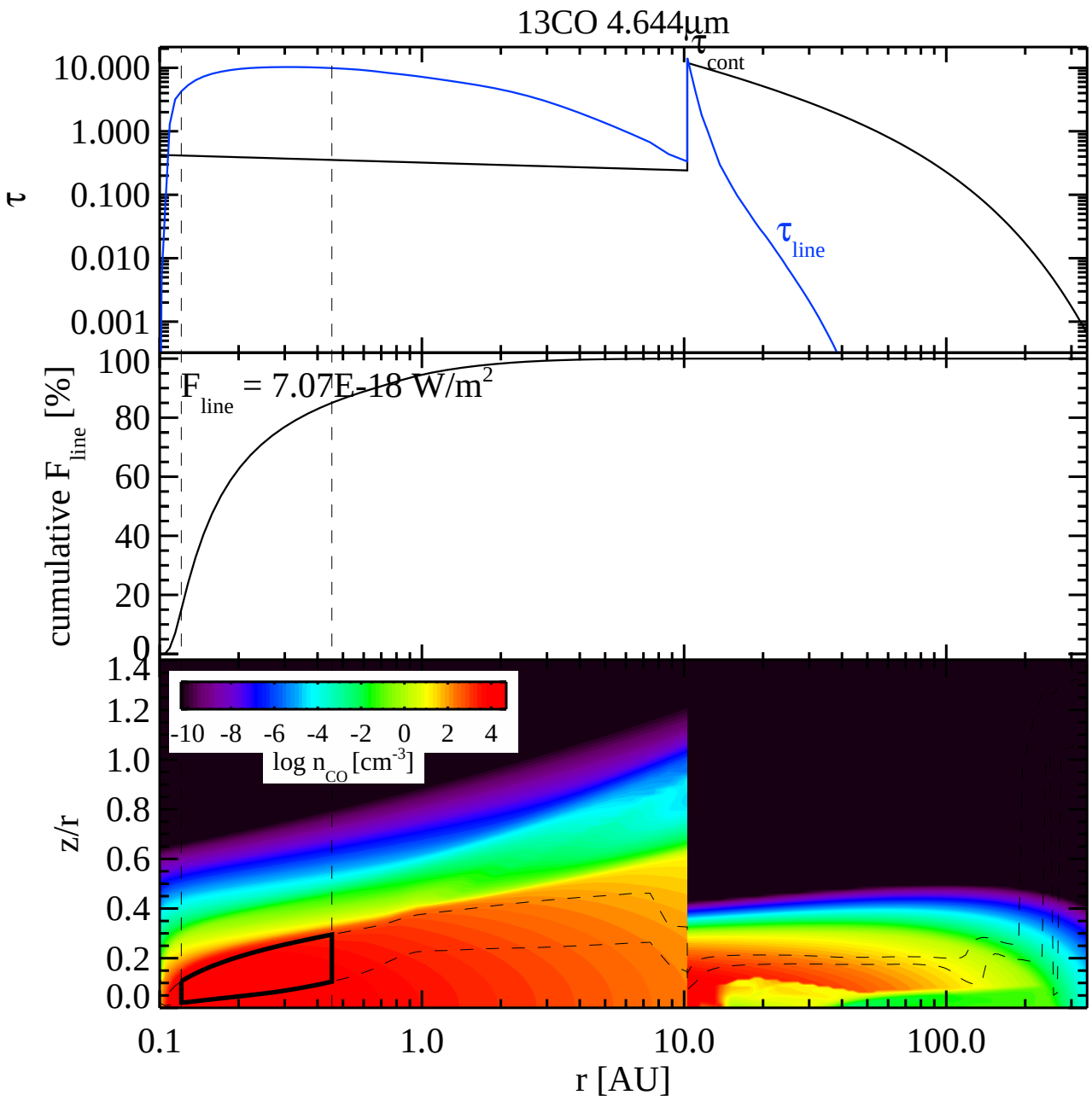

CO 4.736µm
τ
$10^4$
$10^2$
$10^0$
$10^{-2}$
$\tau_{line}$
$\tau_{cont}$
cumulative $F_{line}$ [%]
100
80
60
40
20
0
$F_{line}$ = 1.27E-17 W/m$^2$
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log $n_{CO}$ [cm$^{-3}$]
0.1
1.0
10.0
100.0
r [AU]

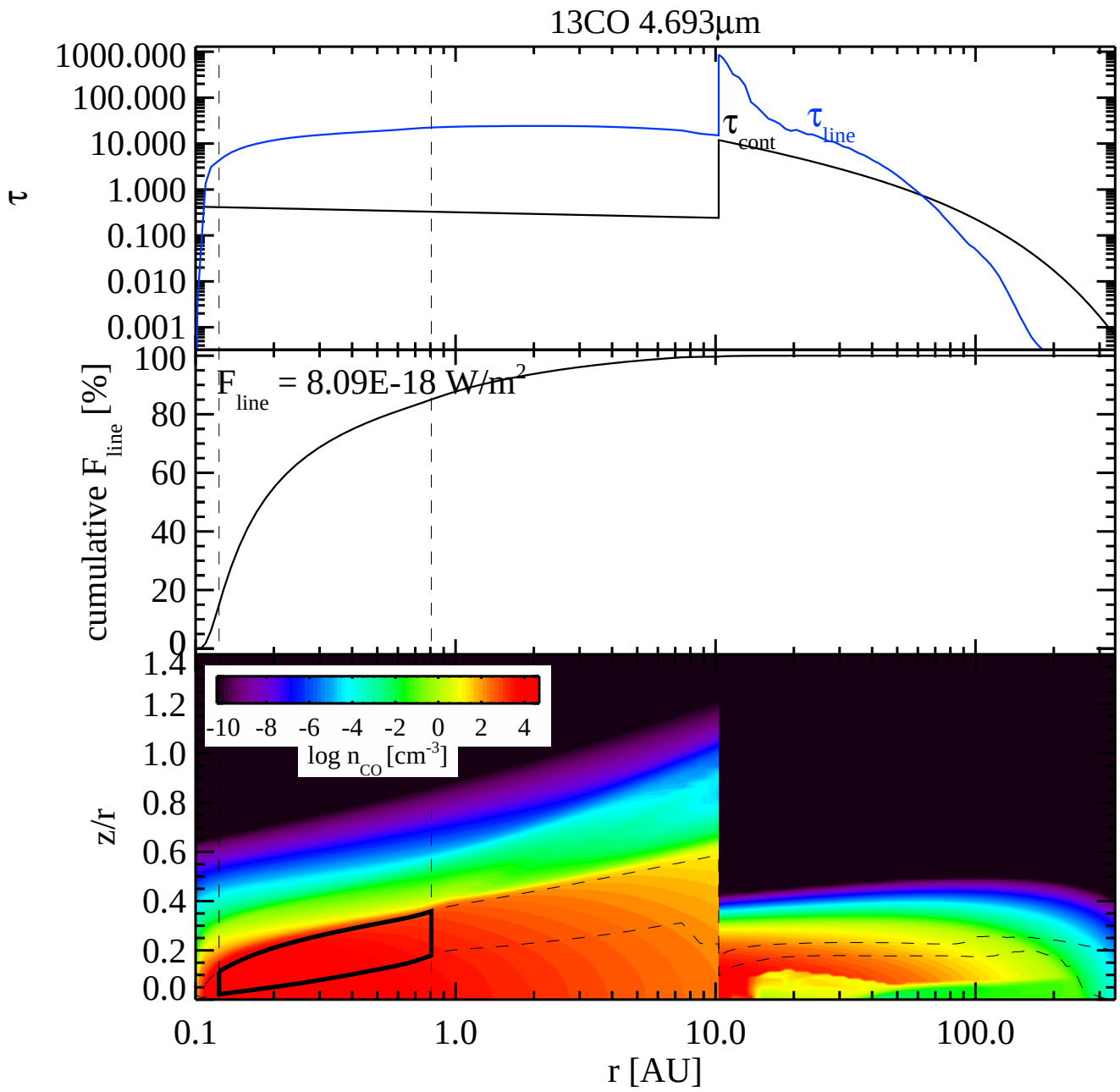

CO 4.774µm
τ
$10^4$
$10^2$
$10^0$
$10^{-2}$
$\tau_{line}$
$\tau_{cont}$
cumulative $F_{line}$ [%]
100
80
60
40
20
0
$F_{line}$ = 1.25E-17 W/m$^2$
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log $n_{CO}$ [cm$^{-3}$]
0.1
1.0
10.0
100.0
r [AU]

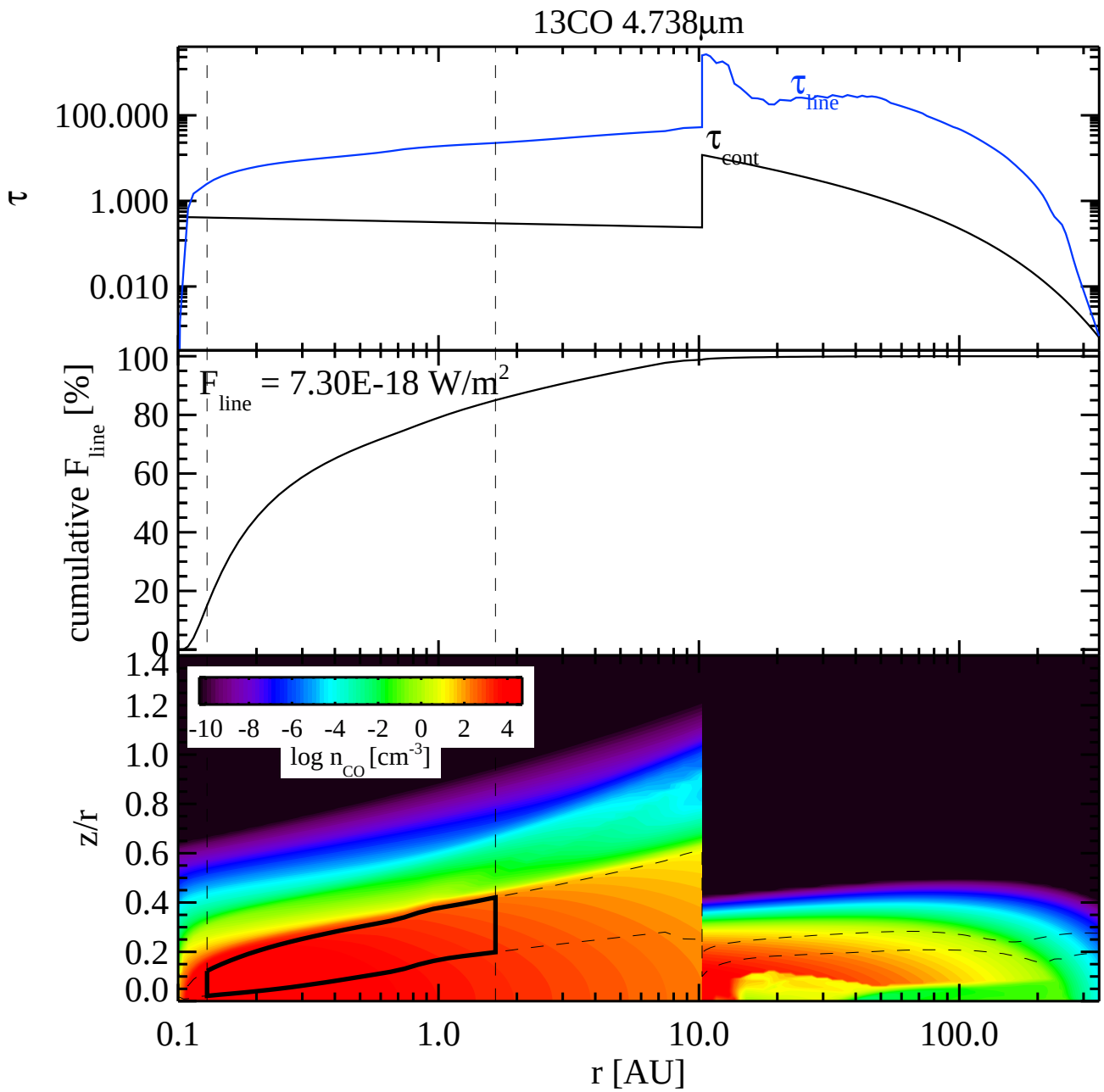

CO 4.920µm
τ
100.000
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 9.83E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

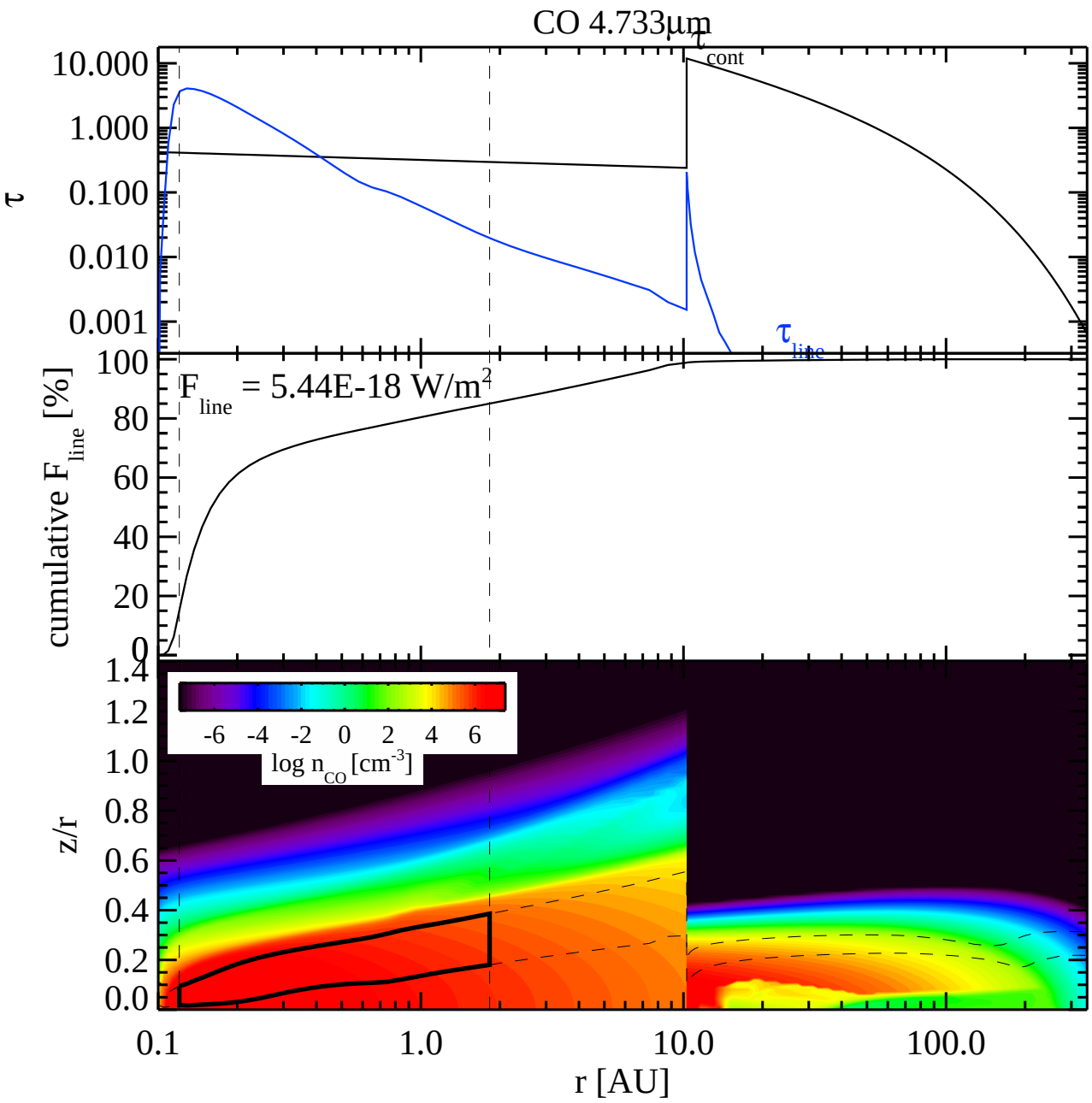

CO 4.967µm
τ
100.000
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 9.12E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

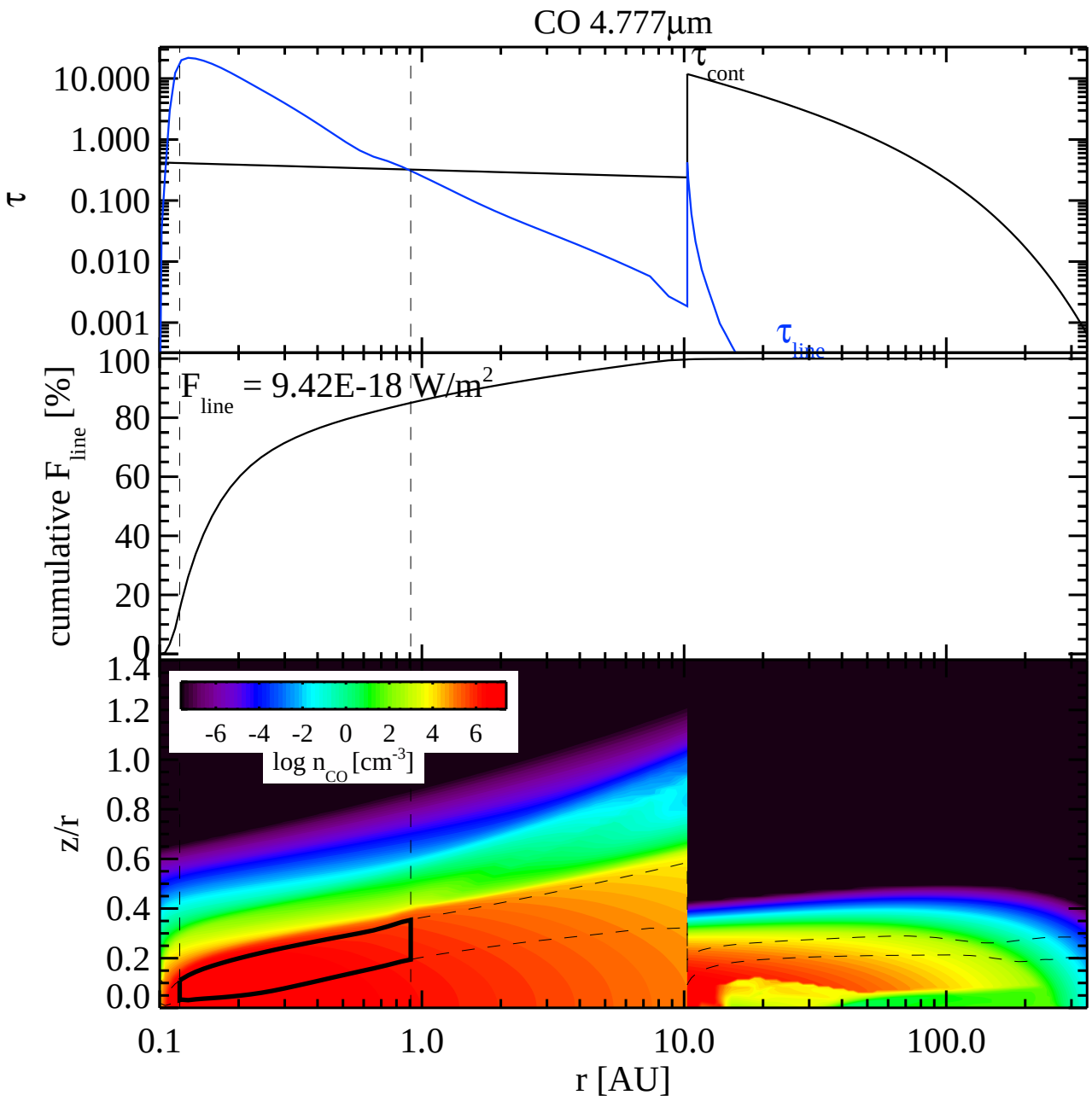

CO 5.066µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 6.86E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

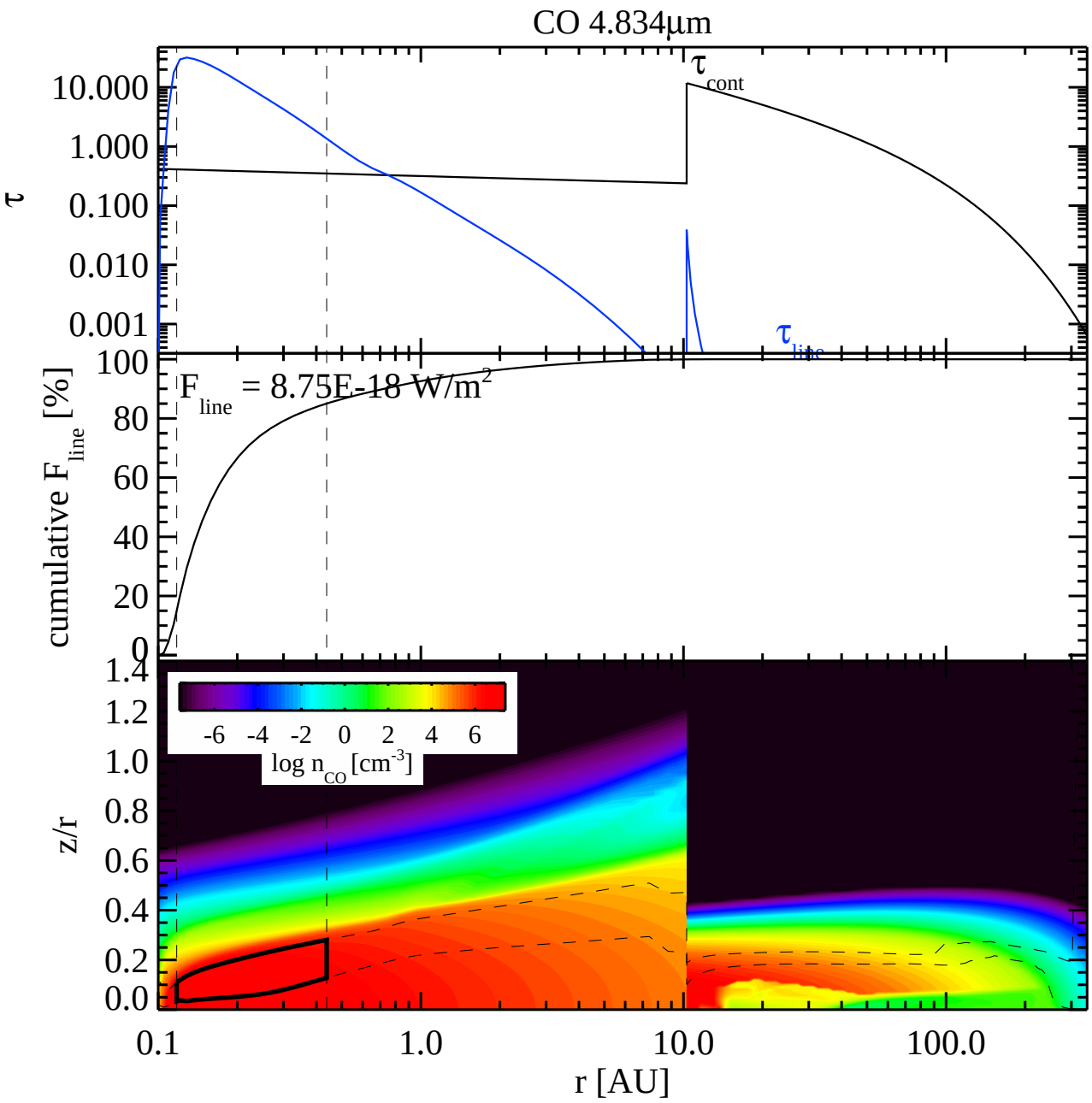

13CO 4.644µm
τ
τ cont
τ line
10.000
1.000
0.100
0.010
0.001
cumulative F line [%]
F line = 7.07E-18 W/m2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

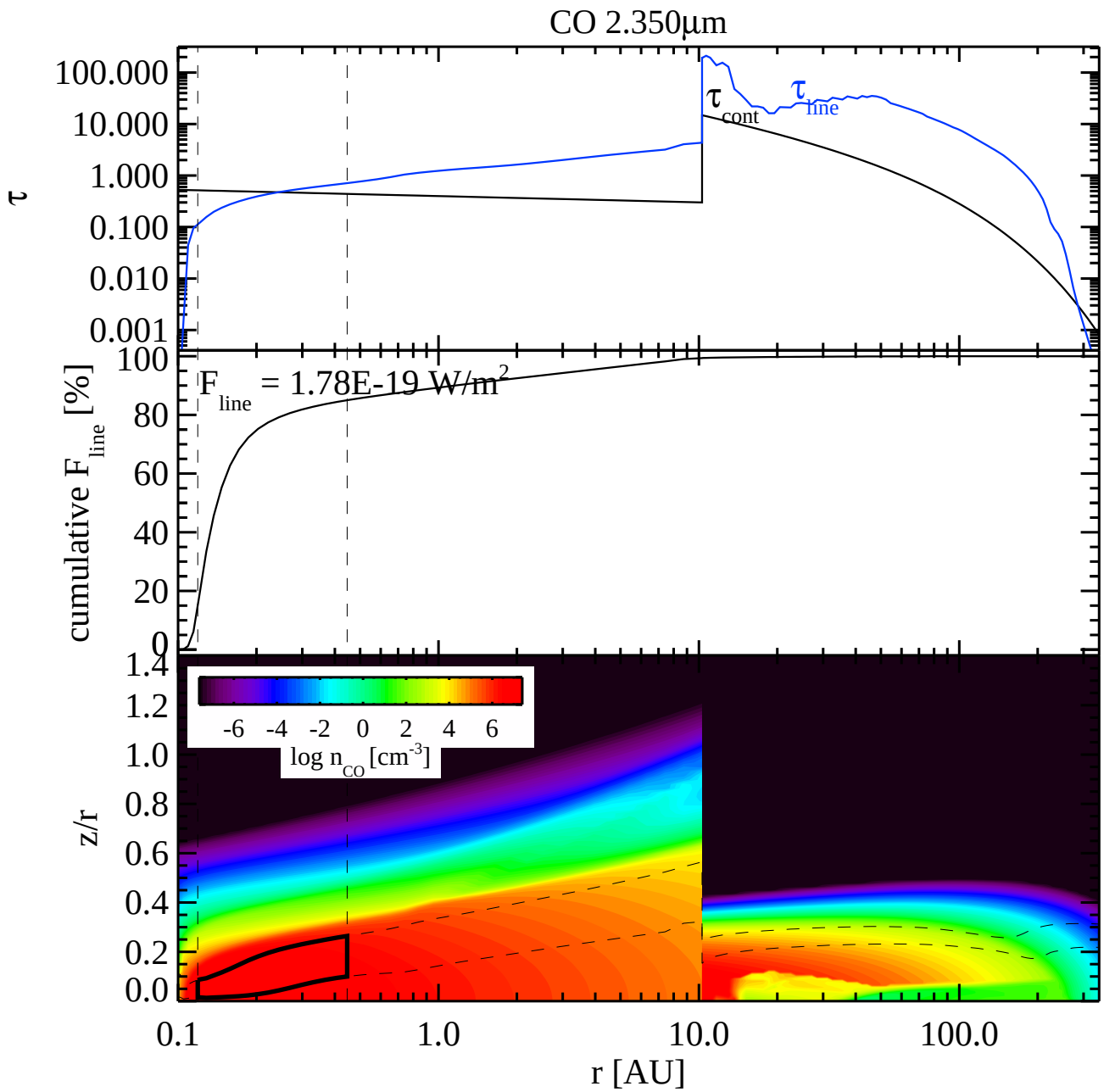

13CO 4.693µm
τ
1000.000
100.000
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 8.09E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

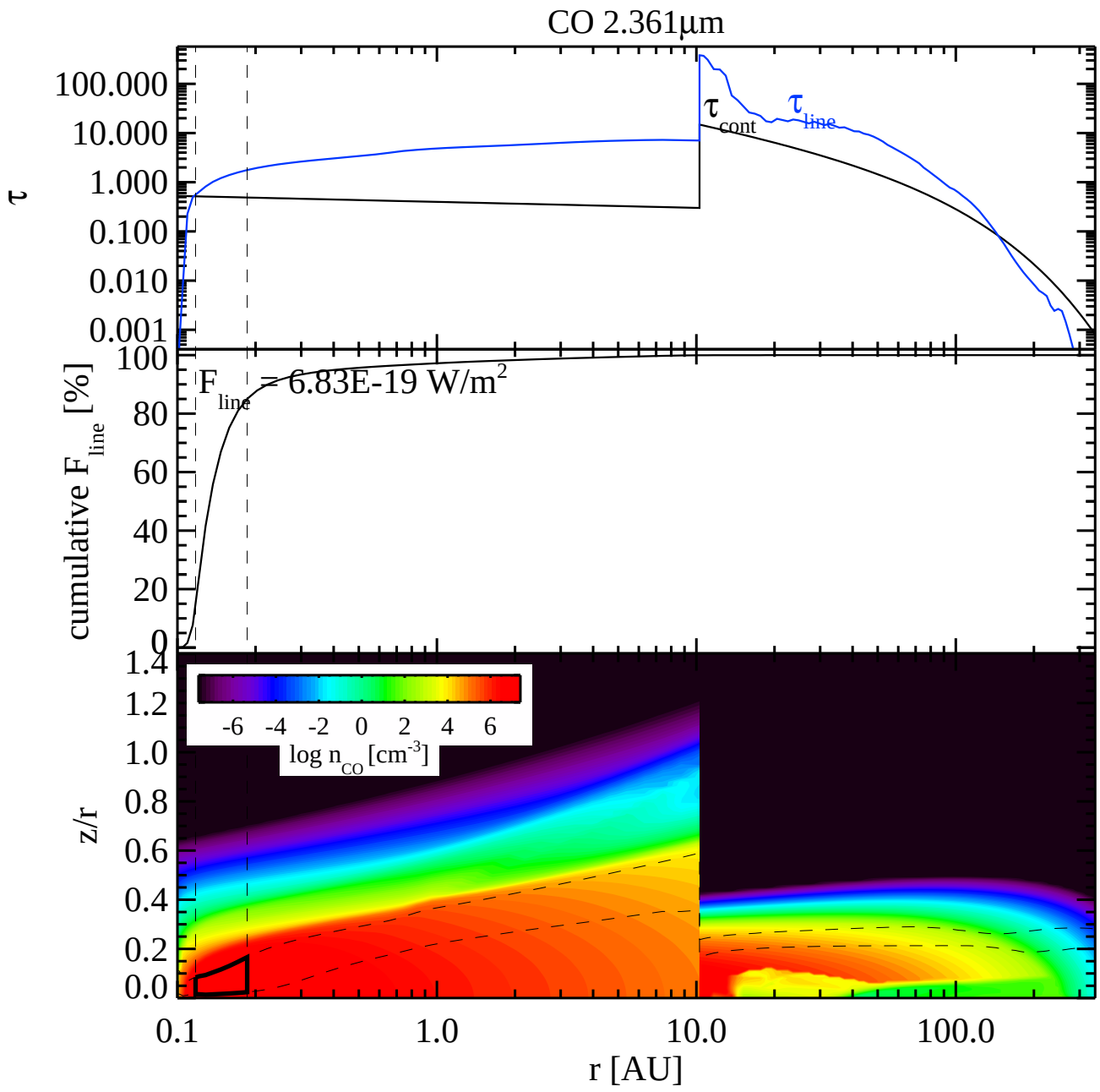

13CO 4.738µm
τ
100.000
1.000
0.010
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 7.30E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

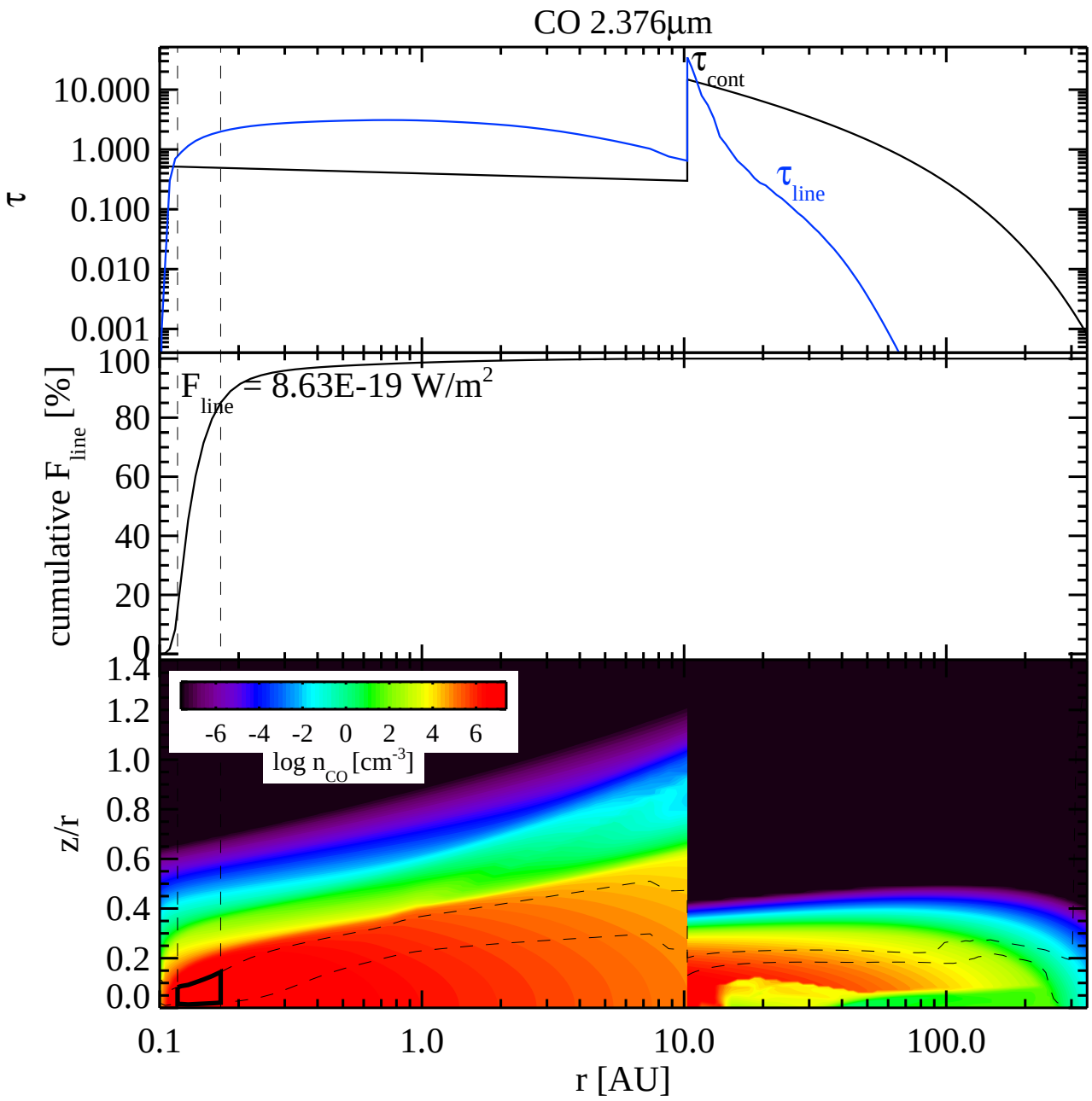

CO 4.733µm
τ
τ cont
τ line
10.000
1.000
0.100
0.010
0.001
cumulative F line [%]
F line = 5.44E-18 W/m2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

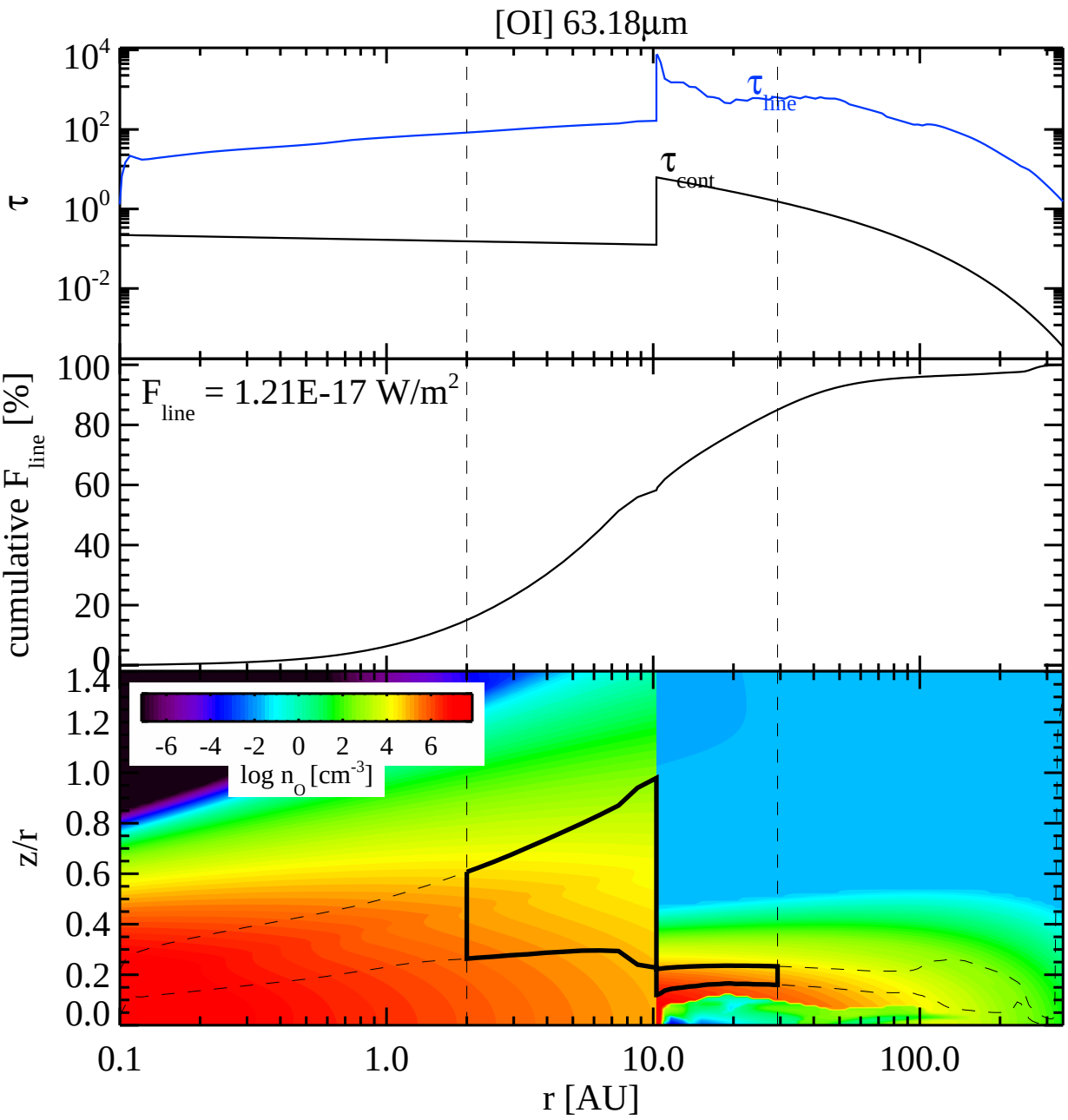

CO 4.777µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 9.42E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

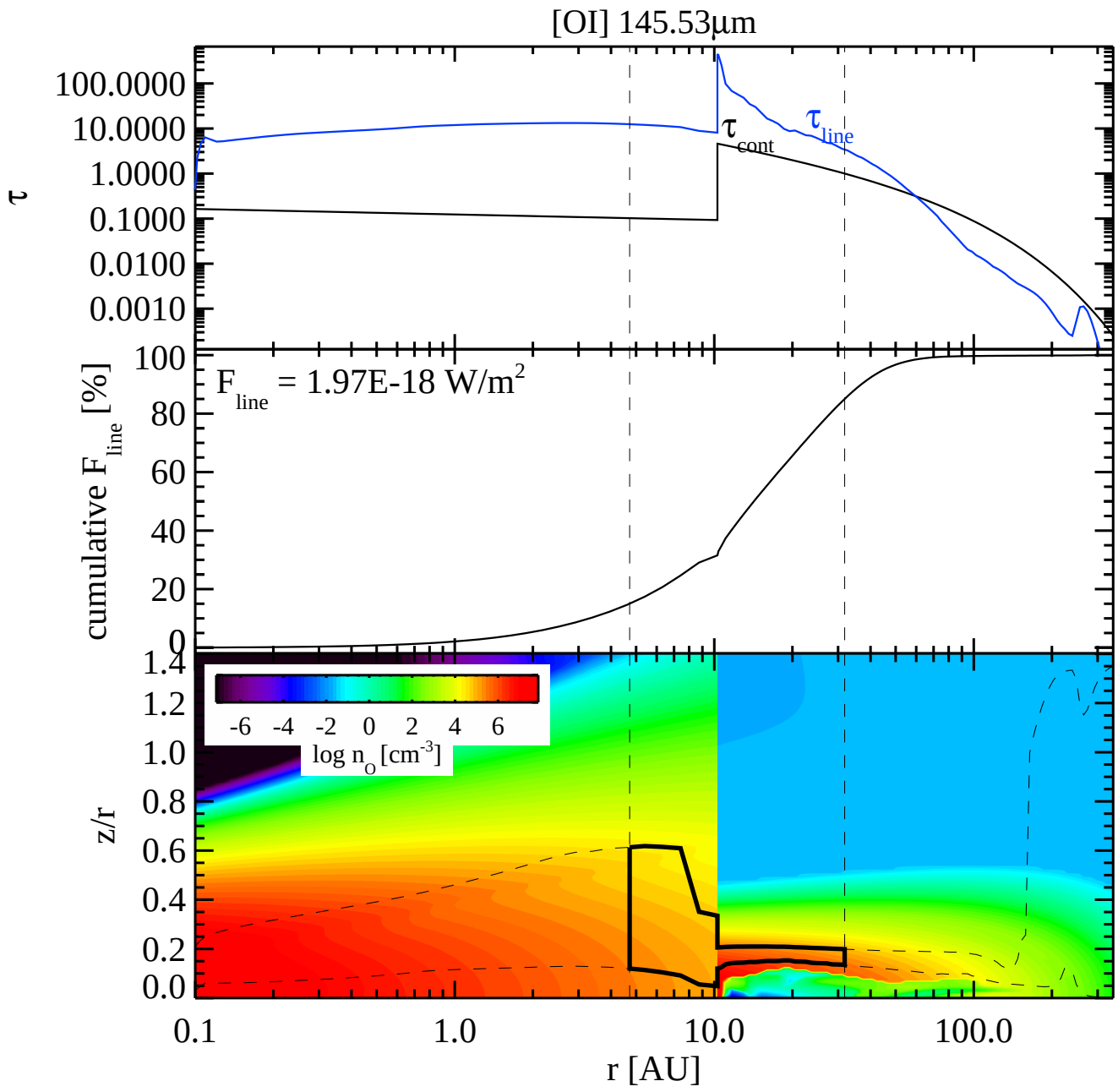

CO 4.834µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 8.75E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

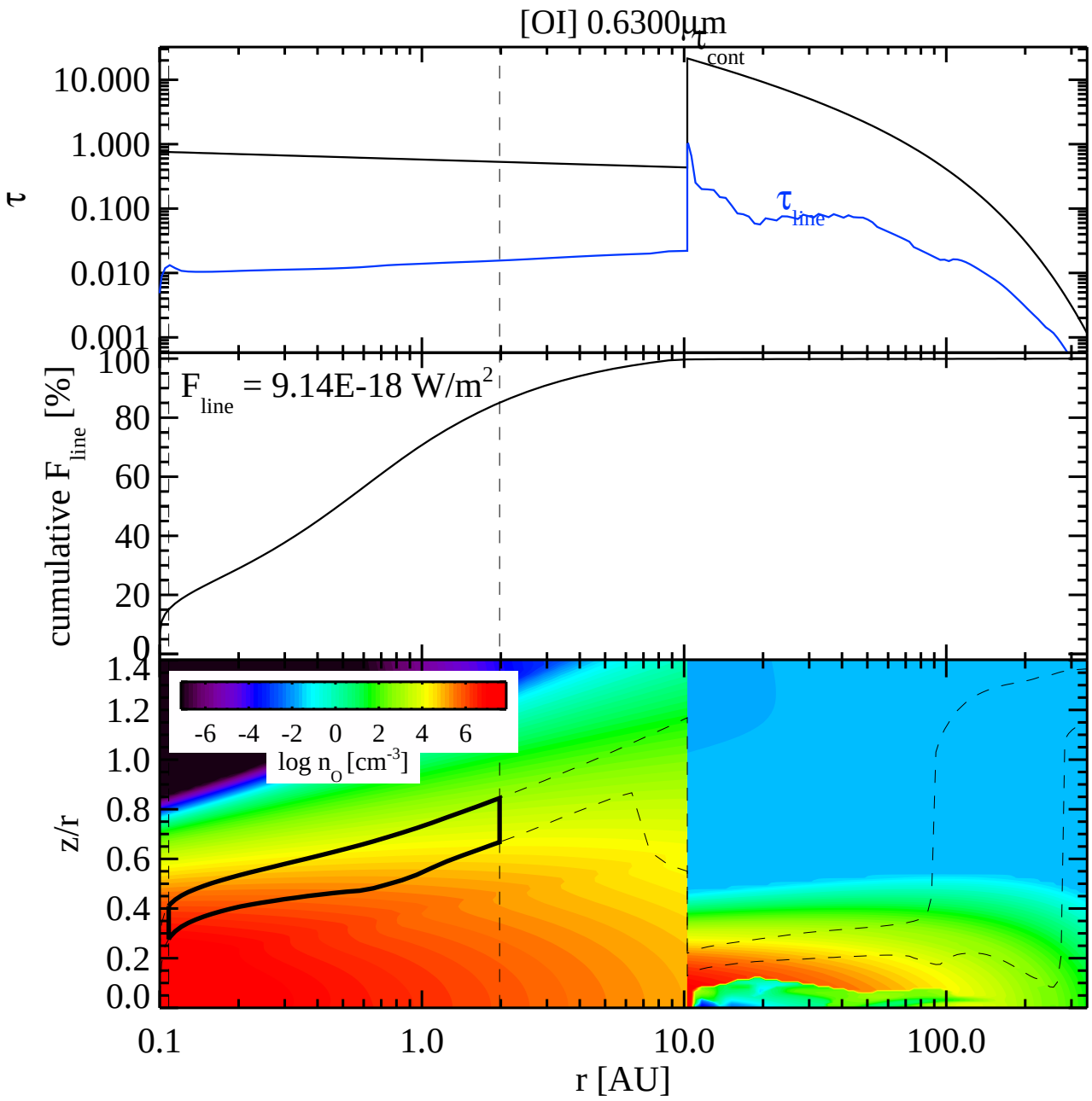

CO 2.350µm
τ
100.000
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 1.78E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

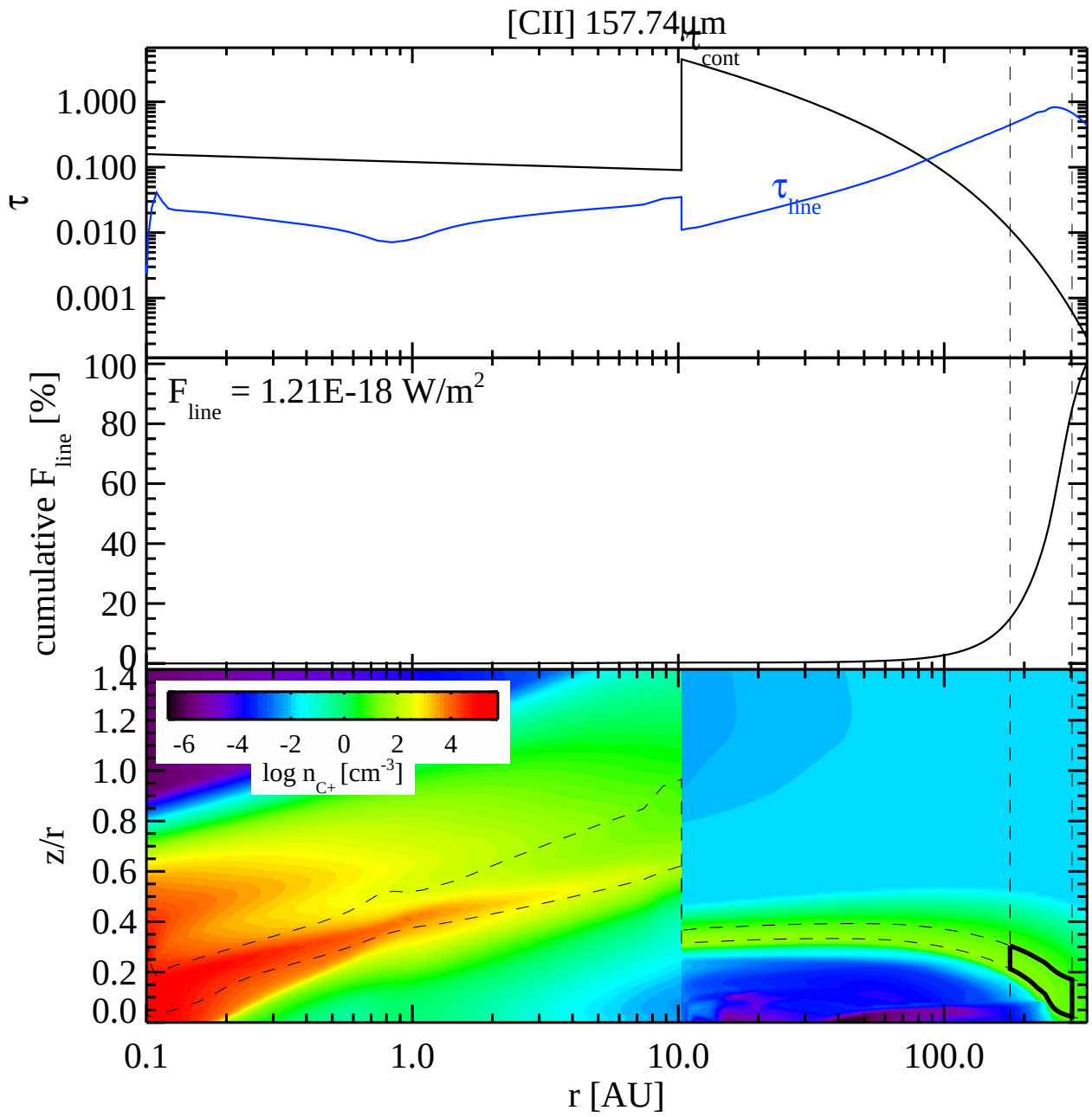

CO 2.361µm
τ
100.000
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 6.83E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

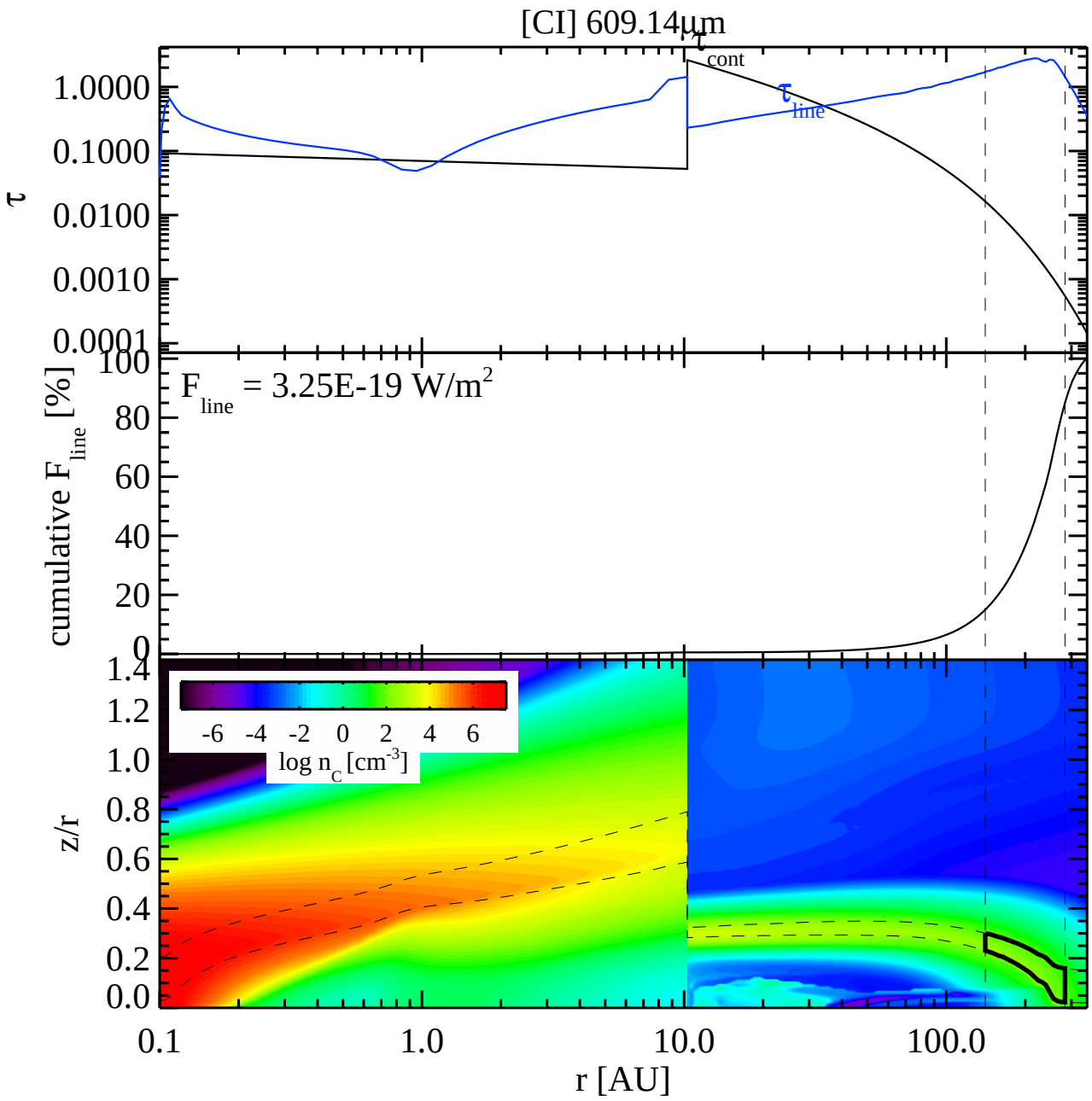

CO 2.376µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 8.63E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n CO [cm-3]
0.1
1.0
10.0
100.0
r [AU]

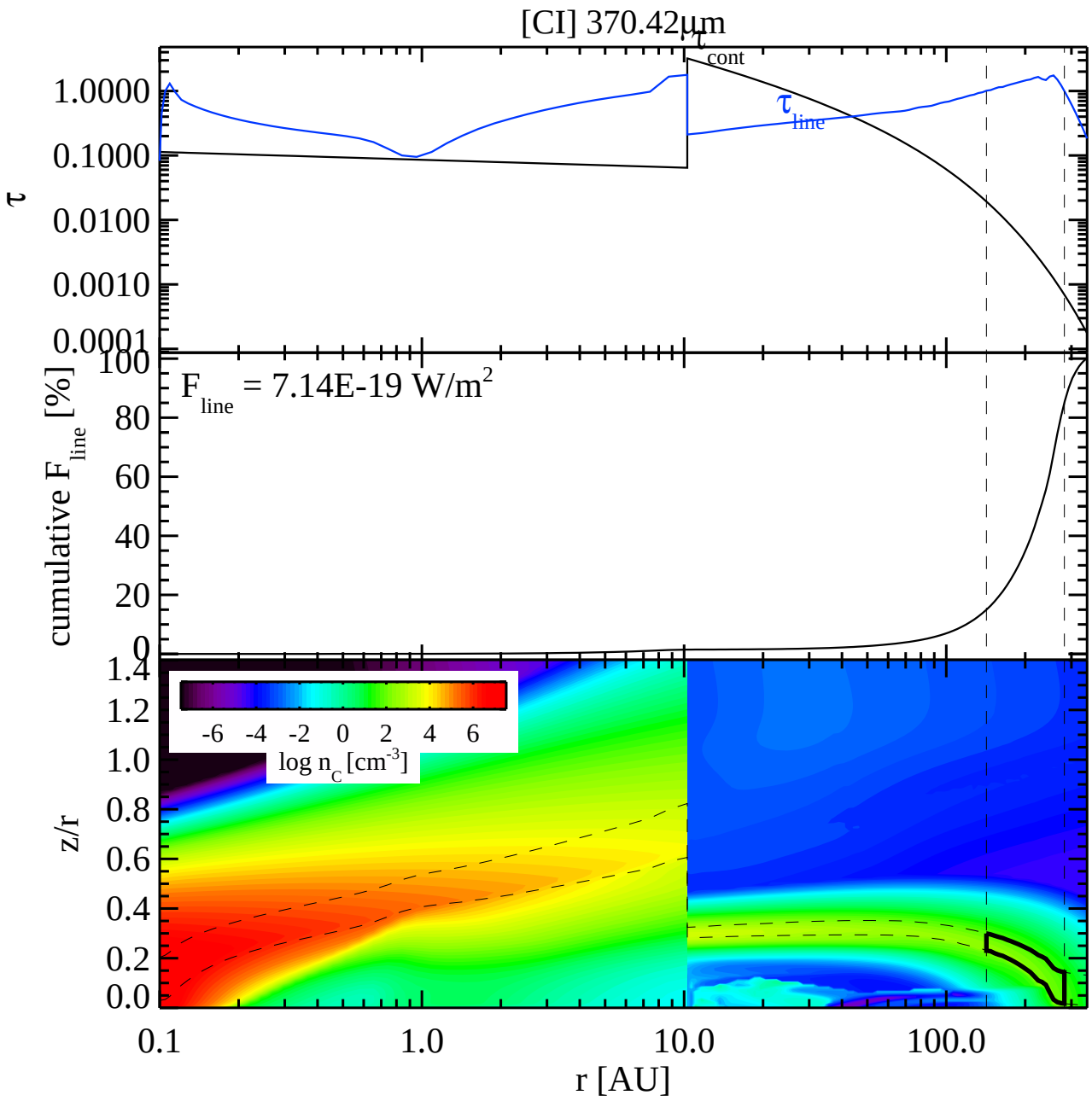

[OI] 63.18μm
τ
$10^4$
$10^2$
$10^0$
$10^{-2}$
$\tau_{line}$
$\tau_{cont}$
cumulative $F_{line}$ [%]
$F_{line}$ = 1.21E-17 W/m$^2$
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log $n_O$ [cm$^{-3}$]
0.1
1.0
10.0
100.0
r [AU]

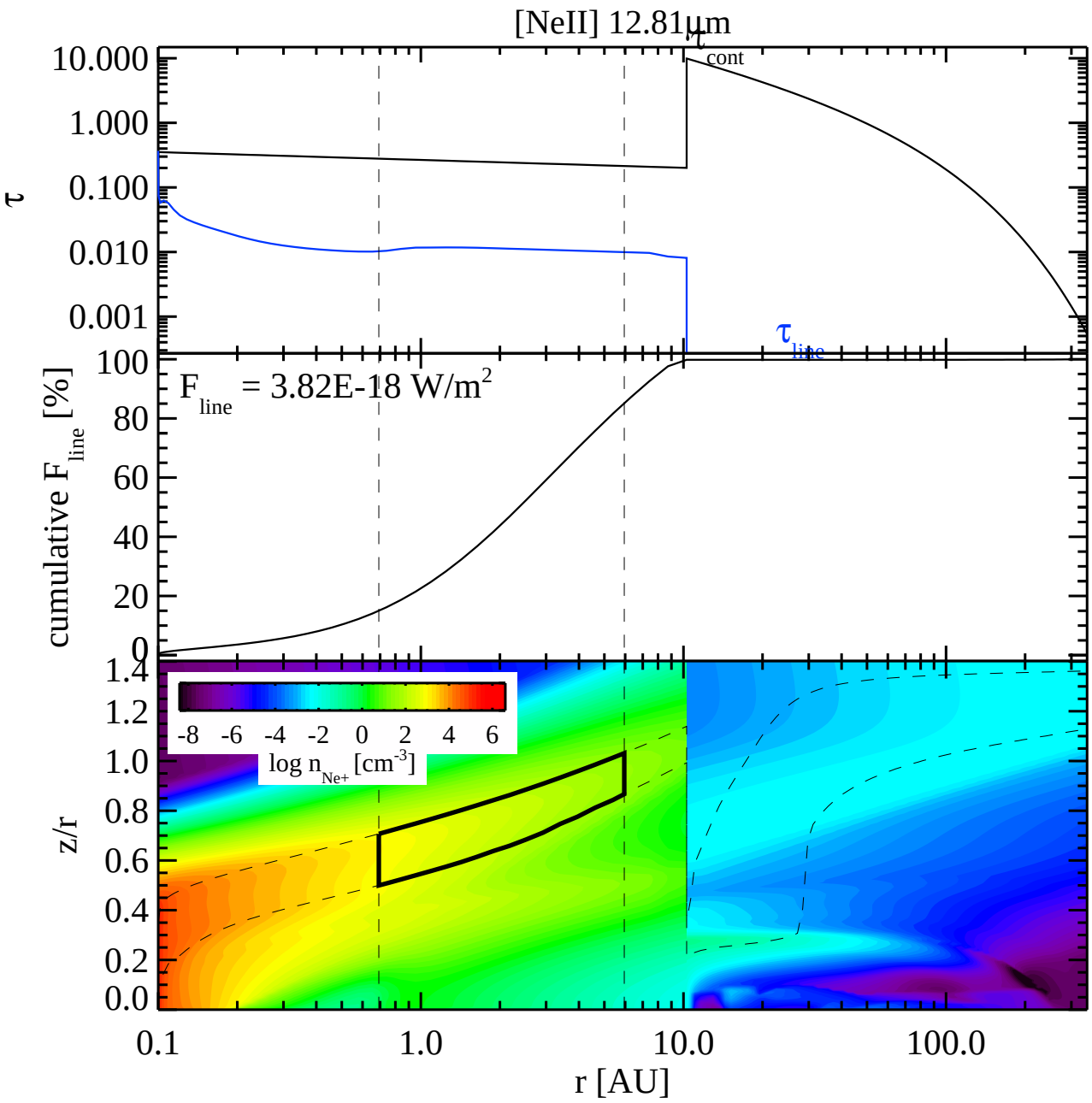

[OI] 145.53µm
τ
100.0000
10.0000
1.0000
0.1000
0.0100
0.0010
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 1.97E-18 W/m2
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
z/r
-6 -4 -2 0 2 4 6
log n O [cm-3]
0.1
1.0
10.0
100.0
r [AU]

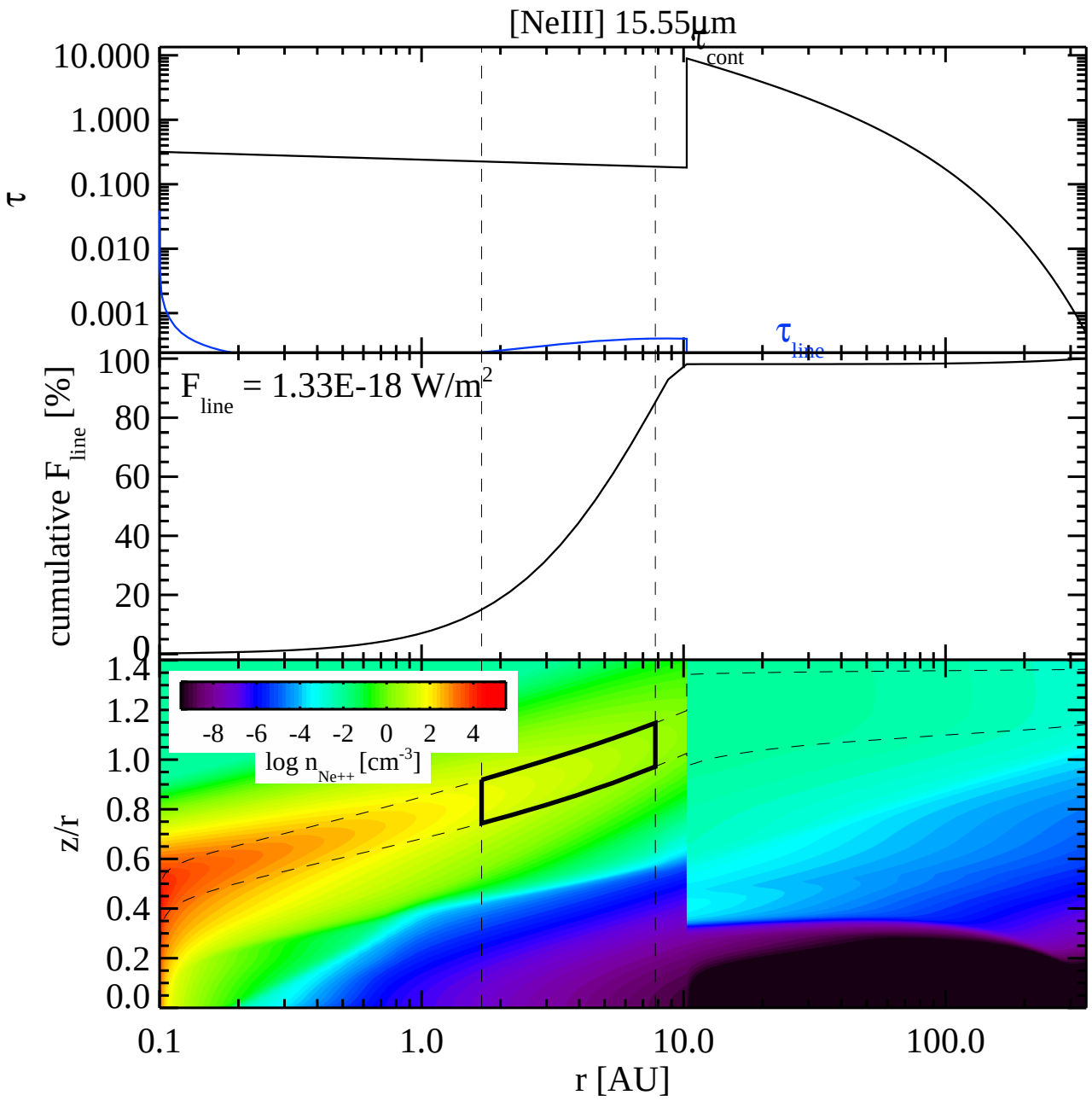

[OI] 0.6300μm
τ
τ cont
τ line
10.000
1.000
0.100
0.010
0.001
cumulative F line [%]
F line = 9.14E-18 W/m2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n O [cm-3]
0.1
1.0
10.0
100.0
r [AU]

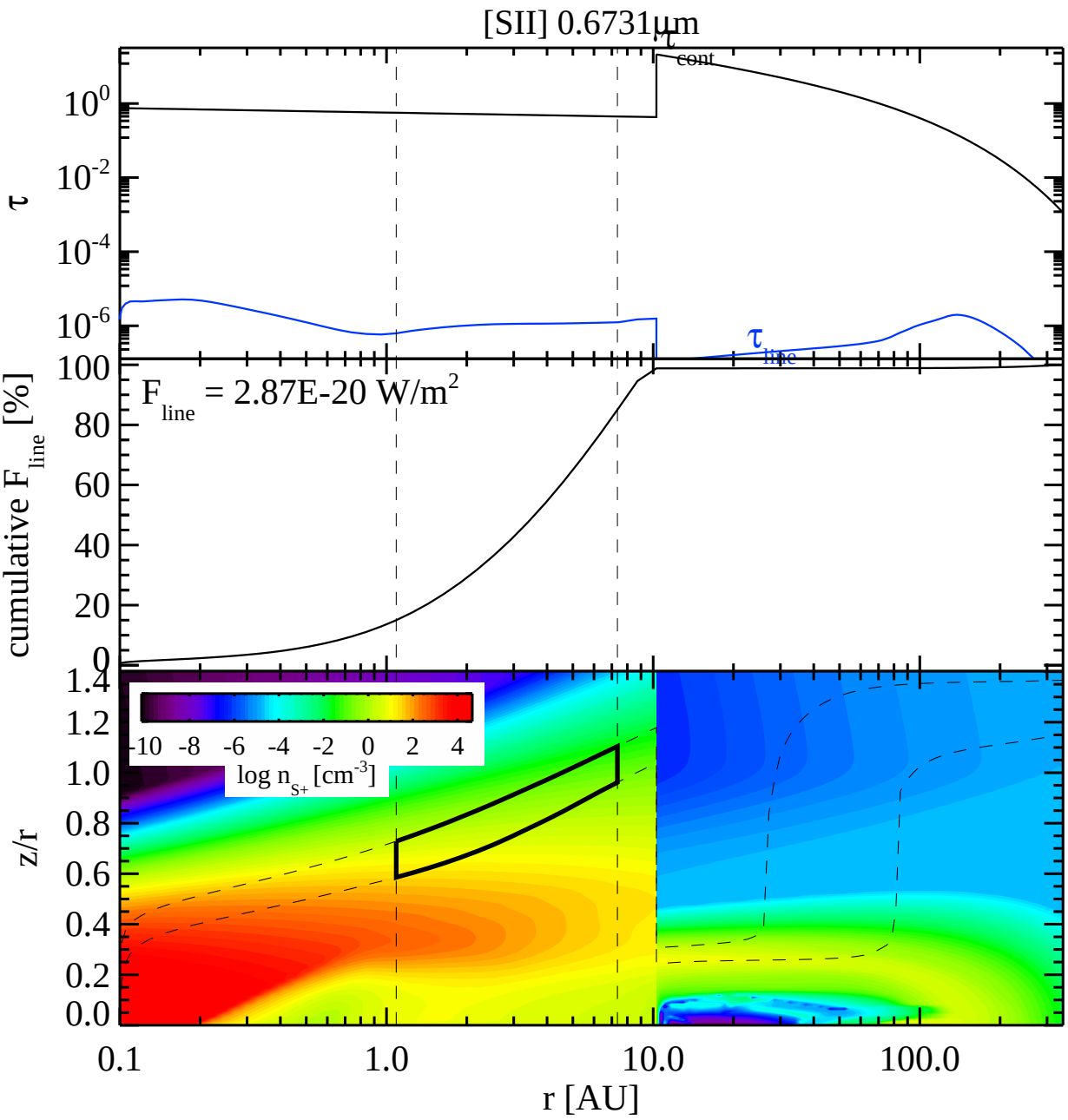

[CII] 157.74μm
τ
τ cont
τ line
1.000
0.100
0.010
0.001
cumulative F line [%]
F line = 1.21E-18 W/m2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4
log n C+ [cm-3]
0.1
1.0
10.0
100.0
r [AU]

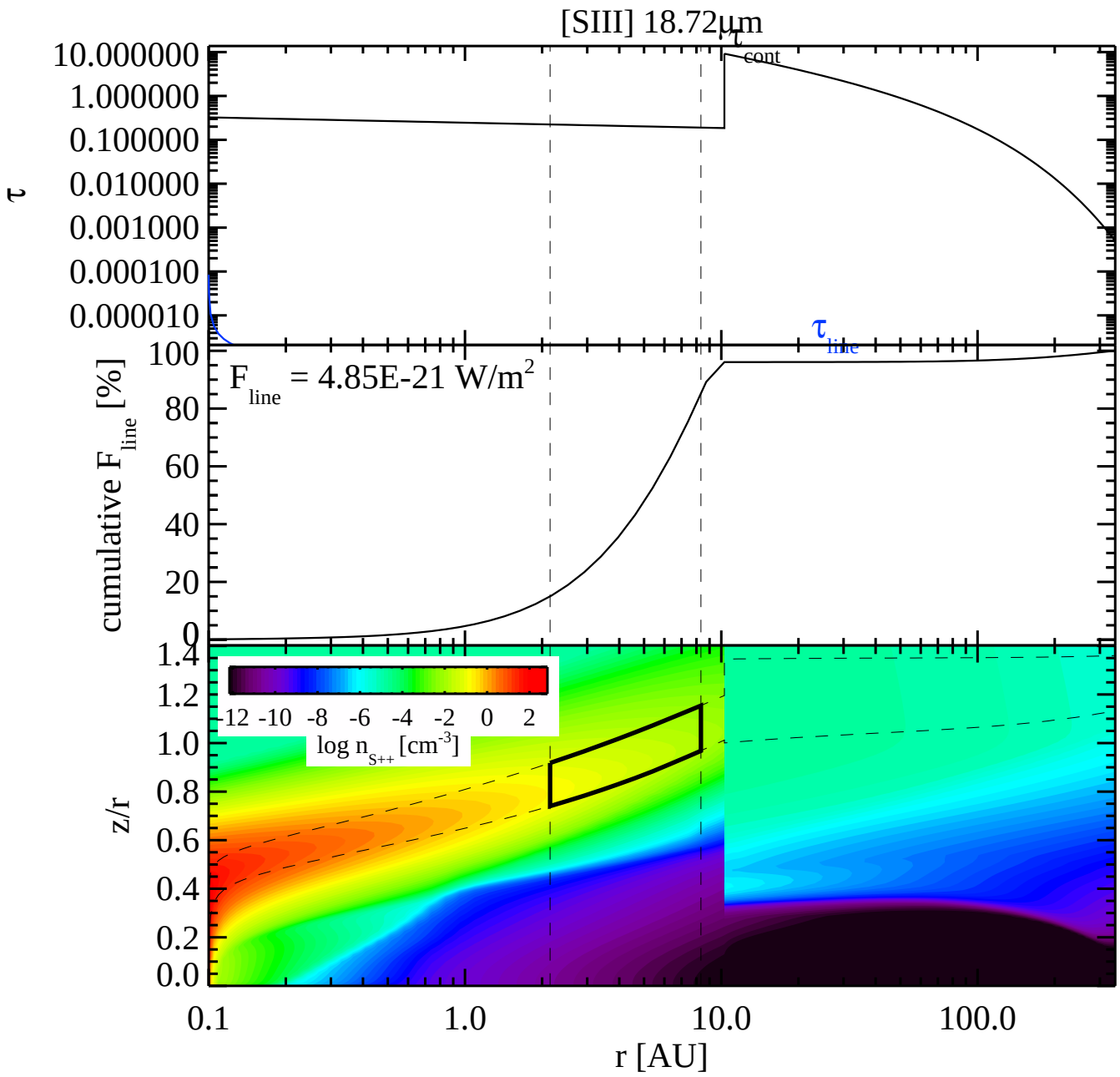

[CI] 609.14μm
τ
τ cont
τ line
1.0000
0.1000
0.0100
0.0010
0.0001
cumulative F line [%]
F line = 3.25E-19 W/m2
100
80
60
40
20
0
-6 -4 -2 0 2 4 6
log n C [cm-3]
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.1
1.0
10.0
100.0
r [AU]

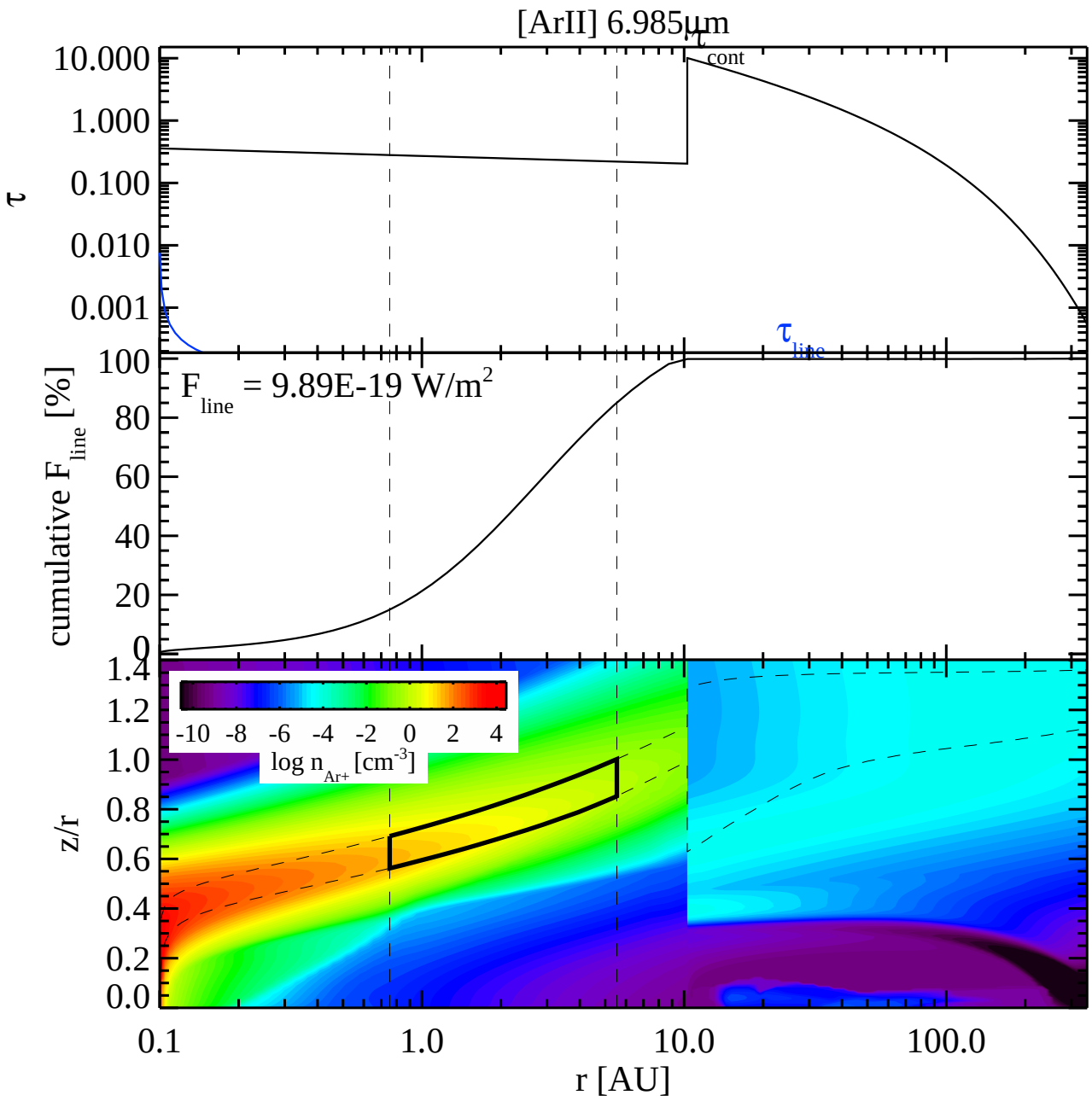

[CI] 370.42μm
τ
τ cont
τ line
1.0000
0.1000
0.0100
0.0010
0.0001
cumulative F line [%]
F line = 7.14E-19 W/m2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-6 -4 -2 0 2 4 6
log n C [cm-3]
0.1
1.0
10.0
100.0
r [AU]

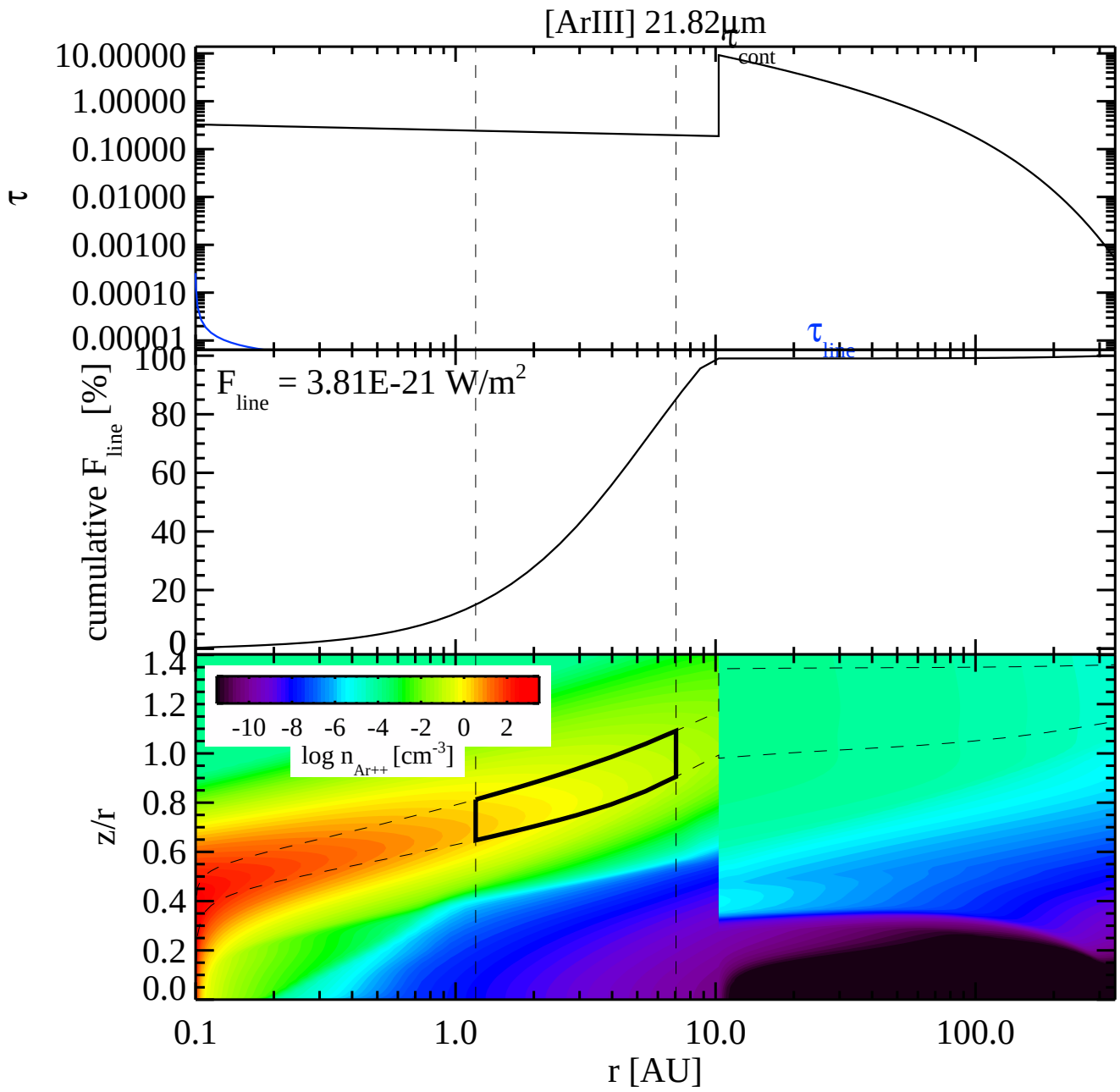

[NeII] 12.81μm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 3.82E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-8 -6 -4 -2 0 2 4 6
log n Ne+ [cm-3]
0.1
1.0
10.0
100.0
r [AU]

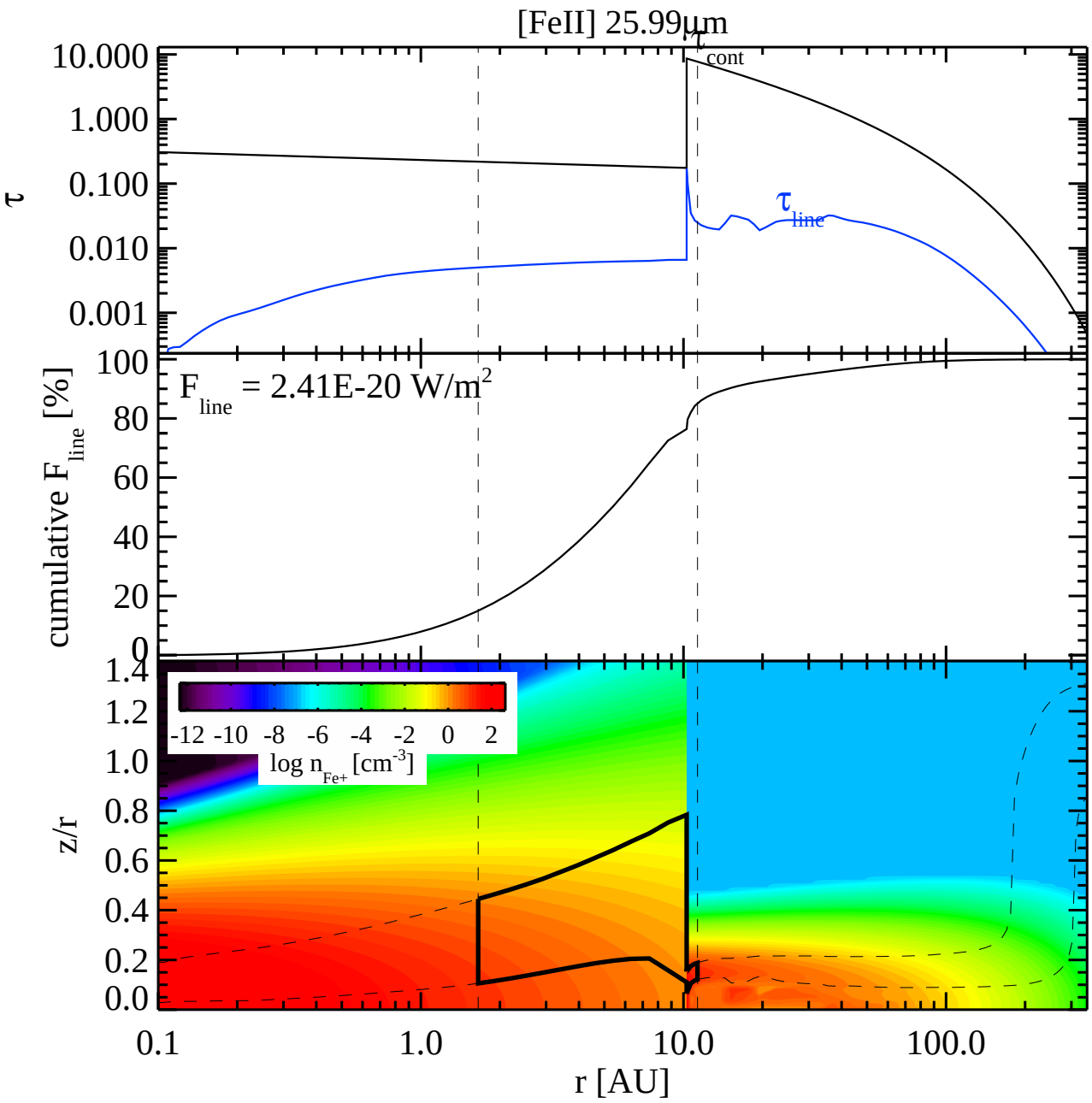

[NeIII] 15.55µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 1.33E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-8 -6 -4 -2 0 2 4
log n Ne++ [cm-3]
0.1
1.0
10.0
100.0
r [AU]

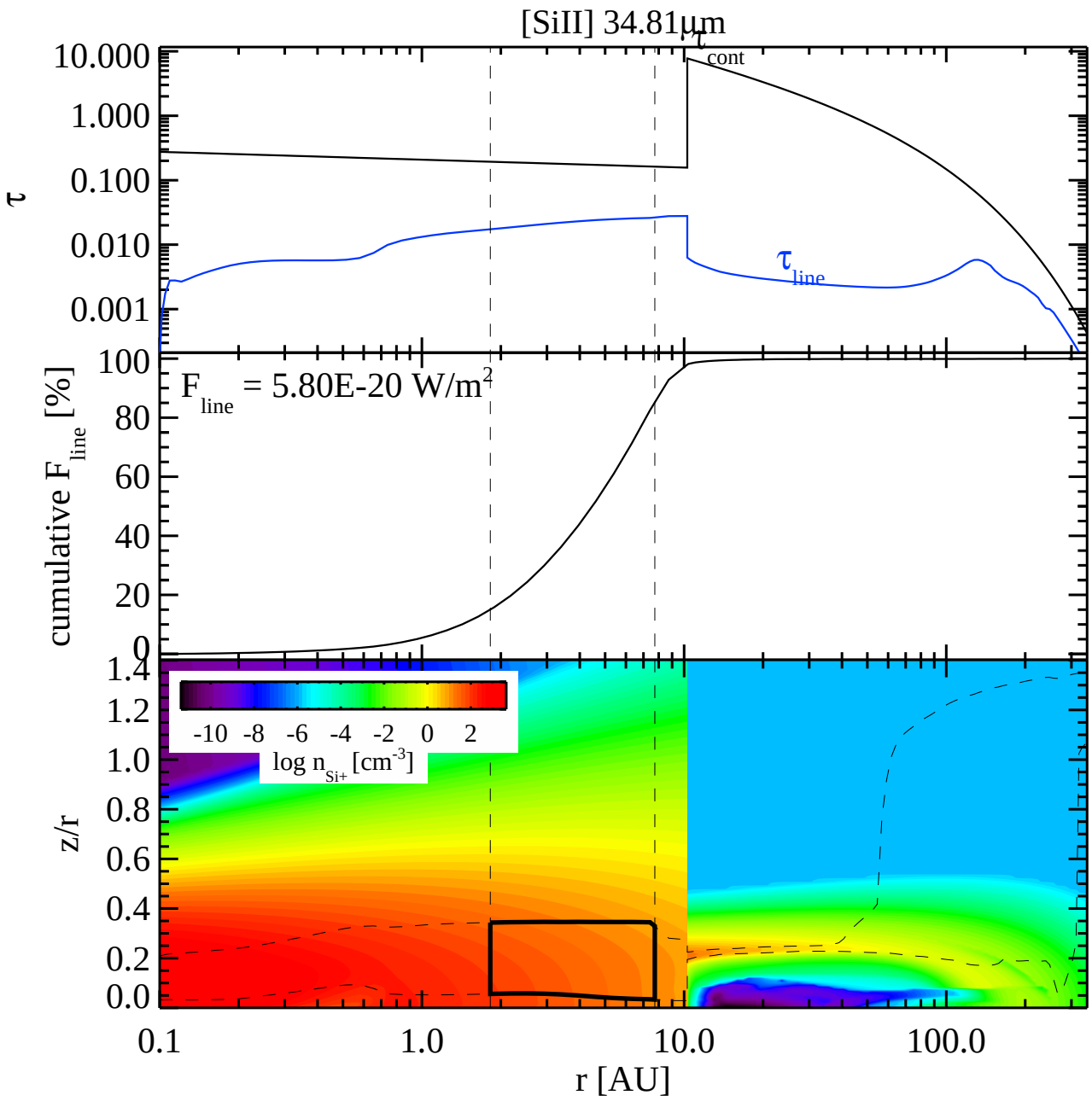

[SII] 0.6731μm
τ
cont
τ
line
10^0
10^-2
10^-4
10^-6
cumulative F_line [%]
F_line = 2.87E-20 W/m^2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n_S+ [cm^-3]
0.1
1.0
10.0
100.0
r [AU]

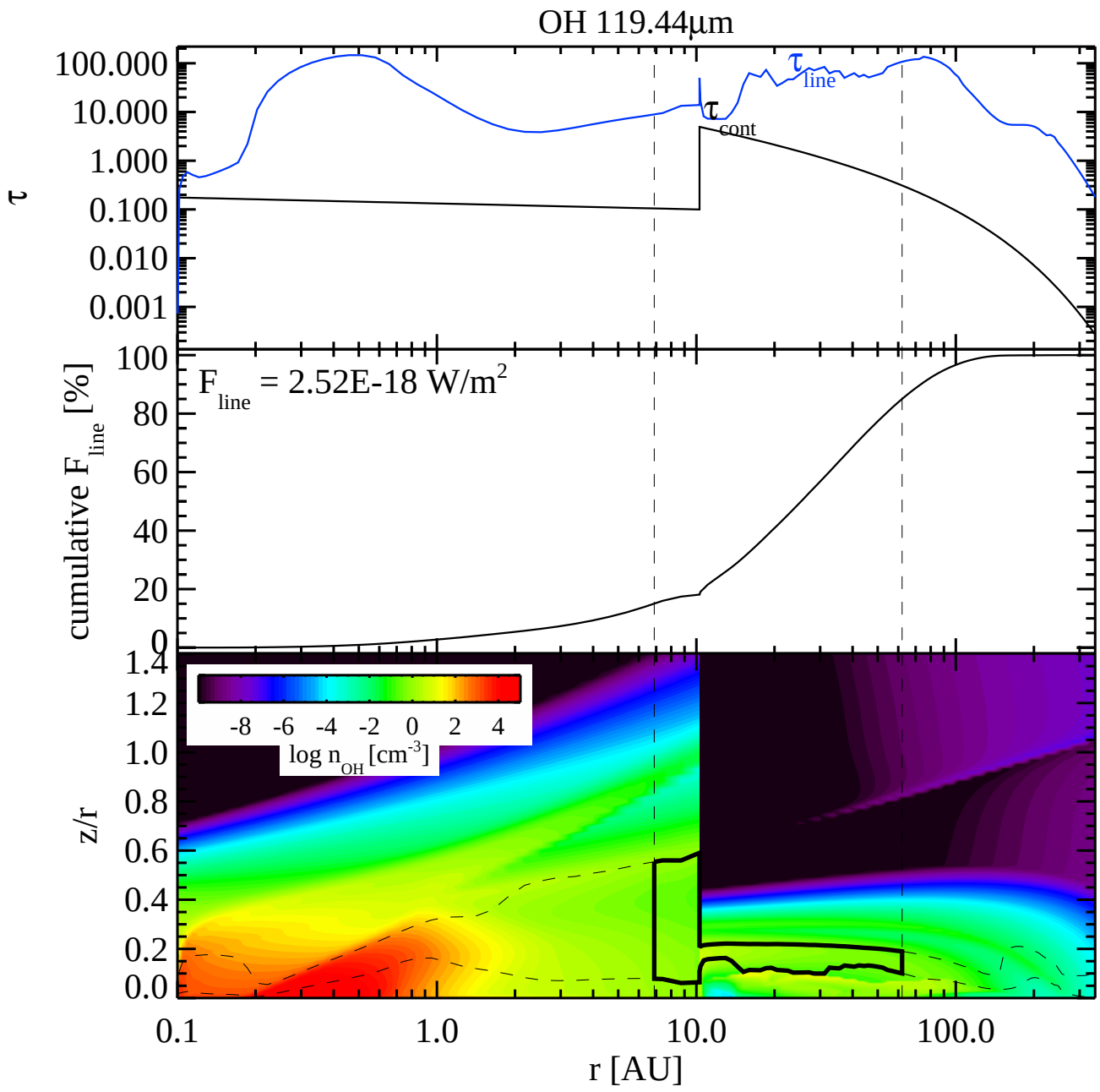

[SIIIJ 18.72μm
τ
10.000000
1.000000
0.100000
0.010000
0.001000
0.000100
0.000010
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 4.85E-21 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-12 -10 -8 -6 -4 -2 0 2
log n S++ [cm-3]
0.1
1.0
10.0
100.0
r [AU]

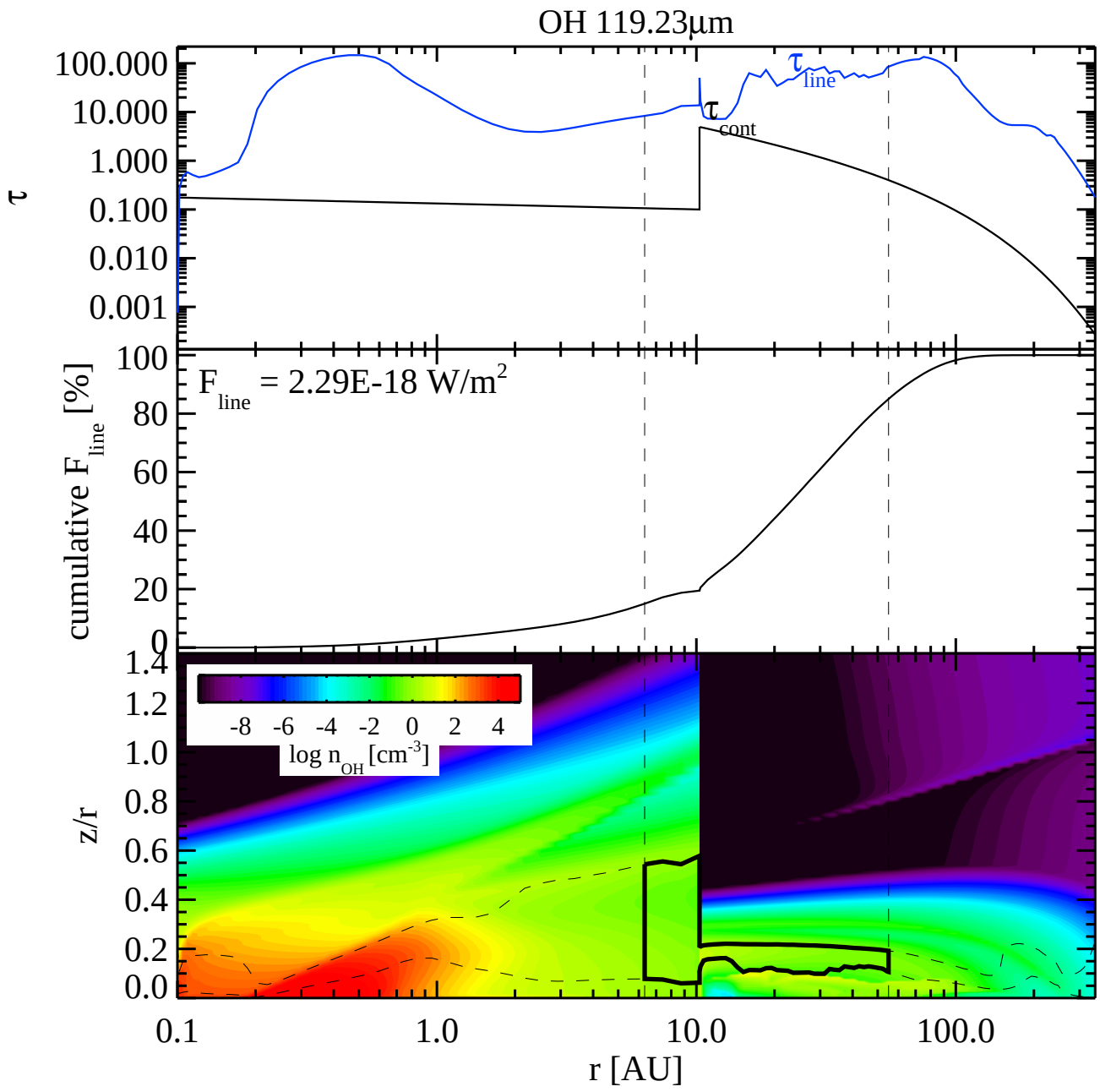

[ArII] 6.985μm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 9.89E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n Ar+ [cm-3]
0.1
1.0
10.0
100.0
r [AU]

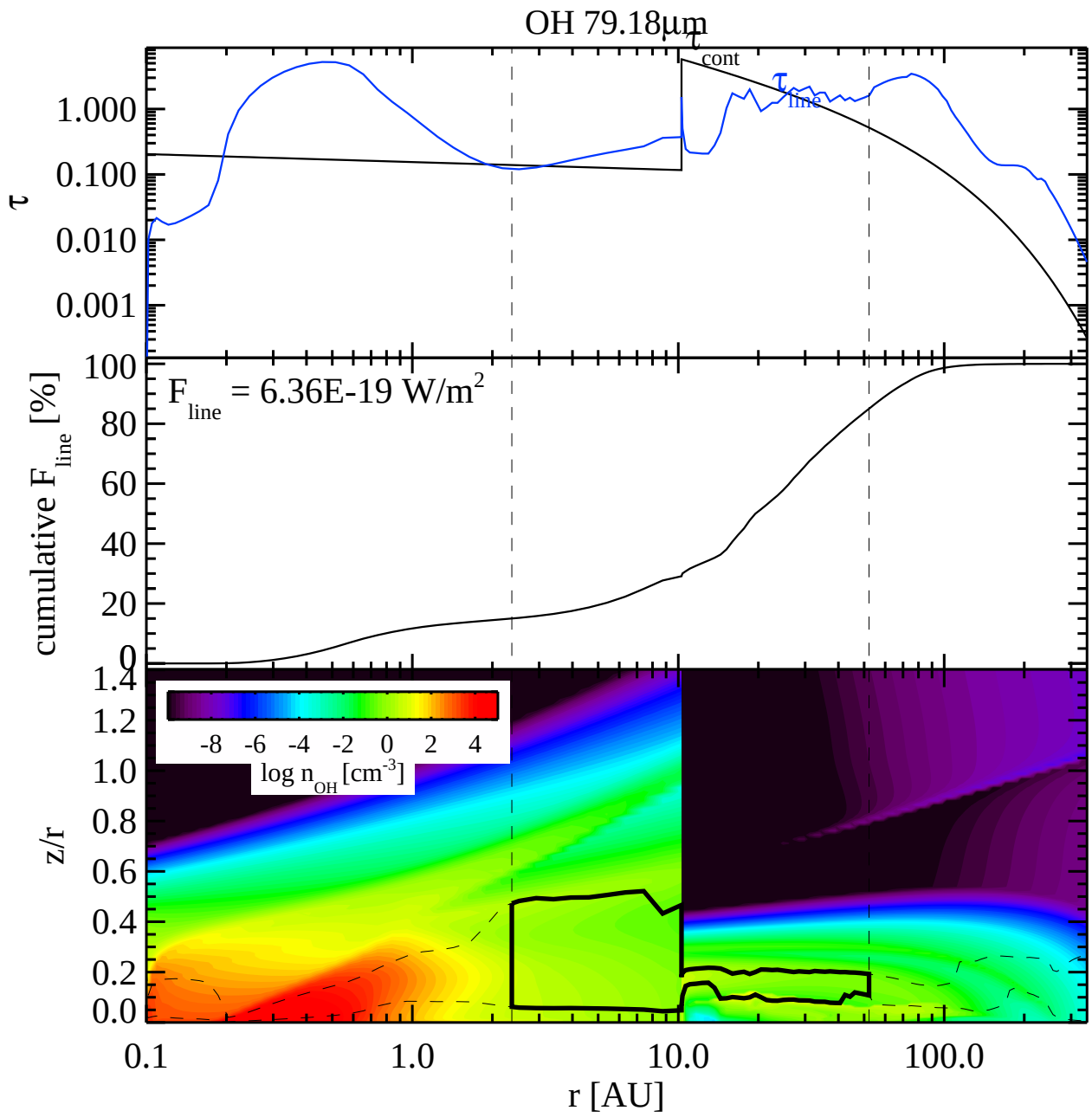

[ArIII] 21.82μm
τ
10.00000
1.00000
0.10000
0.01000
0.00100
0.00010
0.00001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 3.81E-21 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2
log n Ar++ [cm-3]
0.1
1.0
10.0
100.0
r [AU]

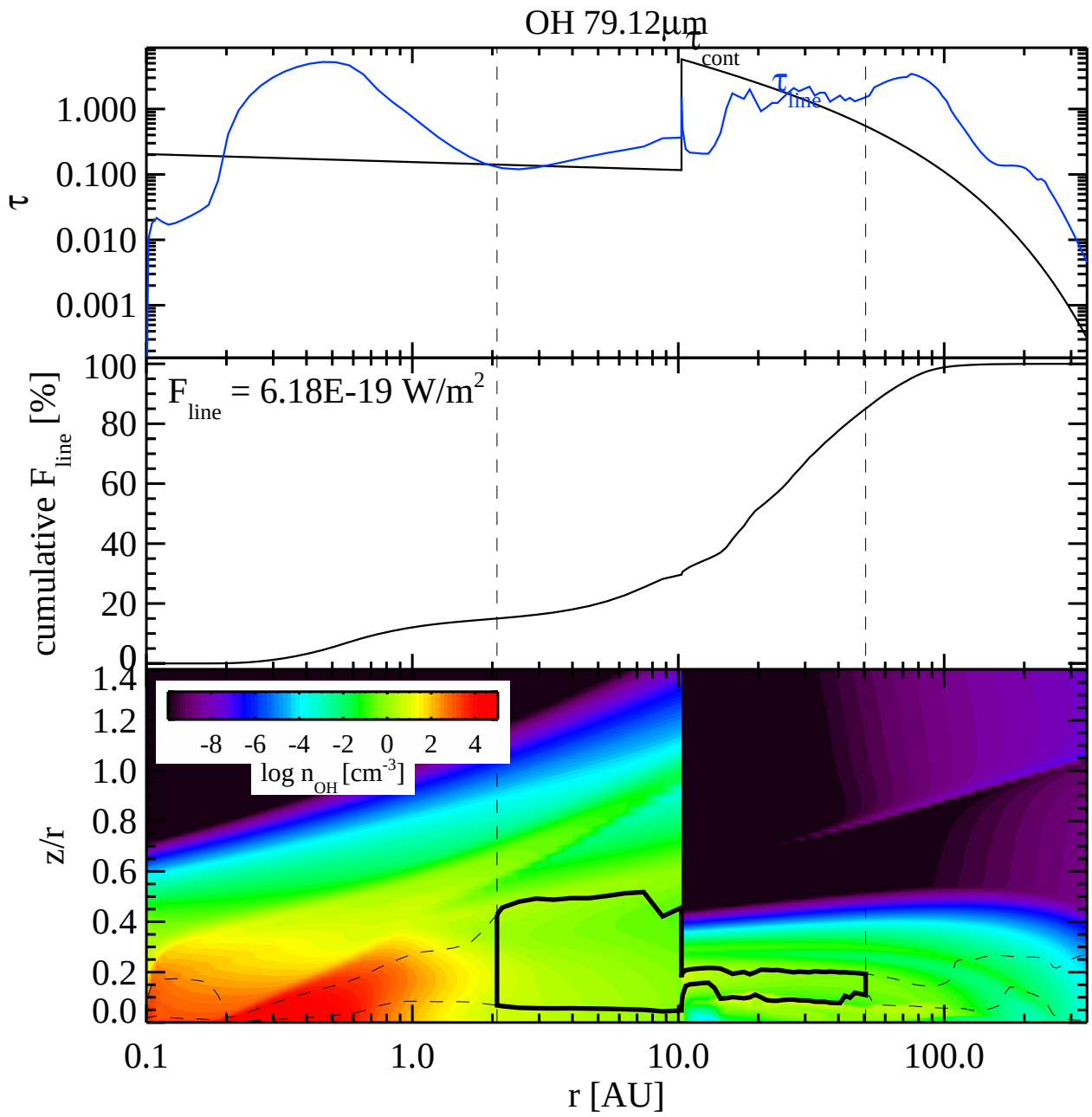

[FeII] 25.99μm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 2.41E-20 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-12 -10 -8 -6 -4 -2 0 2
log n Fe+ [cm-3]
0.1
1.0
10.0
100.0
r [AU]

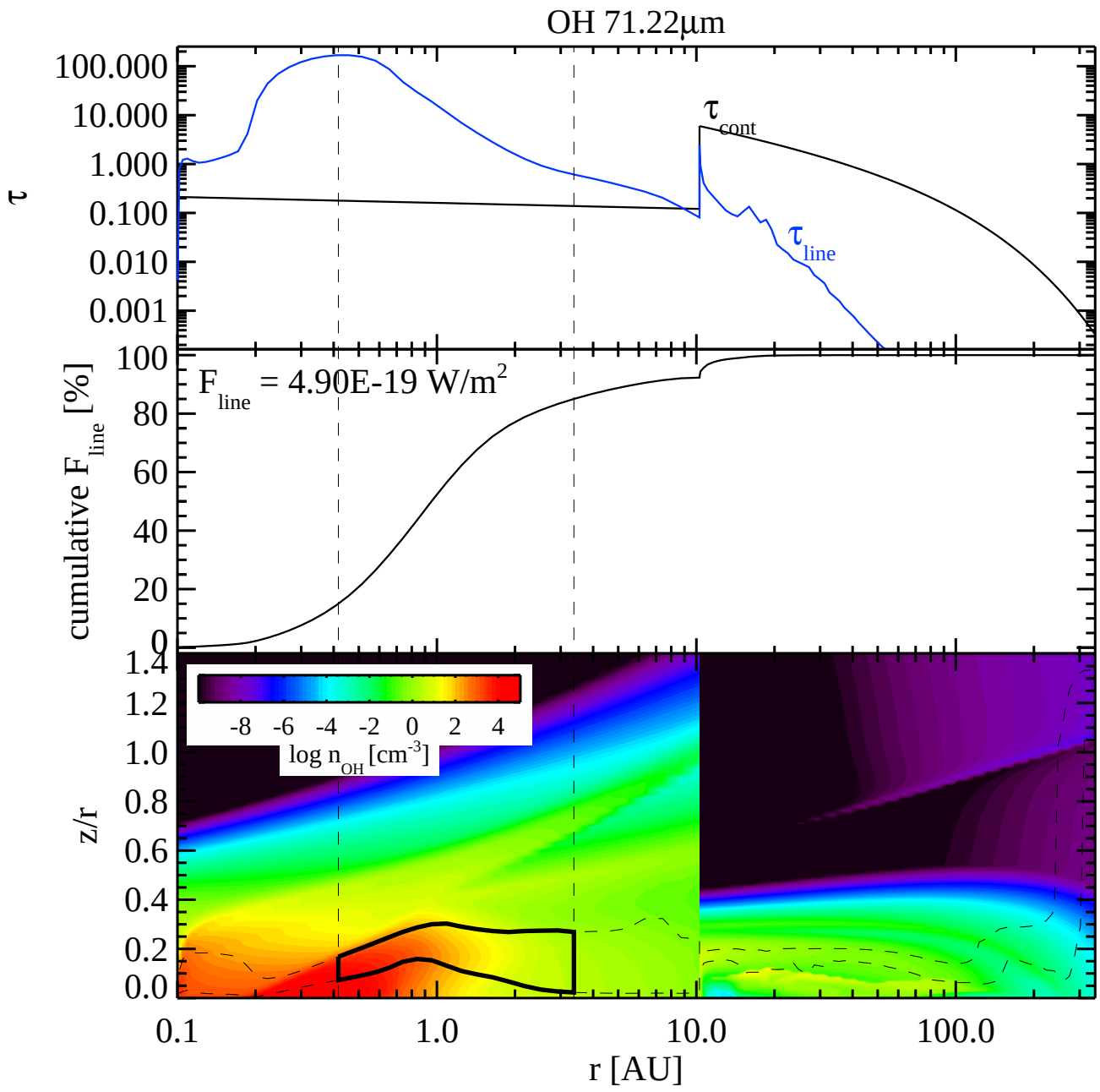

[SiII] 34.81μm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 5.80E-20 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2
log n Si+ [cm-3]
0.1
1.0
10.0
100.0
r [AU]

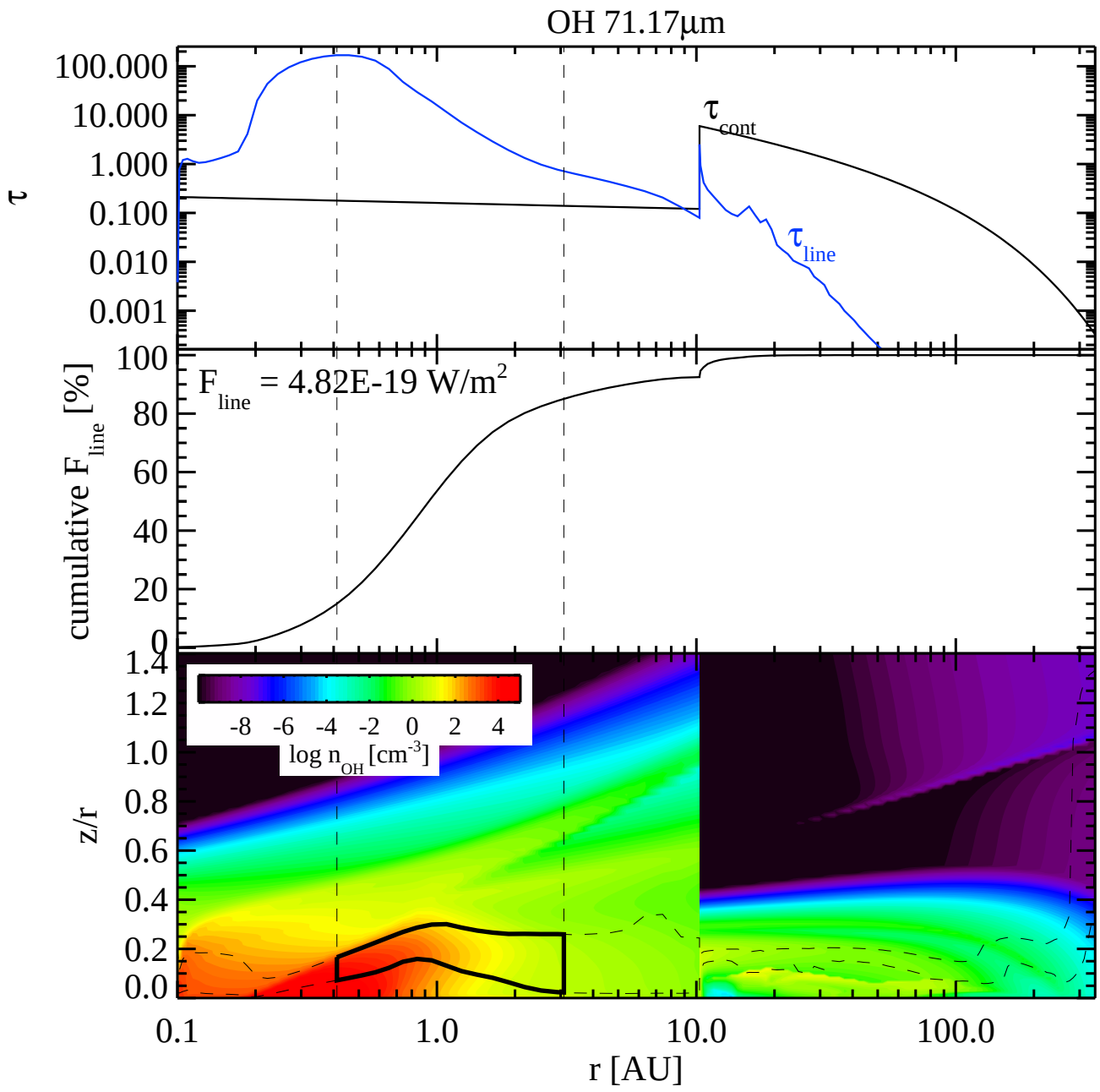

OH 119.44µm
τ
100.000
10.000
1.000
0.100
0.010
0.001
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 2.52E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-8 -6 -4 -2 0 2 4
log n OH [cm-3]
0.1
1.0
10.0
100.0
r [AU]

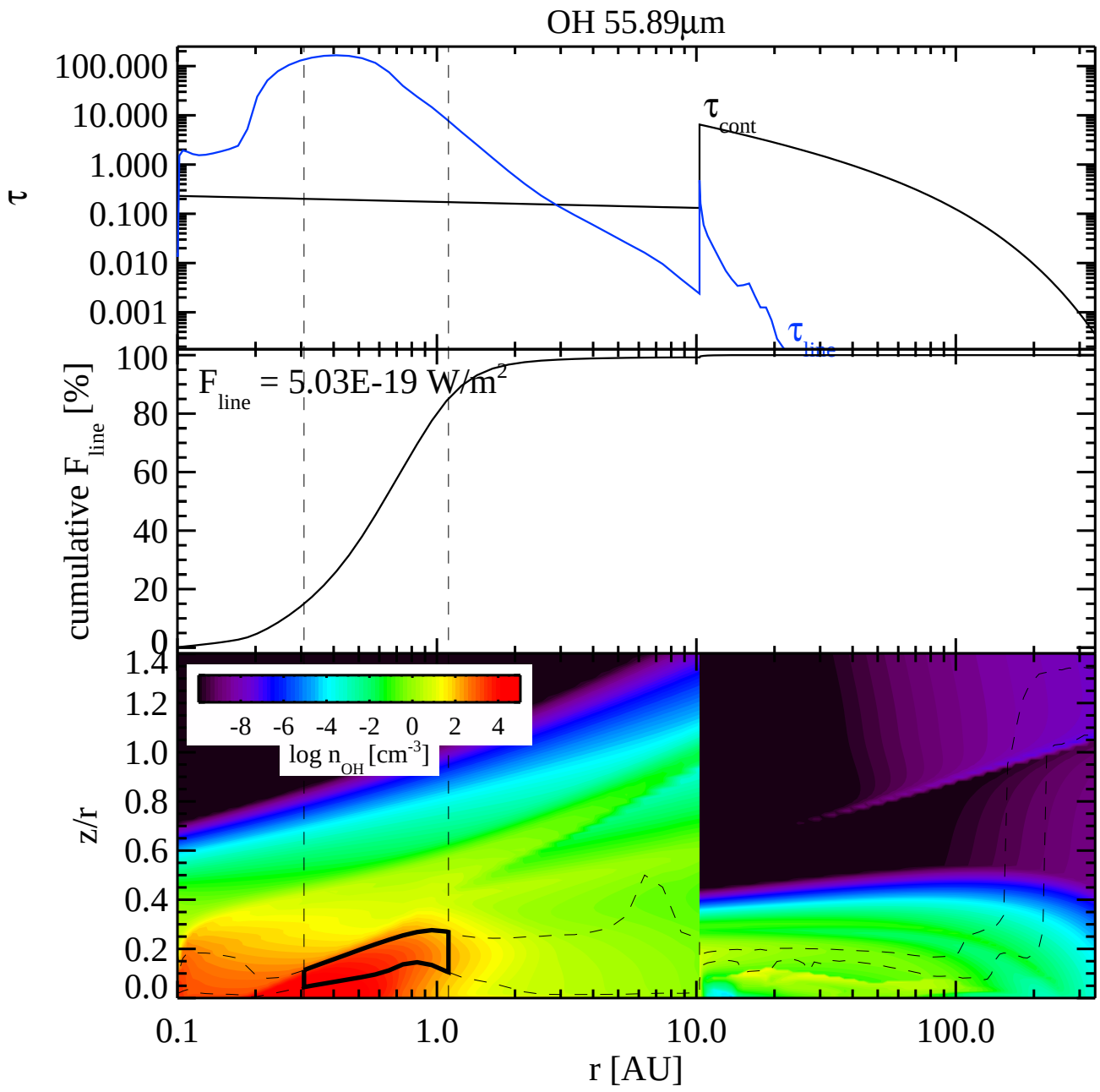

OH 119.23µm
τ
100.000
10.000
1.000
0.100
0.010
0.001
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 2.29E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-8 -6 -4 -2 0 2 4
log n OH [cm-3]
0.1
1.0
10.0
100.0
r [AU]

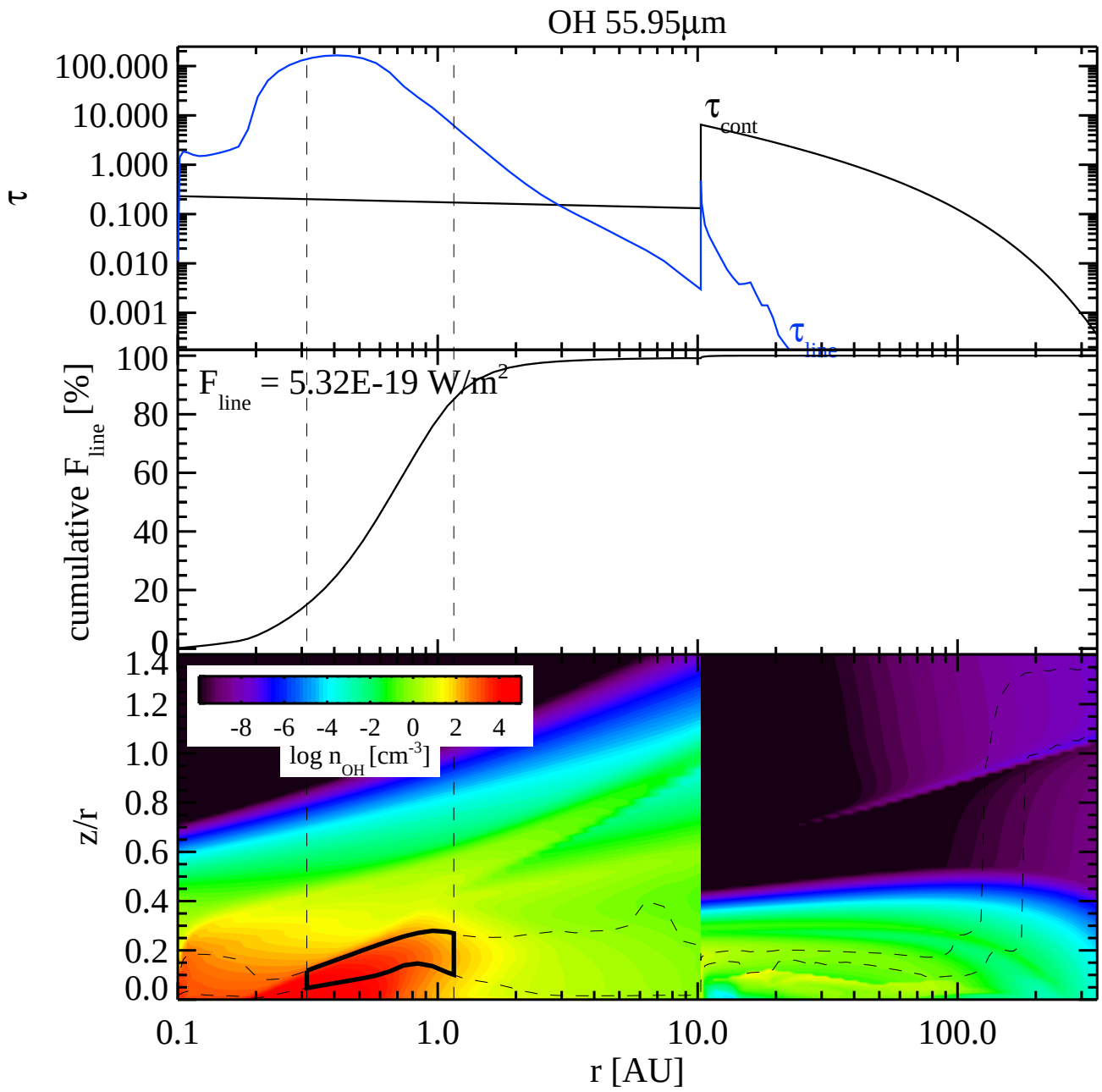

OH 79.18μm
τ
τ cont
τ line
1.000
0.100
0.010
0.001
F line = 6.36E-19 W/m2
cumulative F line [%]
100
80
60
40
20
0
-8 -6 -4 -2 0 2 4
log n OH [cm-3]
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.1
1.0
10.0
100.0
r [AU]

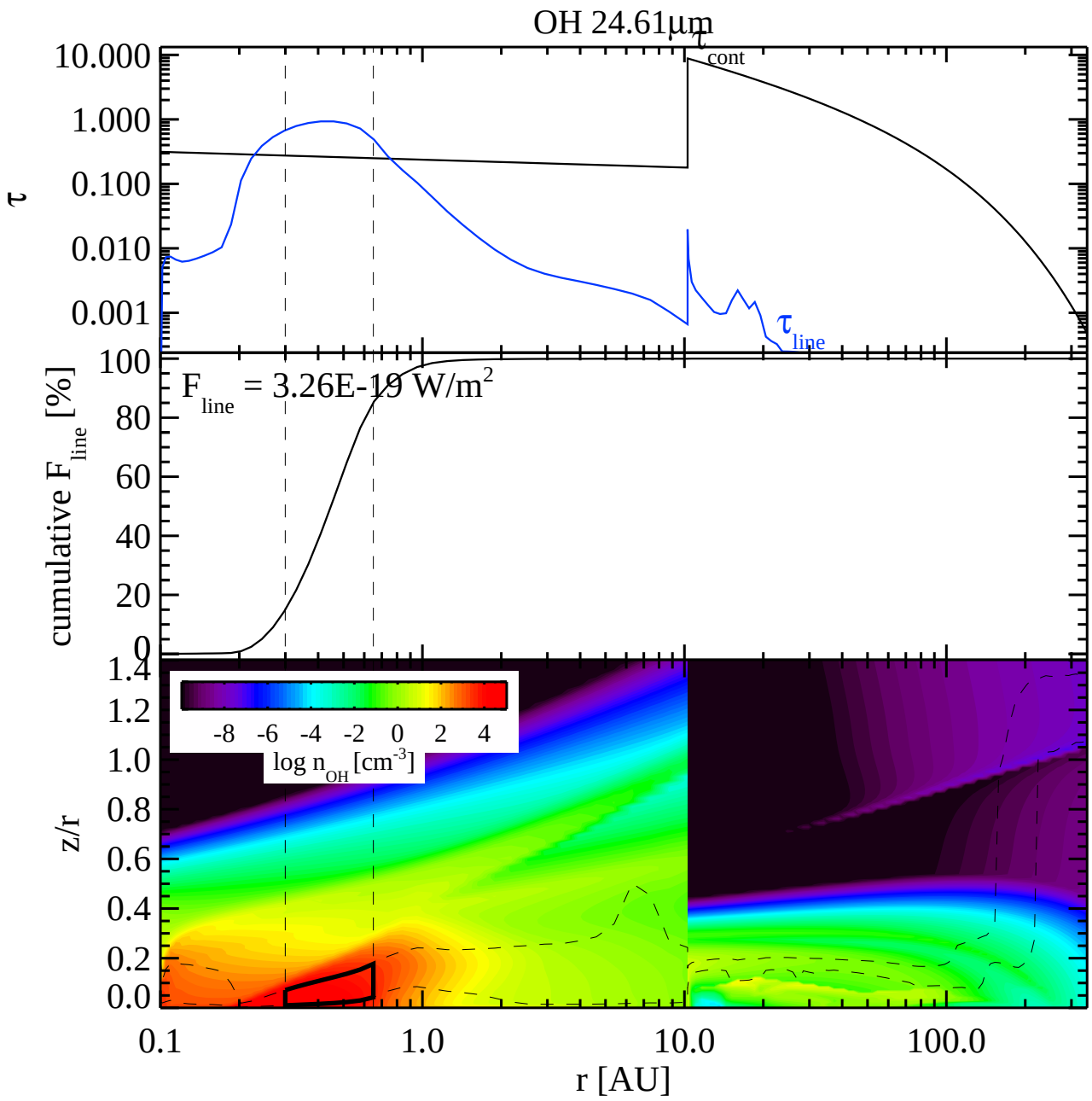

OH 79.12µm
τ
τ cont
τ line
1.000
0.100
0.010
0.001
F line = 6.18E-19 W/m2
cumulative F line [%]
100
80
60
40
20
0
-8 -6 -4 -2 0 2 4
log n OH [cm-3]
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.1
1.0
10.0
100.0
r [AU]

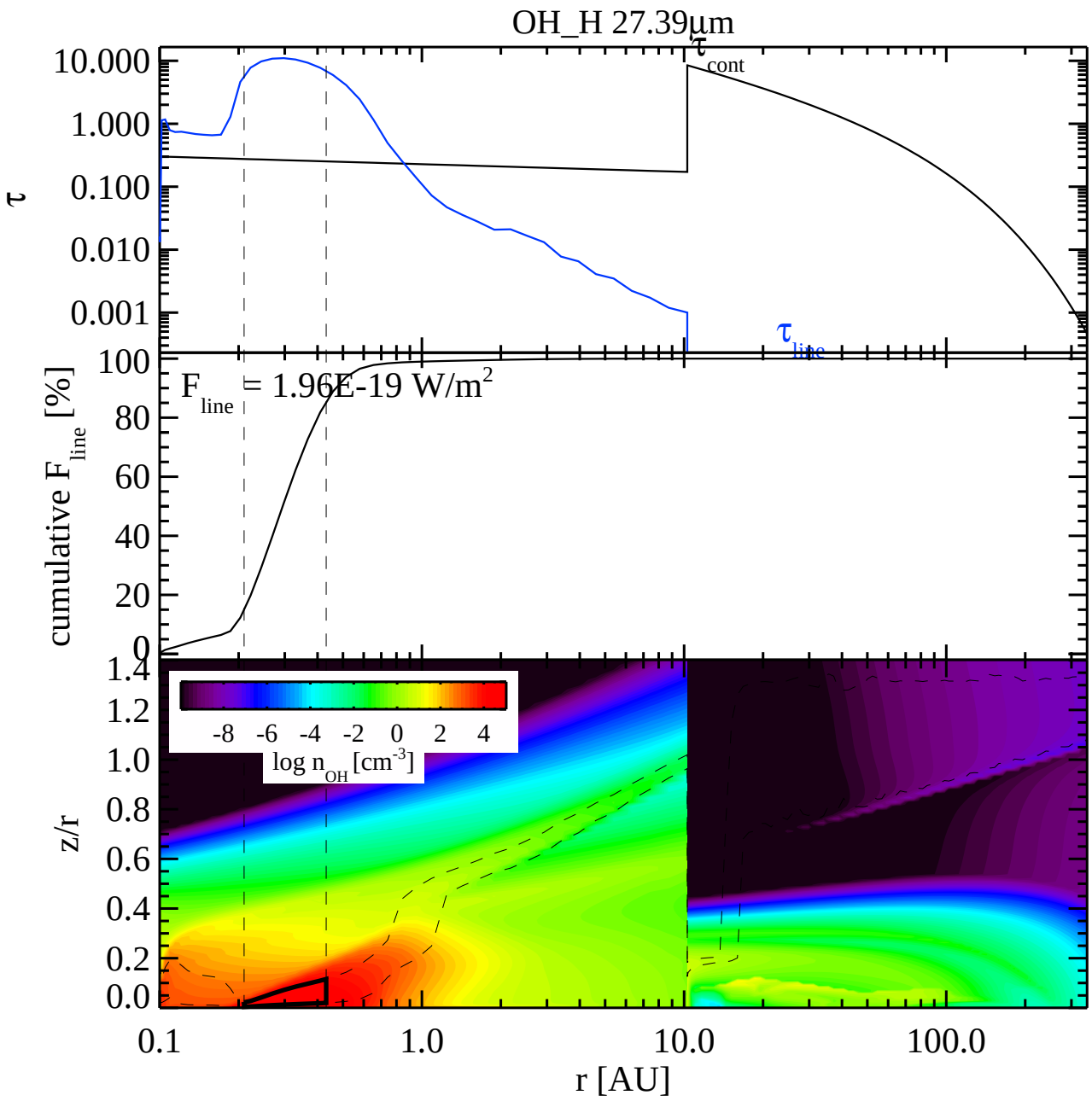

OH 71.22µm
τ
100.000
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
F line = 4.90E-19 W/m2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-8 -6 -4 -2 0 2 4
log n OH [cm-3]
0.1
1.0
10.0
100.0
r [AU]

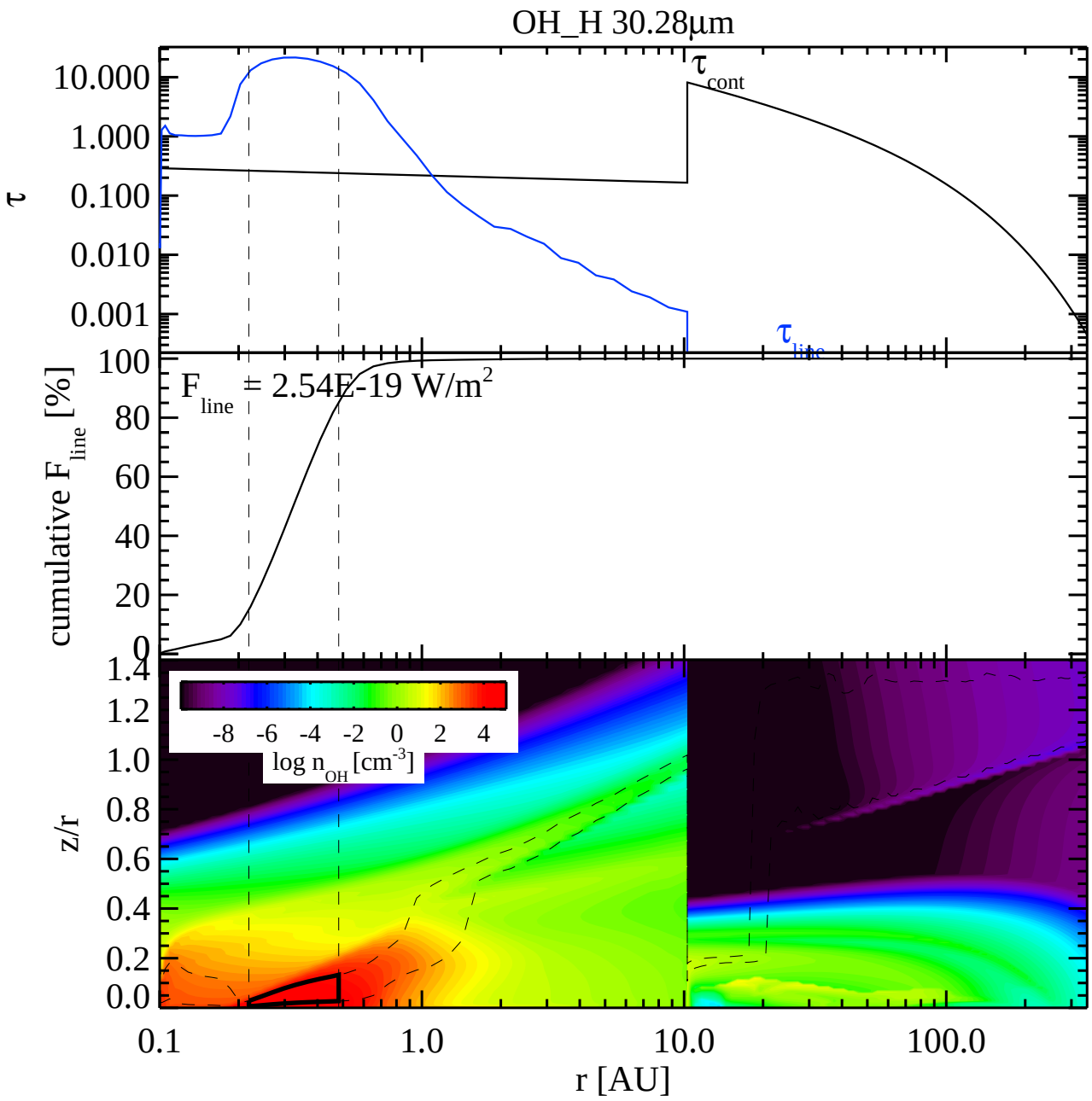

OH 71.17µm
τ
100.000
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
F line = 4.82E-19 W/m2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-8 -6 -4 -2 0 2 4
log n OH [cm-3]
0.1
1.0
10.0
100.0
r [AU]

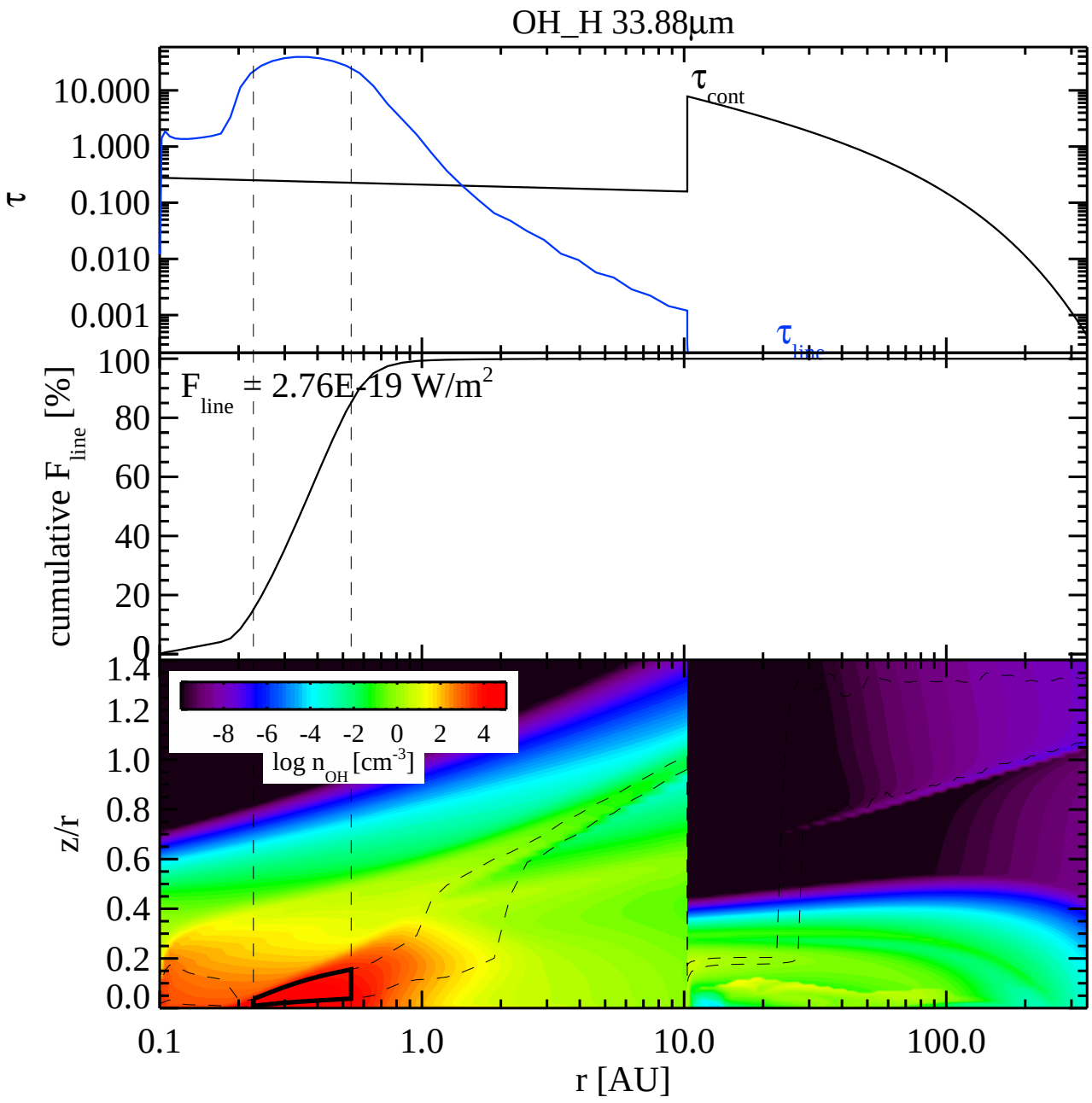

OH 55.89µm
τ
100.000
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
F line = 5.03E-19 W/m2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-8 -6 -4 -2 0 2 4
log n OH [cm-3]
0.1
1.0
10.0
100.0
r [AU]

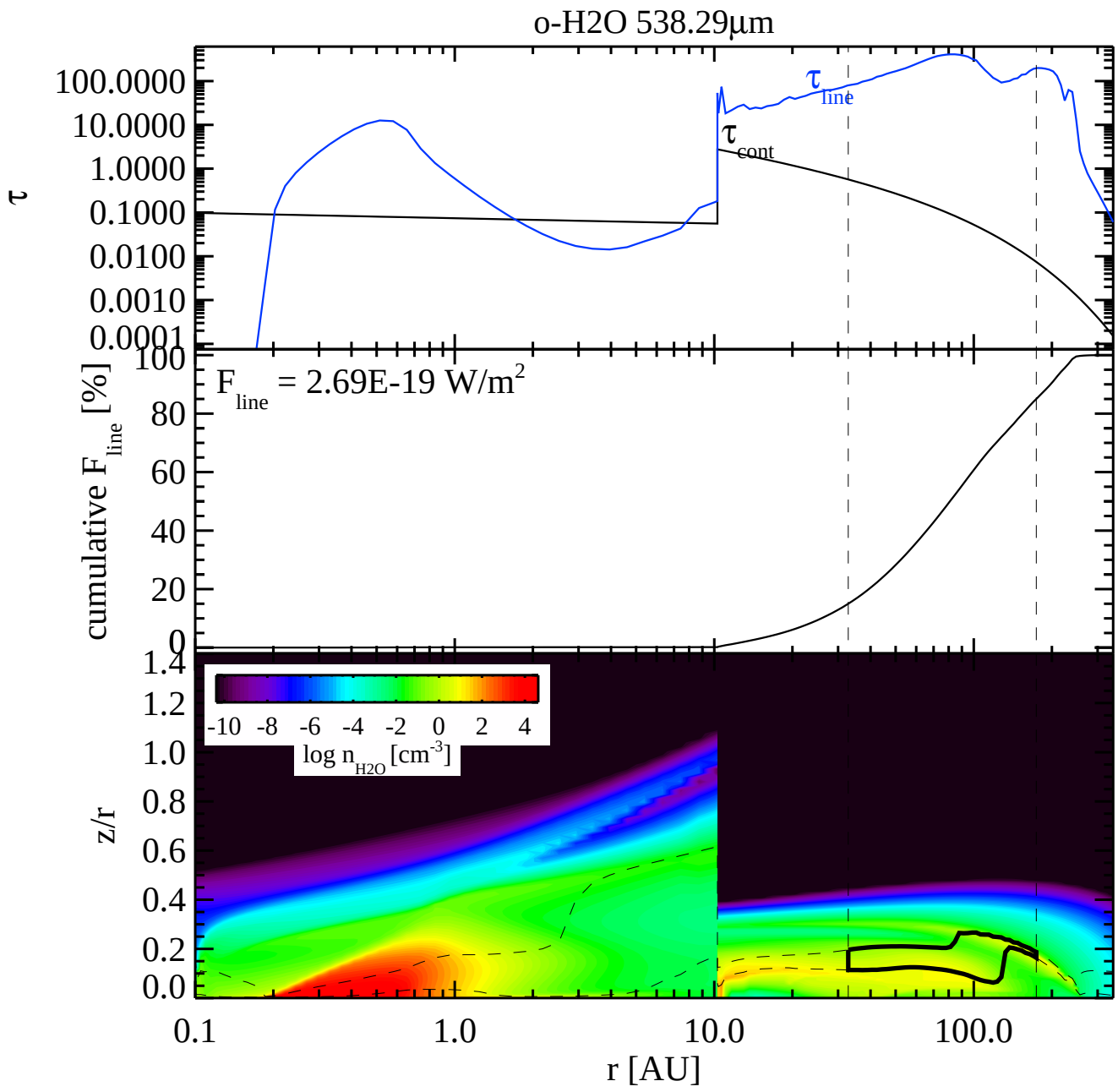

OH 55.95µm
τ
100.000
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 5.32E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-8 -6 -4 -2 0 2 4
log n OH [cm-3]
0.1
1.0
10.0
100.0
r [AU]

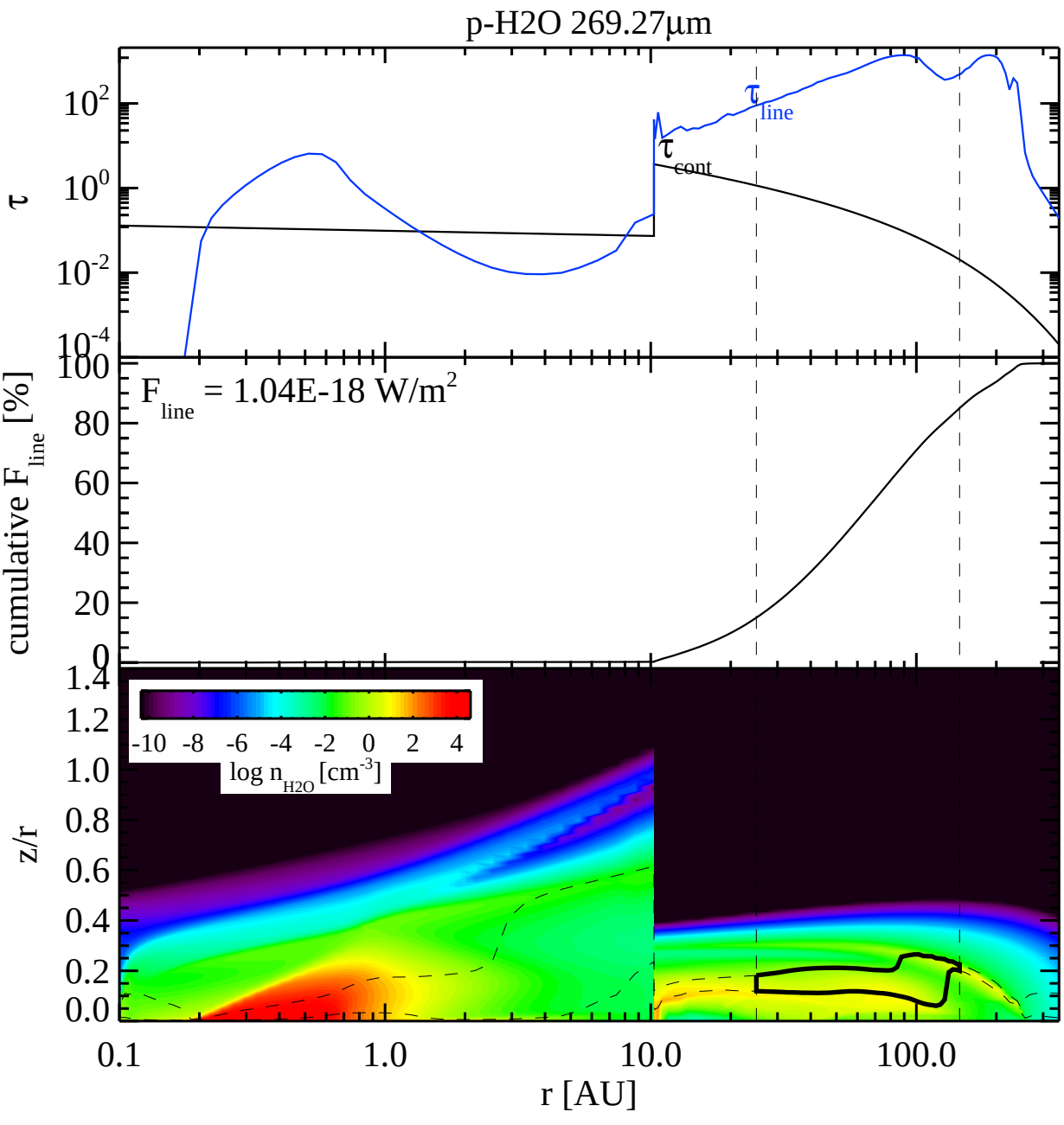

OH 24.61µm
τ
τ cont
τ line
10.000
1.000
0.100
0.010
0.001
cumulative F line [%]
F line = 3.26E-19 W/m2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-8 -6 -4 -2 0 2 4
log n OH [cm-3]
0.1
1.0
10.0
100.0
r [AU]

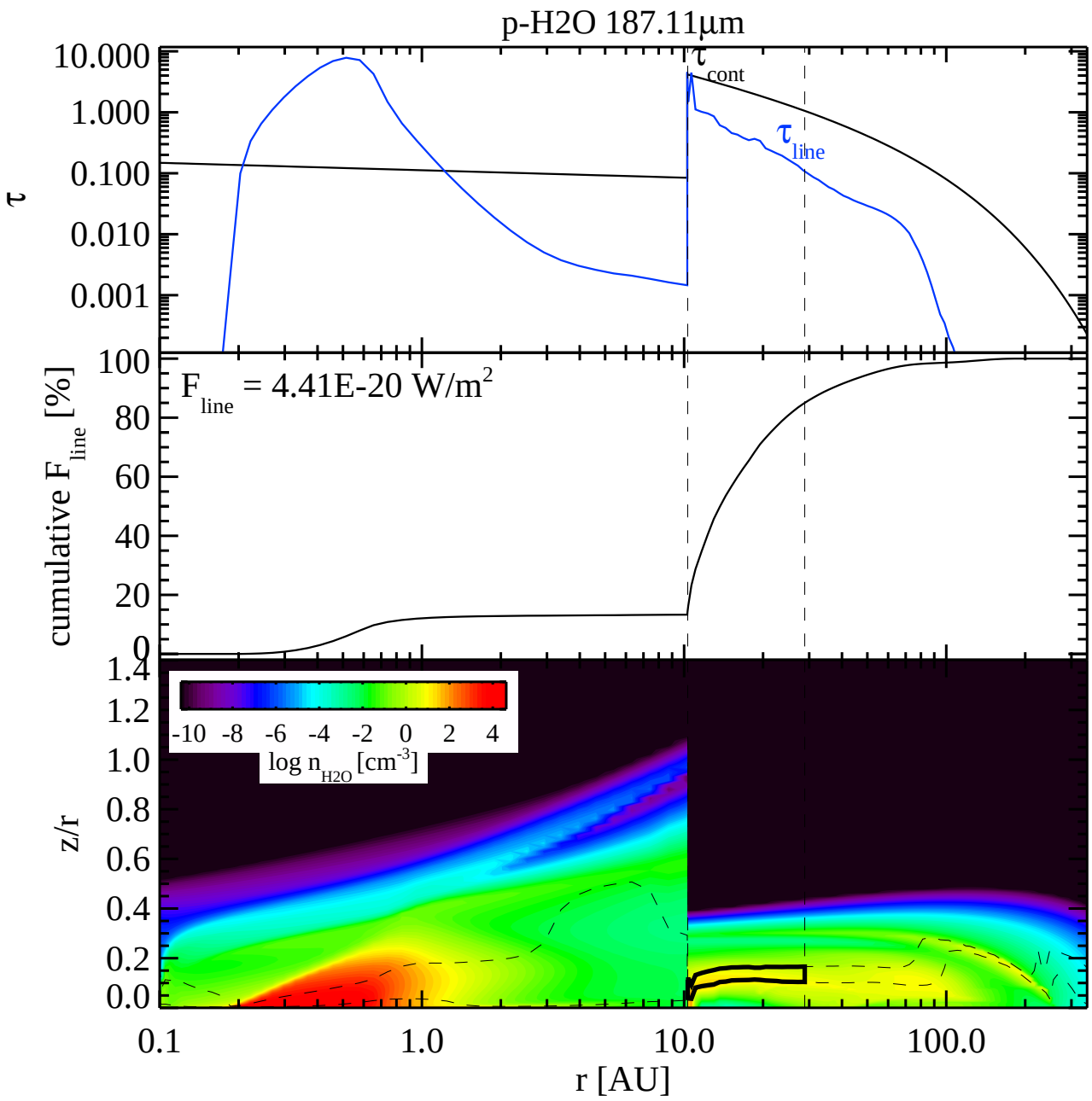

OH_H 27.39µm
τ
τ cont
τ line
10.000
1.000
0.100
0.010
0.001
F line = 1.96E-19 W/m2
cumulative F line [%]
100
80
60
40
20
0
-8 -6 -4 -2 0 2 4
log n OH [cm-3]
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.1
1.0
10.0
100.0
r [AU]

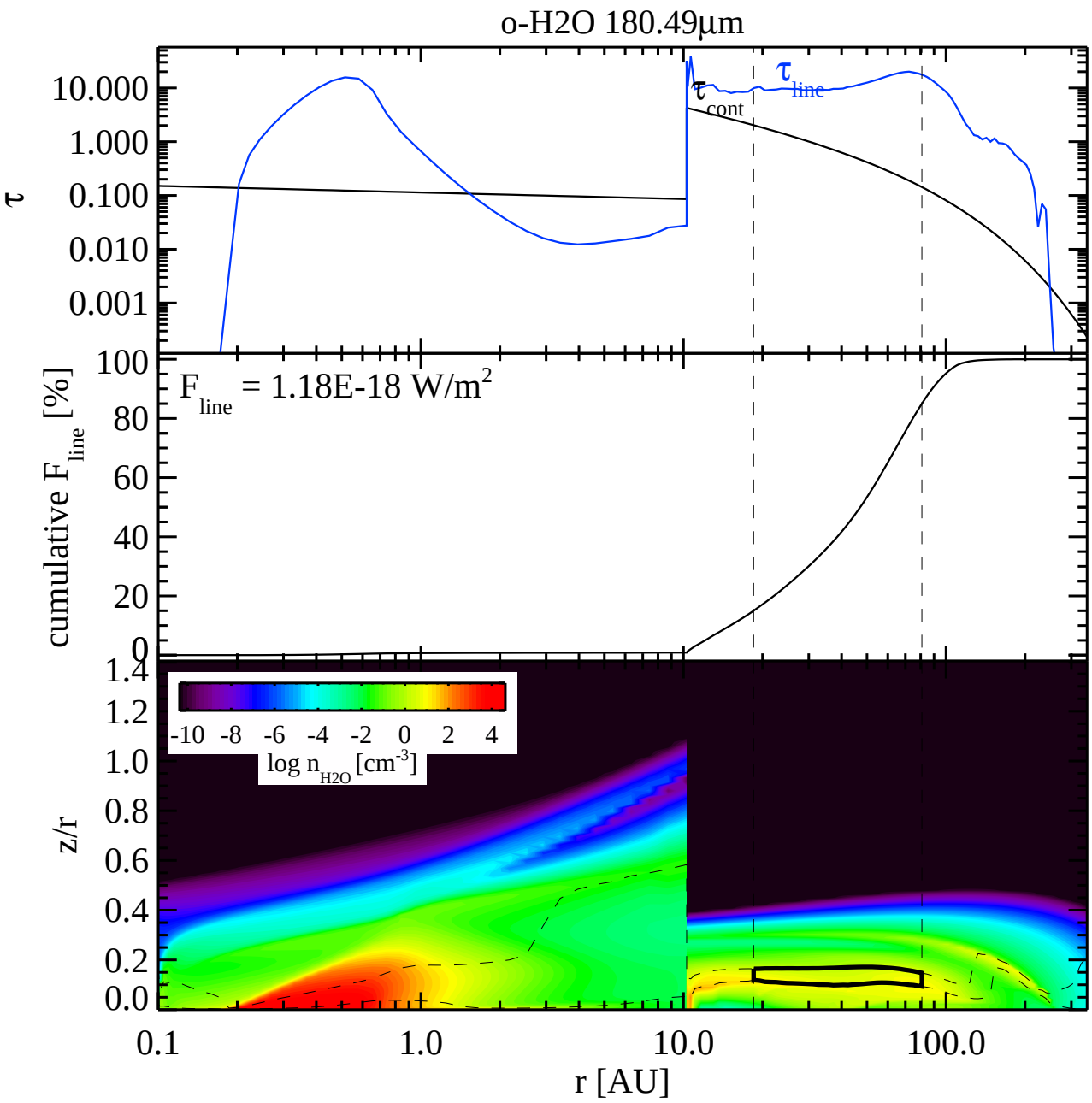

OH_H 30.28µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 2.54E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-8 -6 -4 -2 0 2 4
log n OH [cm-3]
0.1
1.0
10.0
100.0
r [AU]

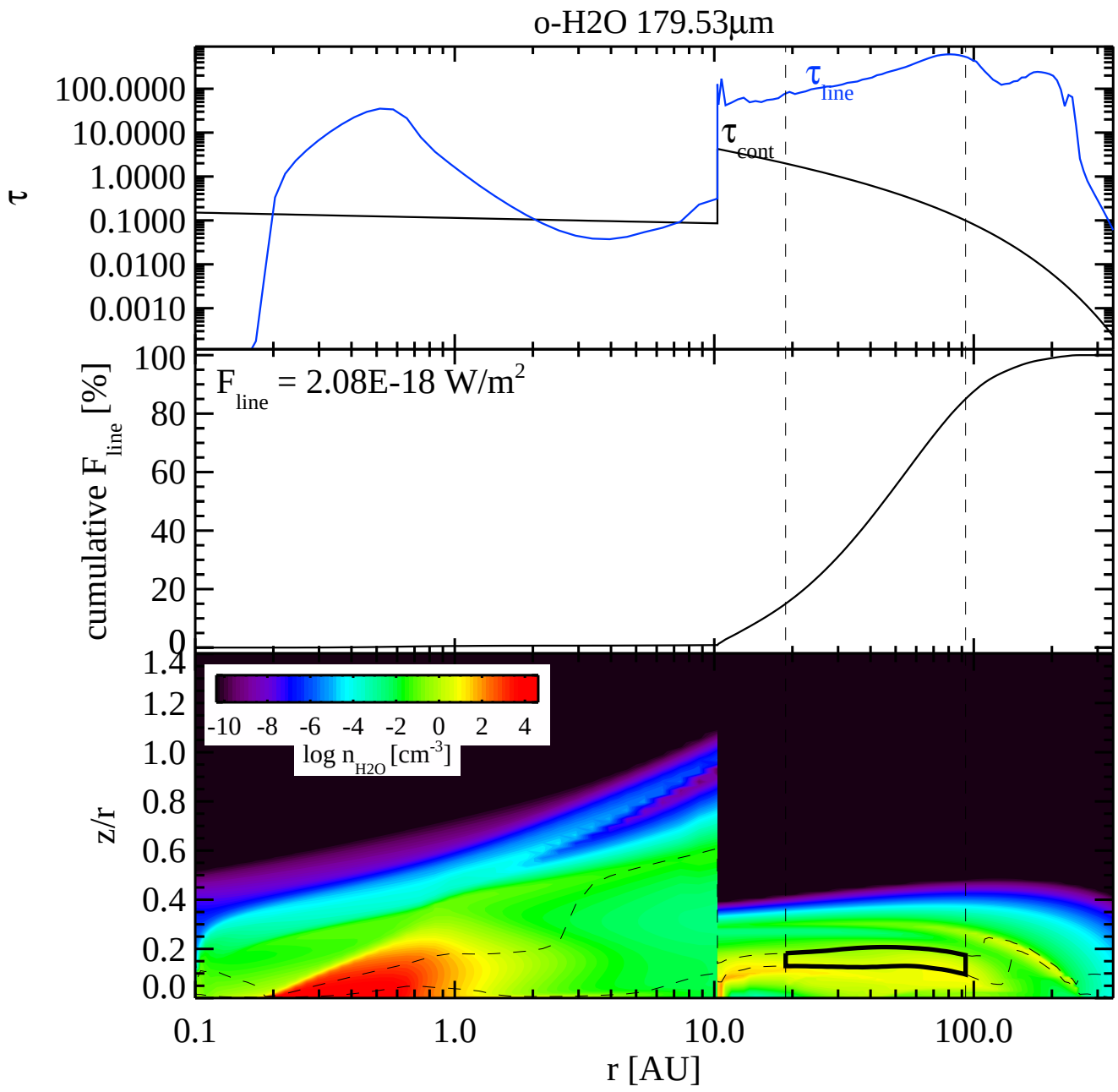

OH_H 33.88µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 2.76E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-8 -6 -4 -2 0 2 4
log n OH [cm-3]
0.1
1.0
10.0
100.0
r [AU]

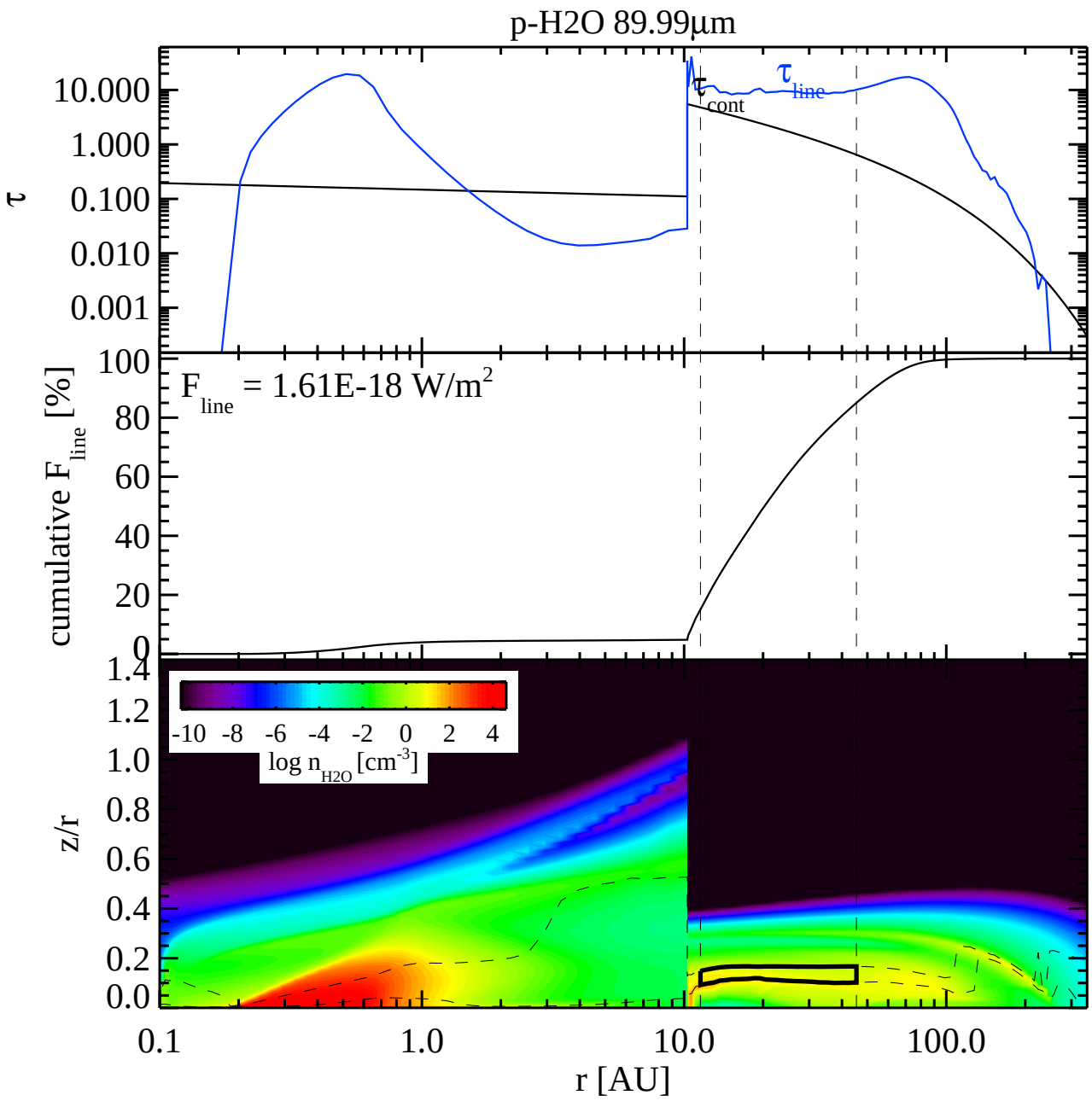

o-H2O 538.29µm
τ
100.0000
10.0000
1.0000
0.1000
0.0100
0.0010
0.0001
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 2.69E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n H2O [cm-3]
0.1
1.0
10.0
100.0
r [AU]

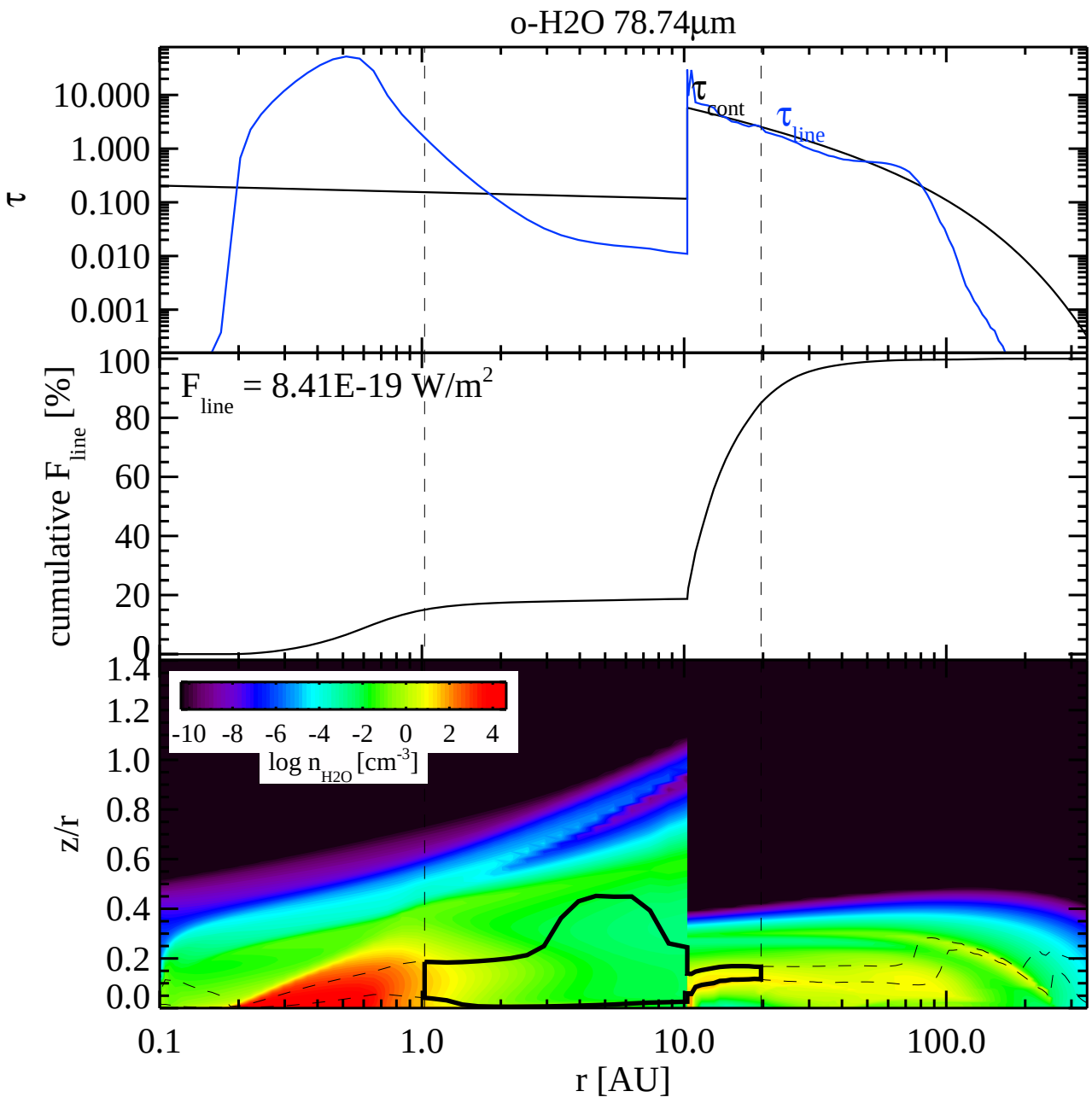

p-H2O 269.27µm
τ
$10^2$
$10^0$
$10^{-2}$
$10^{-4}$
$\tau_{line}$
$\tau_{cont}$
cumulative $F_{line}$ [%]
$F_{line}$ = 1.04E-18 W/m$^2$
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log $n_{H2O}$ [cm$^{-3}$]
0.1
1.0
10.0
100.0
r [AU]

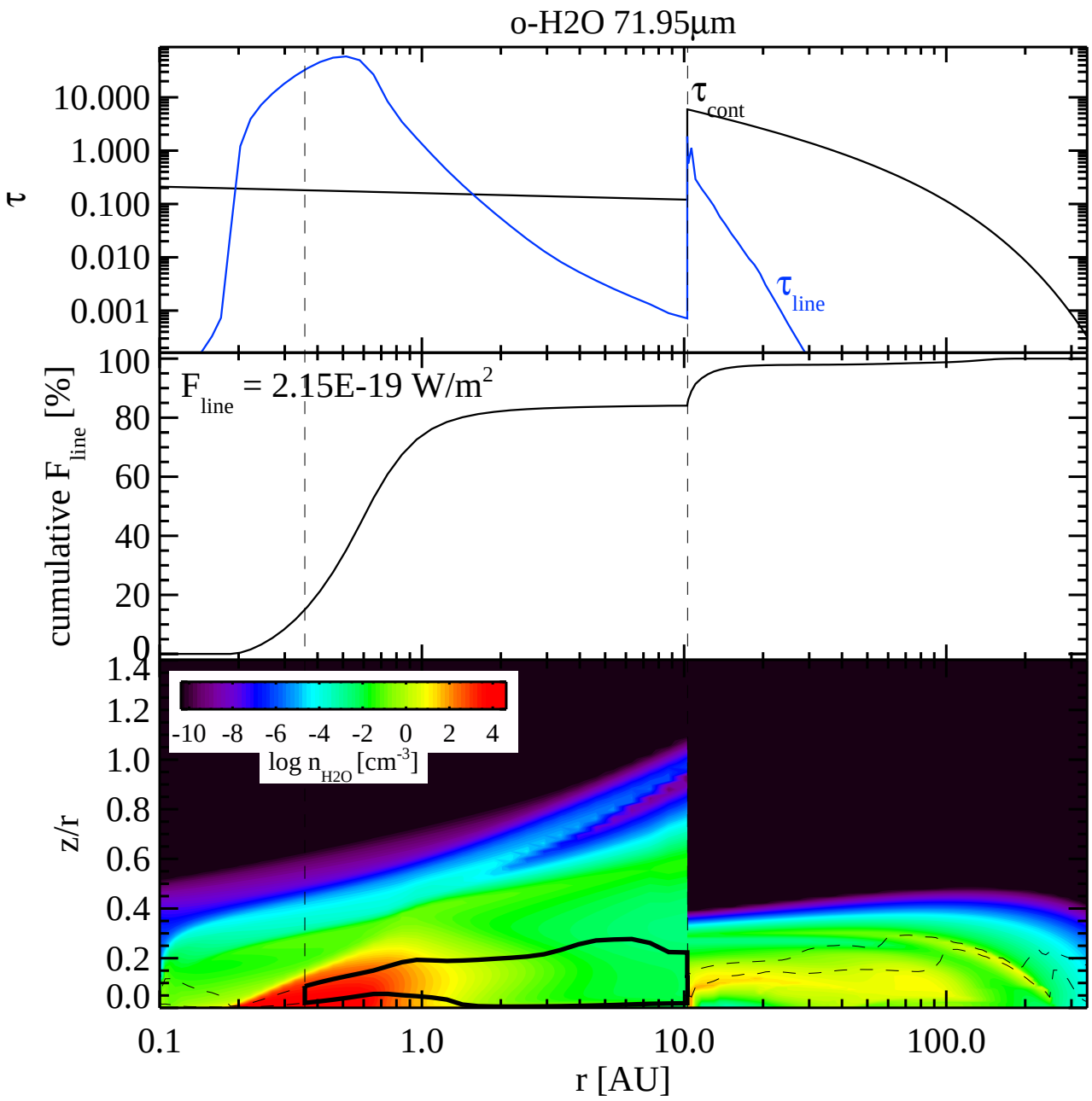

p-H2O 187.11µm
τ
τ cont
τ line
10.000
1.000
0.100
0.010
0.001
F line = 4.41E-20 W/m2
cumulative F line [%]
100
80
60
40
20
0
log n H2O [cm-3]
-10 -8 -6 -4 -2 0 2 4
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.1
1.0
10.0
100.0
r [AU]

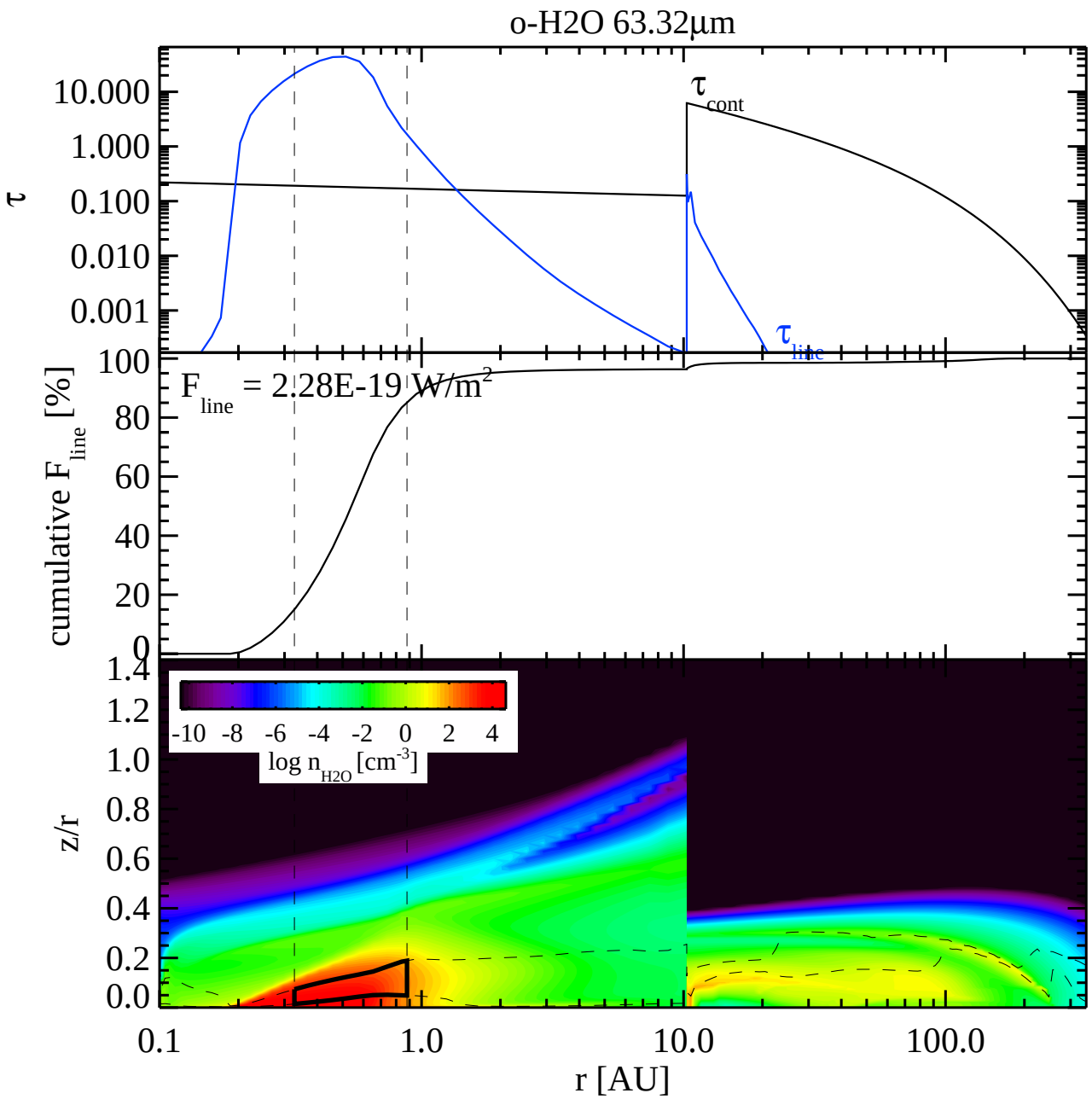

o-H2O 180.49µm
τ
10.000
1.000
0.100
0.010
0.001
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 1.18E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n H2O [cm-3]
0.1
1.0
10.0
100.0
r [AU]

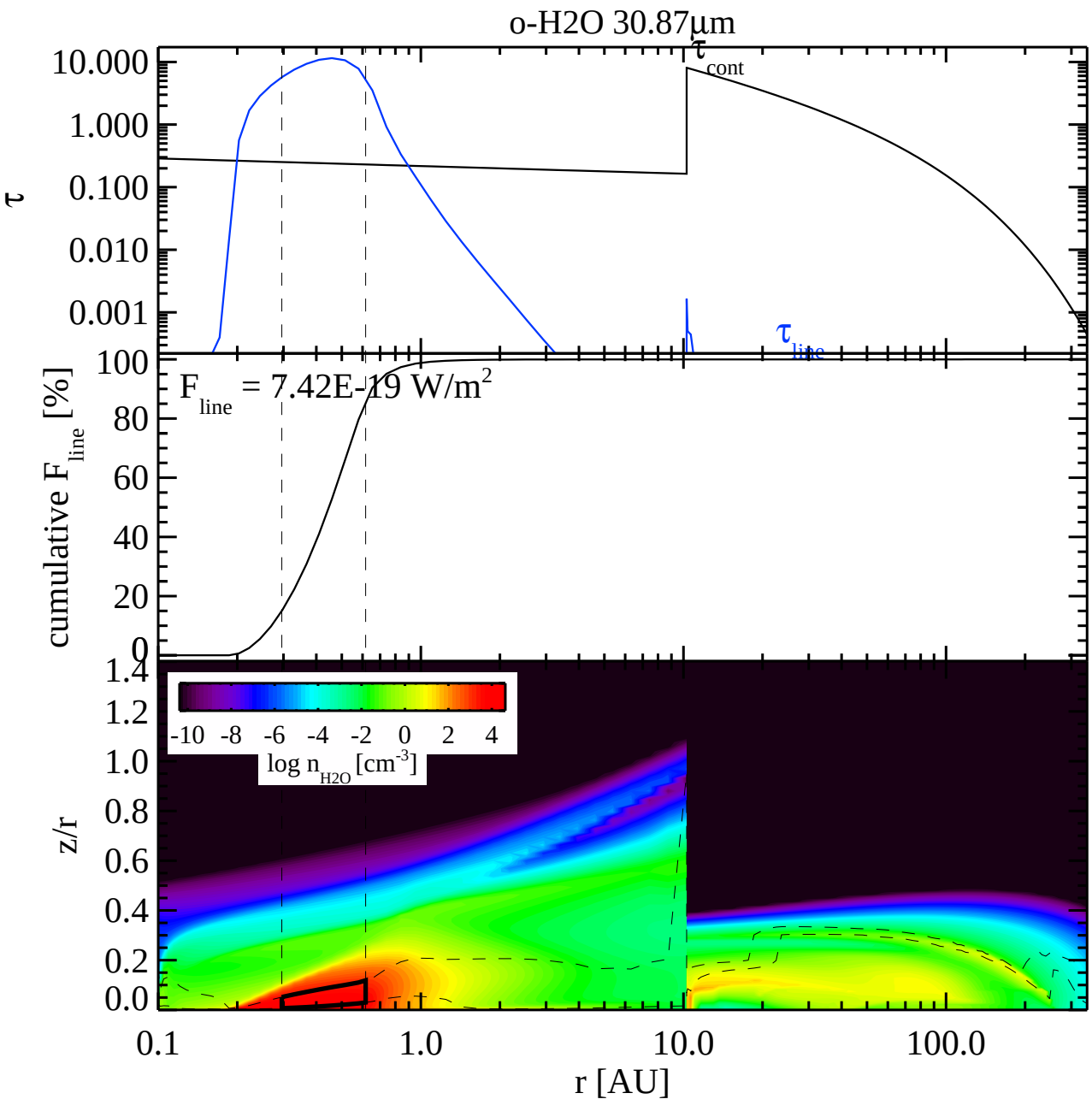

o-H2O 179.53µm
τ
100.0000
10.0000
1.0000
0.1000
0.0100
0.0010
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 2.08E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n H2O [cm-3]
0.1
1.0
10.0
100.0
r [AU]

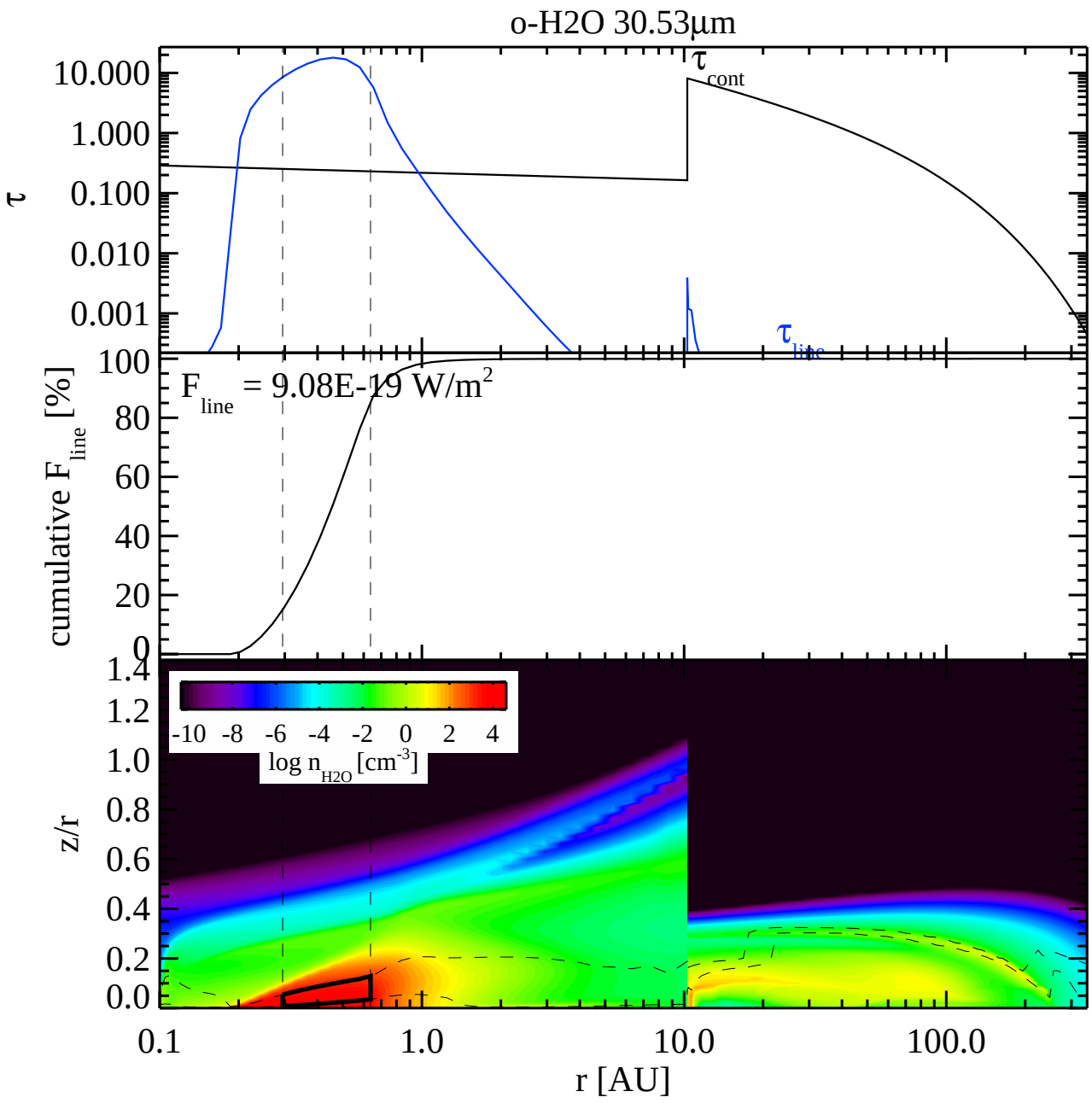

p-H2O 89.99µm
τ
10.000
1.000
0.100
0.010
0.001
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 1.61E-18 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n H2O [cm-3]
0.1
1.0
10.0
100.0
r [AU]

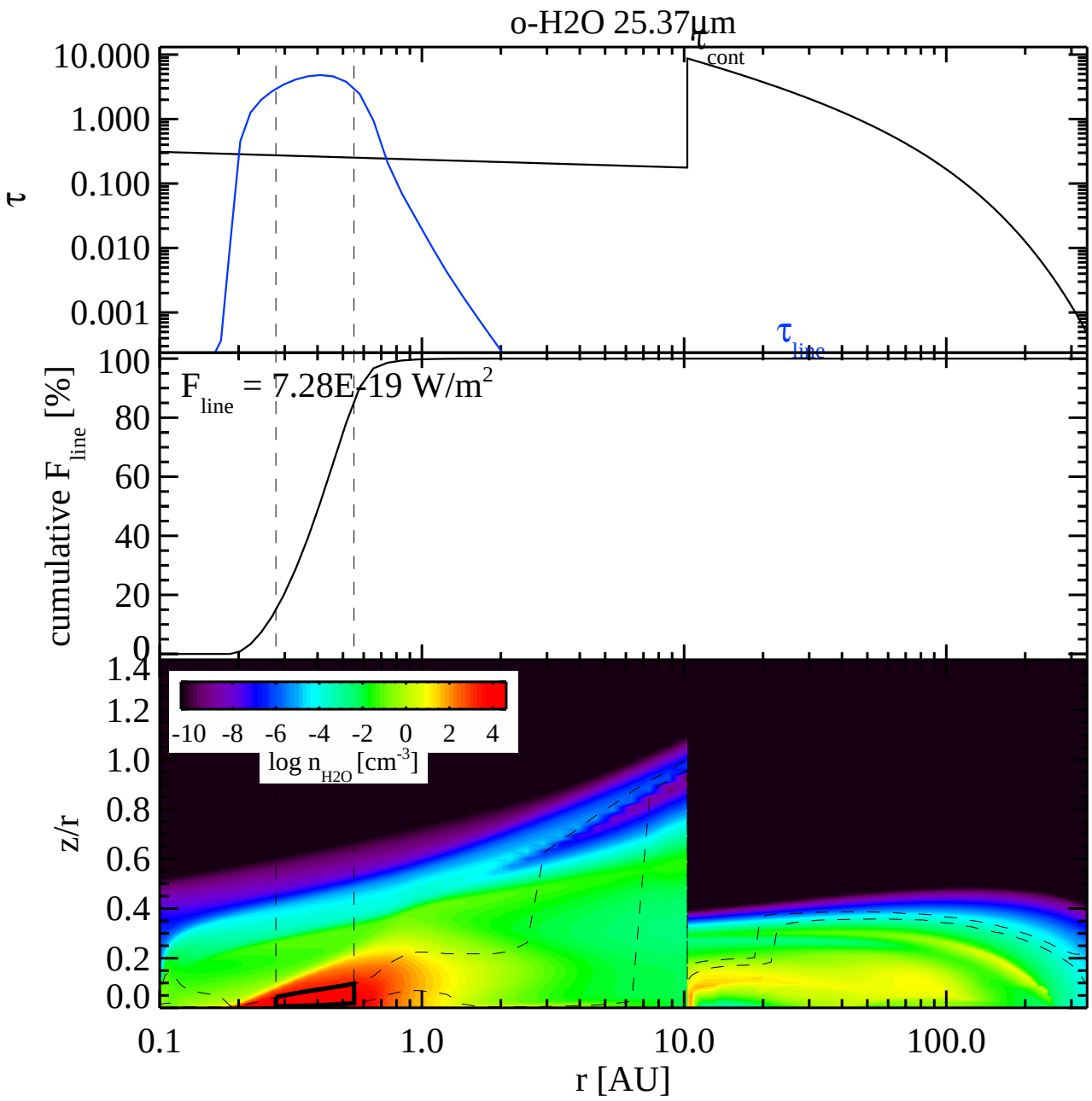

o-H2O 78.74µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 8.41E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n H2O [cm-3]
0.1
1.0
10.0
100.0
r [AU]

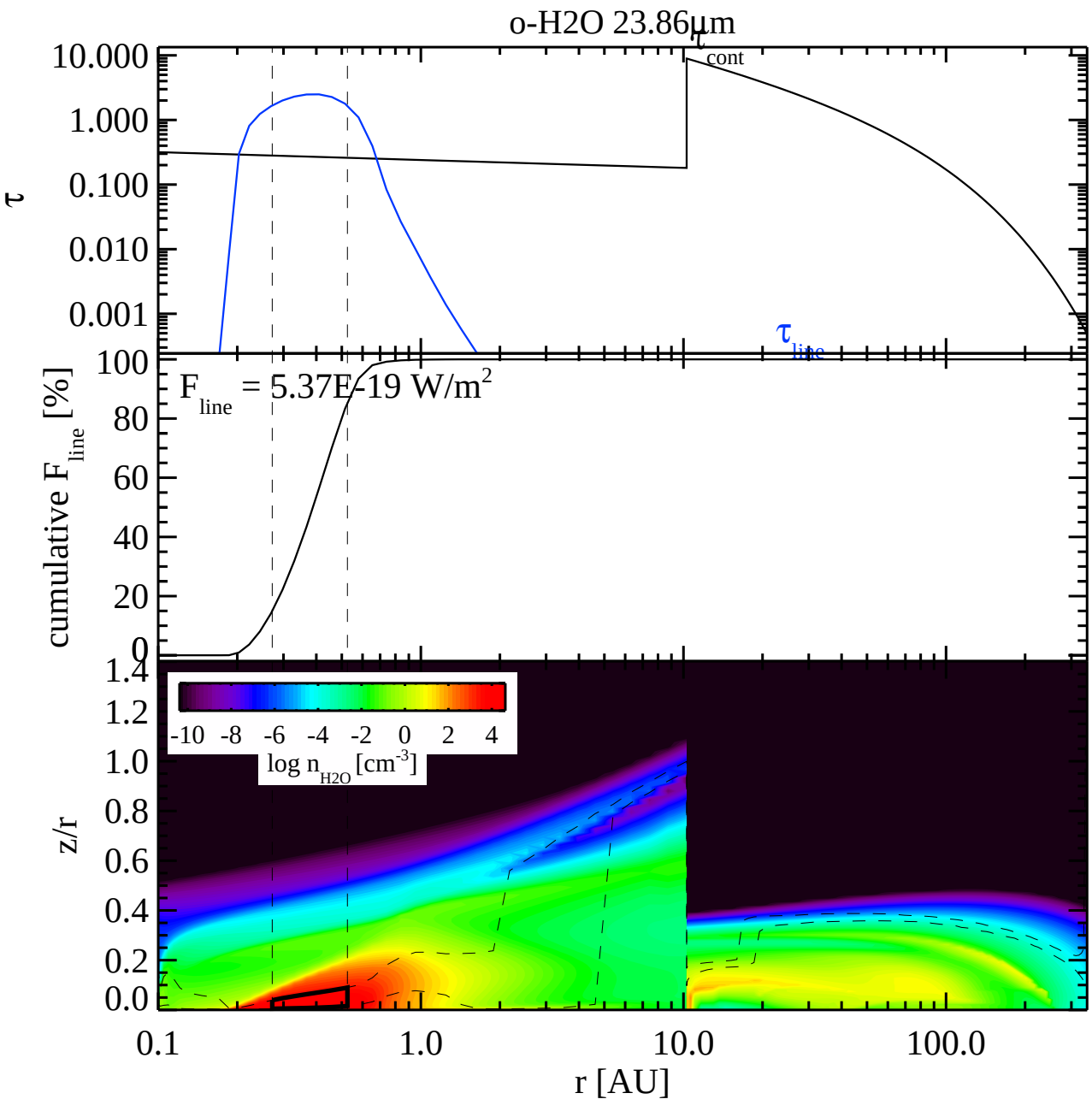

o-H2O 71.95µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 2.15E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n H2O [cm-3]
0.1
1.0
10.0
100.0
r [AU]

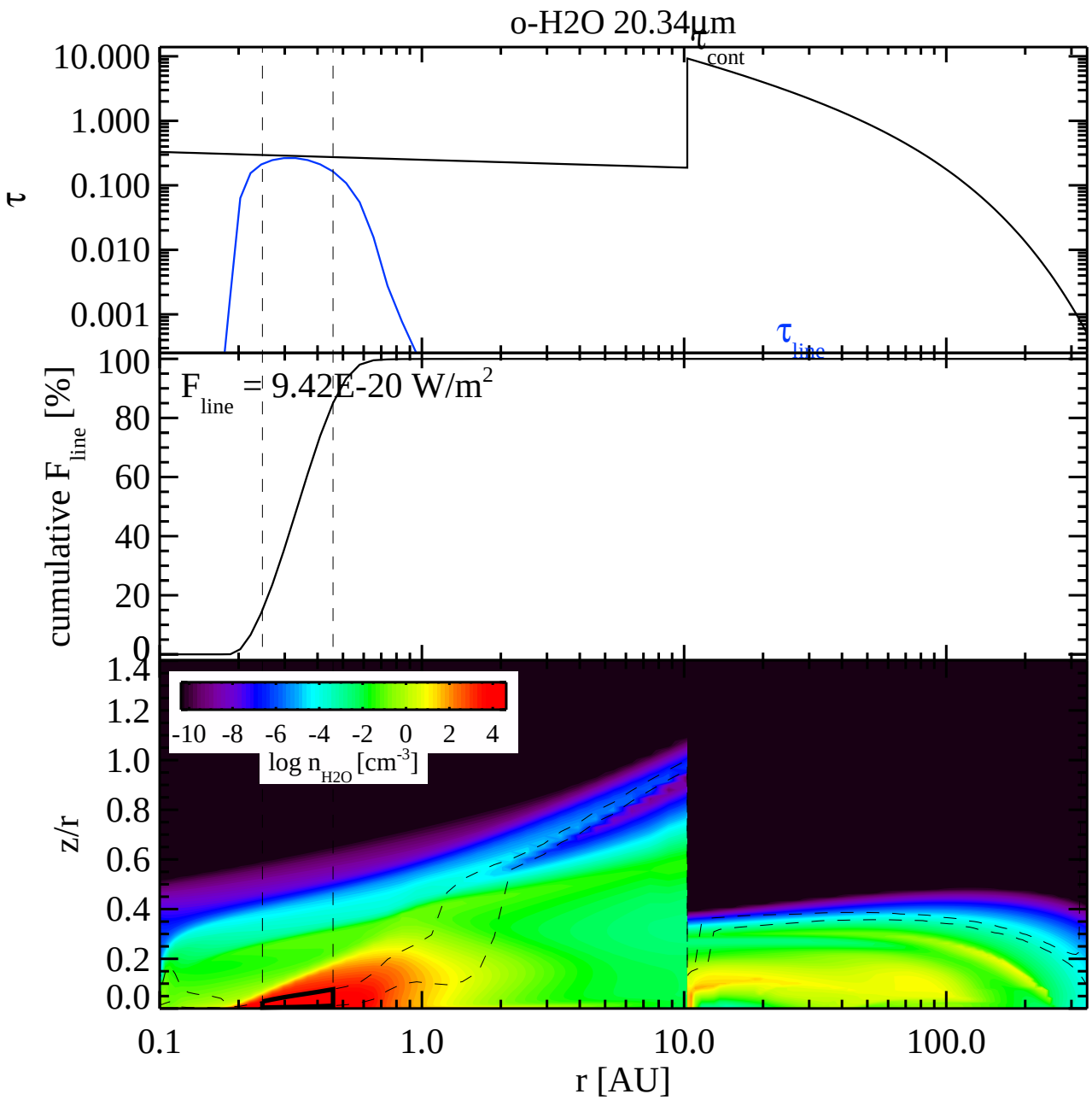

o-H2O 63.32µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 2.28E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n H2O [cm-3]
0.1
1.0
10.0
100.0
r [AU]

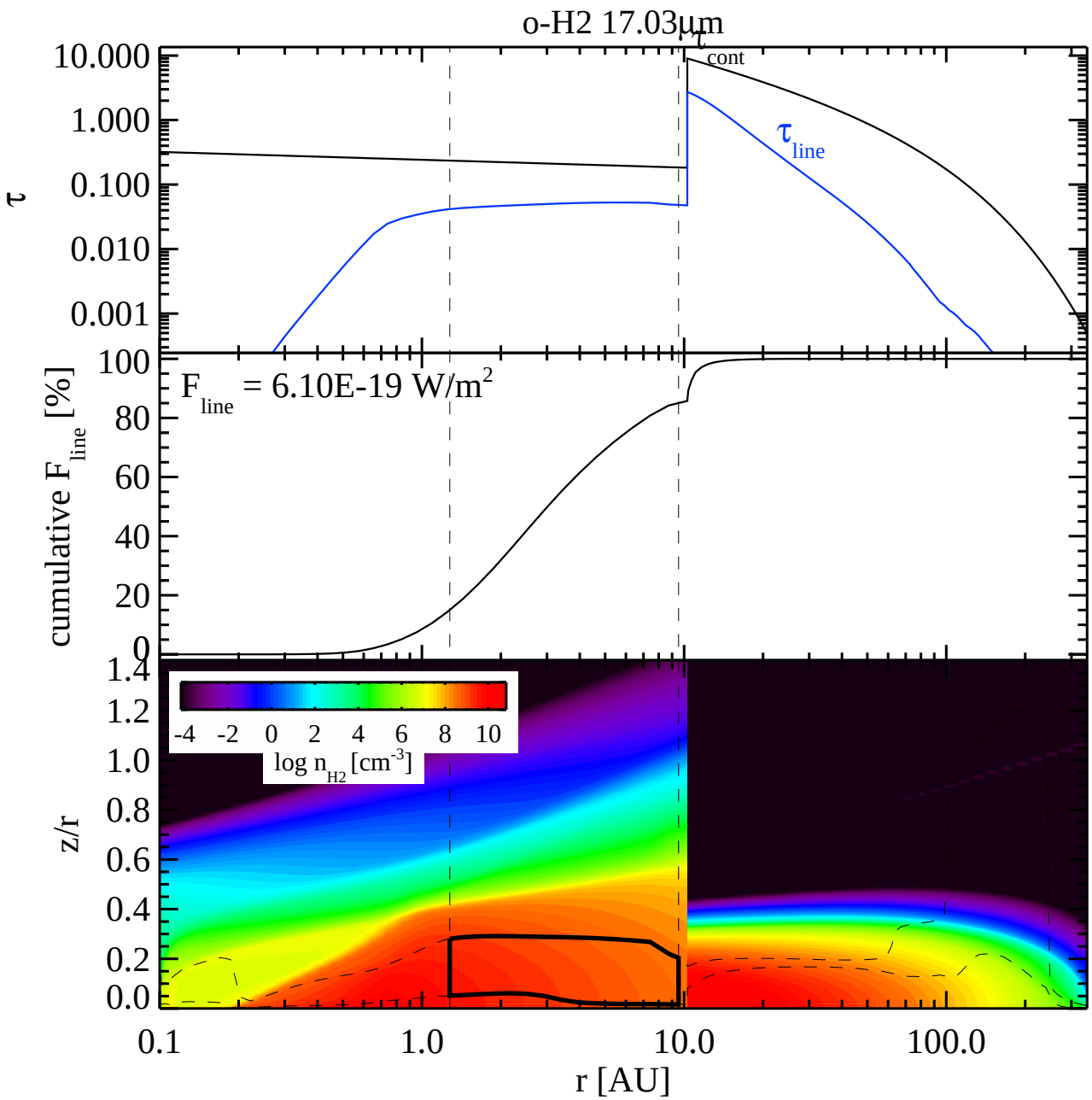

o-H2O 30.87µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 7.42E-19 W/m2
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
z/r
-10 -8 -6 -4 -2 0 2 4
log n H2O [cm-3]
0.1
1.0
10.0
100.0
r [AU]

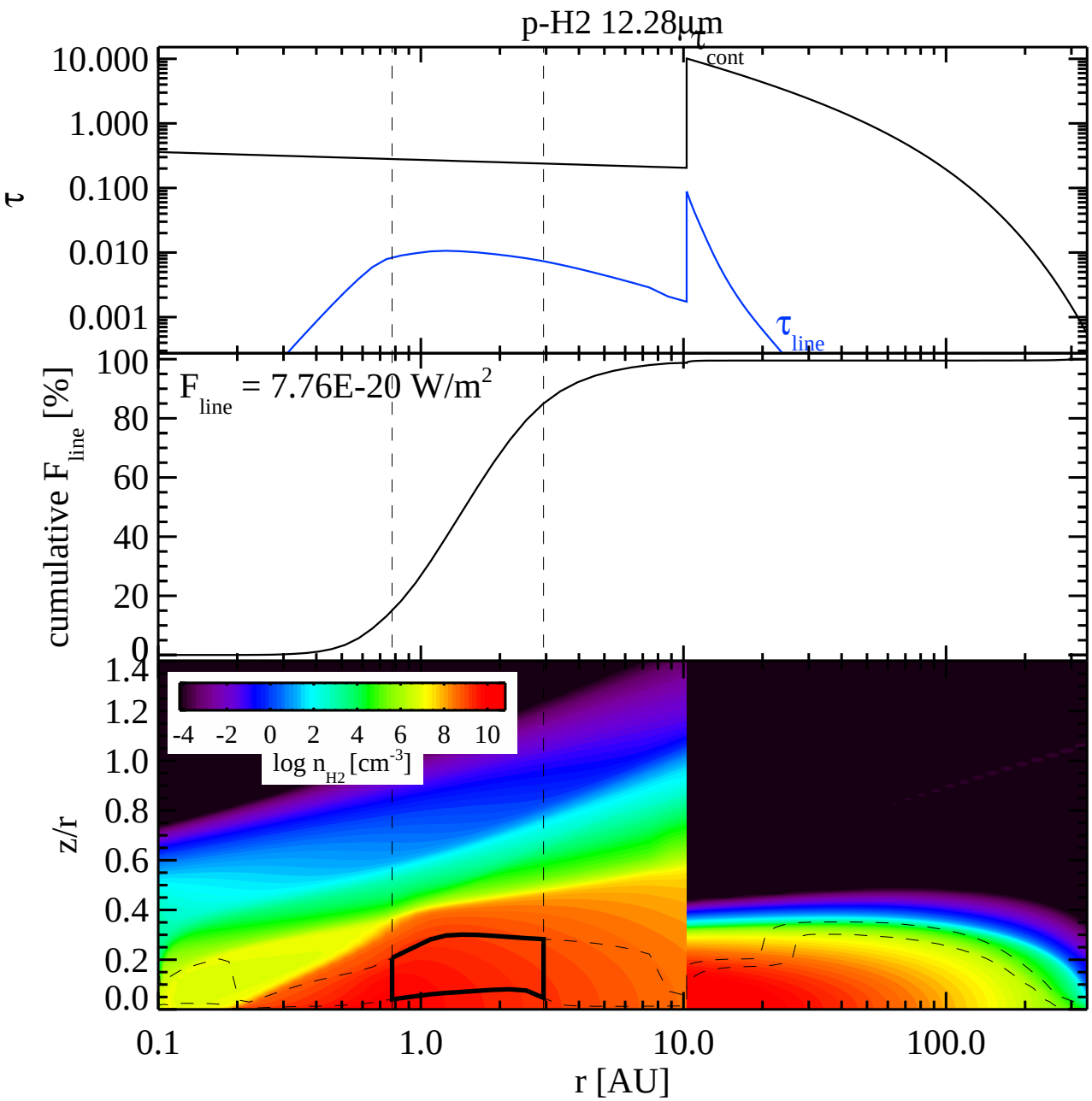

o-H2O 30.53µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 9.08E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n H2O [cm-3]
0.1
1.0
10.0
100.0
r [AU]

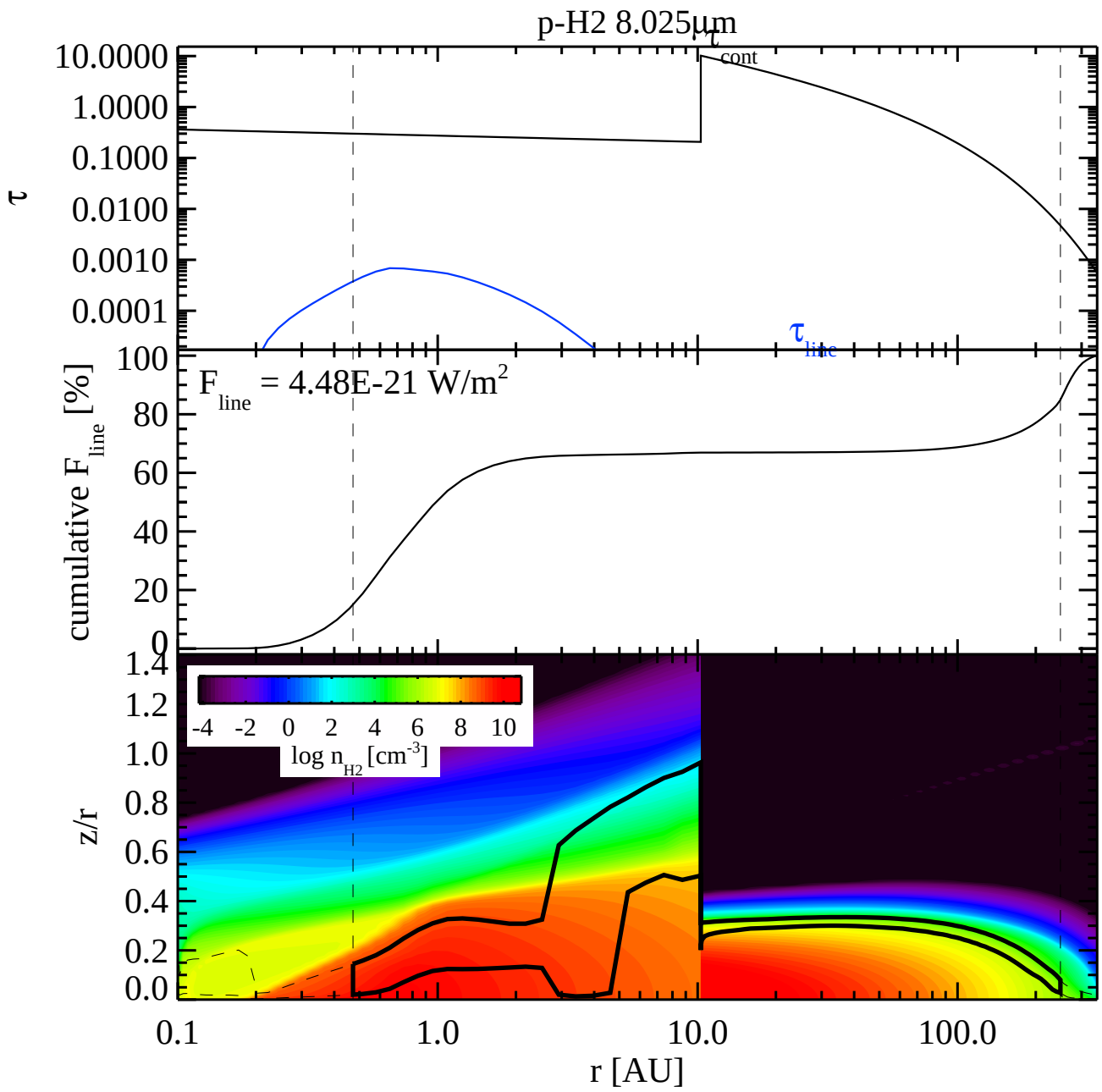

o-H2O 25.37µm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 7.28E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-10 -8 -6 -4 -2 0 2 4
log n H2O [cm-3]
0.1
1.0
10.0
100.0
r [AU]

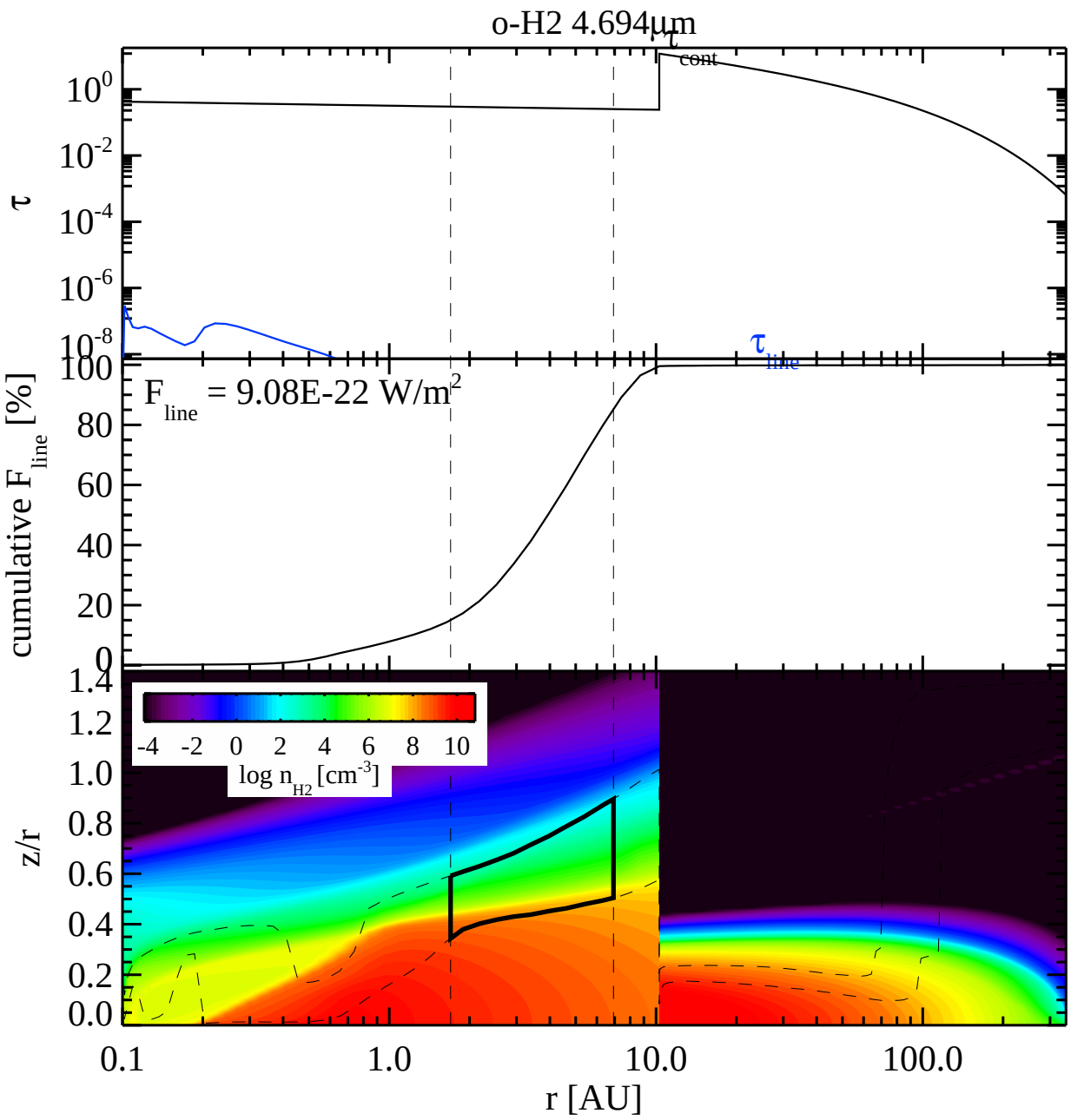

o-H2O 23.86µm
τ_cont
τ_line
τ
10.000
1.000
0.100
0.010
0.001
F_line = 5.37E-19 W/m²
cumulative F_line [%]
100
80
60
40
20
0
-10 -8 -6 -4 -2 0 2 4
log n_H2O [cm⁻³]
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.1
1.0
10.0
100.0
r [AU]

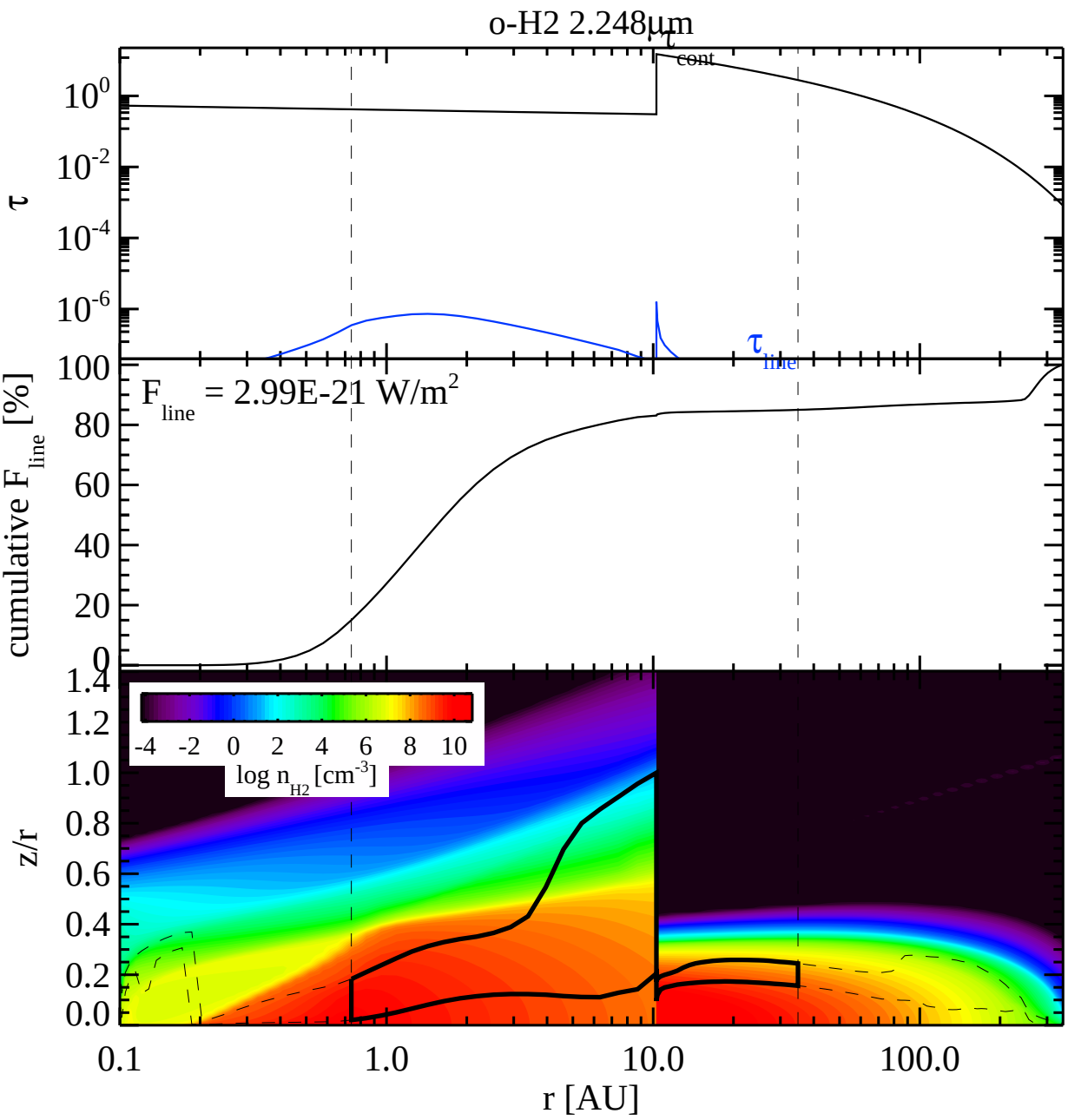

o-H2O 20.34µm
τ cont
τ line
τ
10.000
1.000
0.100
0.010
0.001
F line = 9.42E-20 W/m2
cumulative F line [%]
100
80
60
40
20
0
log n H2O [cm-3]
-10 -8 -6 -4 -2 0 2 4
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.1
1.0
10.0
100.0
r [AU]


o-H2 17.03μm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 6.10E-19 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-4 -2 0 2 4 6 8 10
log n H2 [cm-3]
0.1
1.0
10.0
100.0
r [AU]

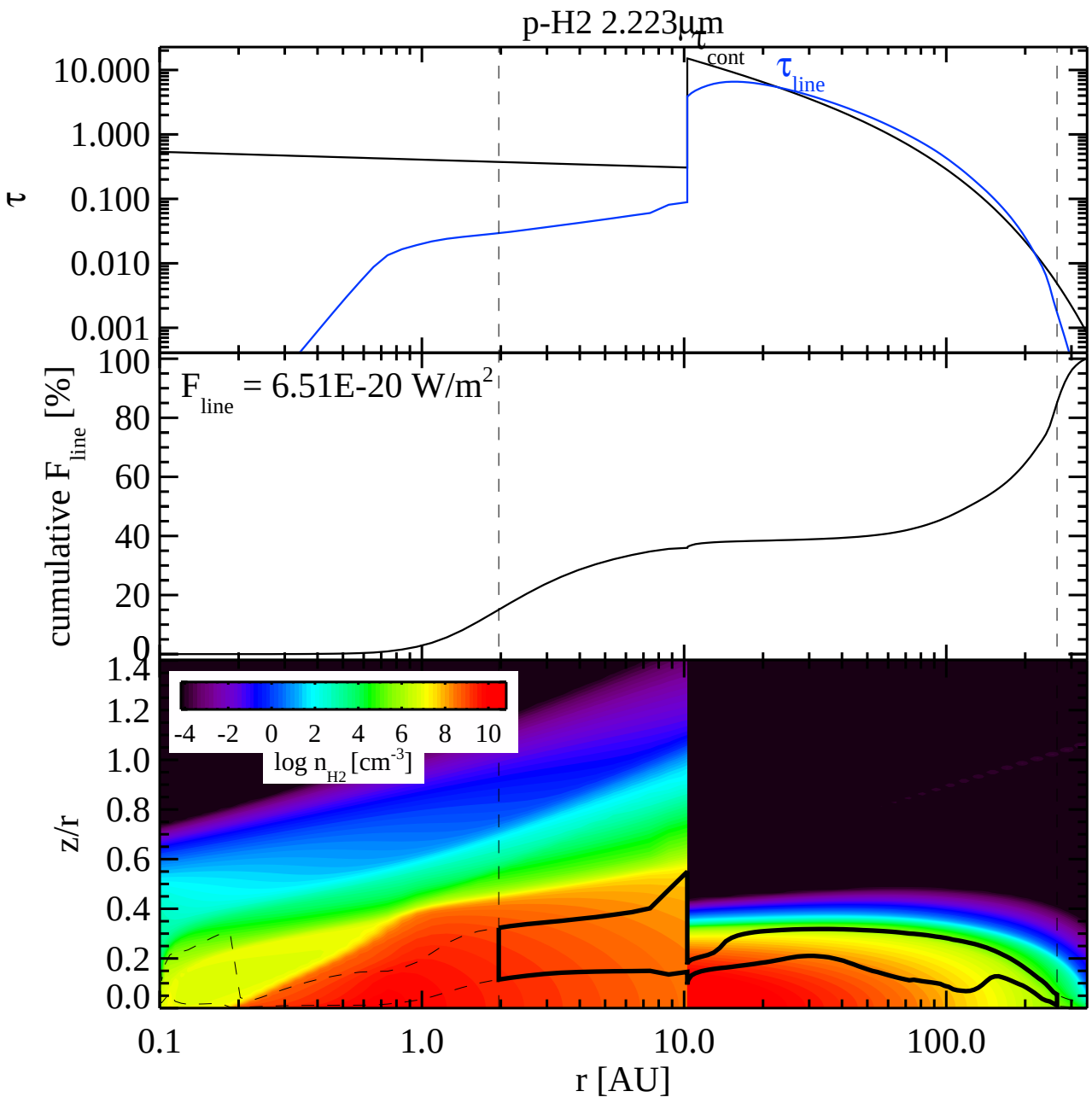

p-H2 12.28μm
τ
10.000
1.000
0.100
0.010
0.001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 7.76E-20 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-4 -2 0 2 4 6 8 10
log n H2 [cm-3]
0.1
1.0
10.0
100.0
r [AU]

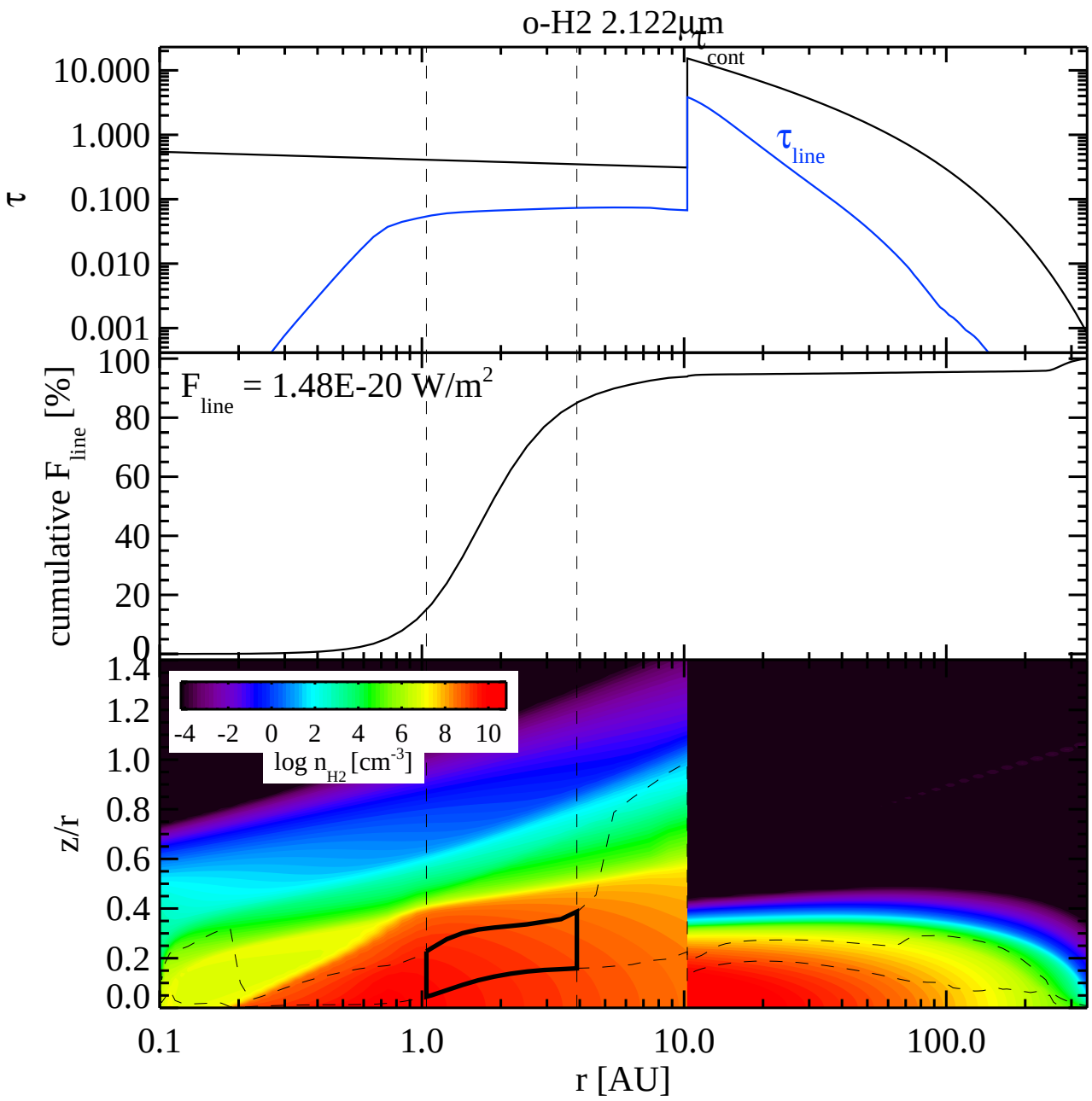

p-H2 8.025µm
τ
10.0000
1.0000
0.1000
0.0100
0.0010
0.0001
τ cont
τ line
cumulative F line [%]
100
80
60
40
20
0
F line = 4.48E-21 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-4 -2 0 2 4 6 8 10
log n H2 [cm-3]
0.1
1.0
10.0
100.0
r [AU]

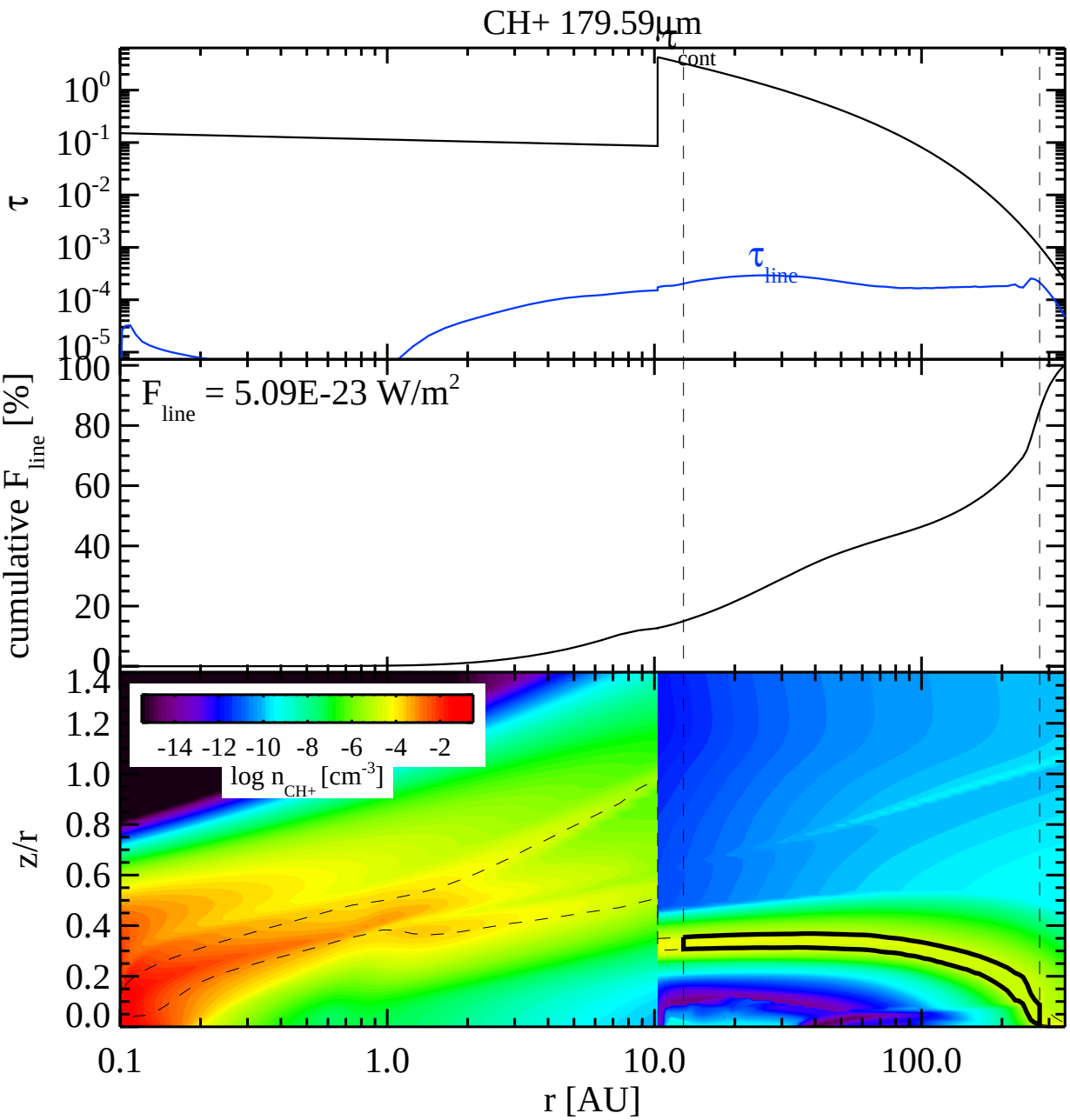

o-H2 4.694μm
τ
cont
τ
line
10^0
10^-2
10^-4
10^-6
10^-8
cumulative F line [%]
F line = 9.08E-22 W/m^2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-4 -2 0 2 4 6 8 10
log n H2 [cm^-3]
0.1
1.0
10.0
100.0
r [AU]

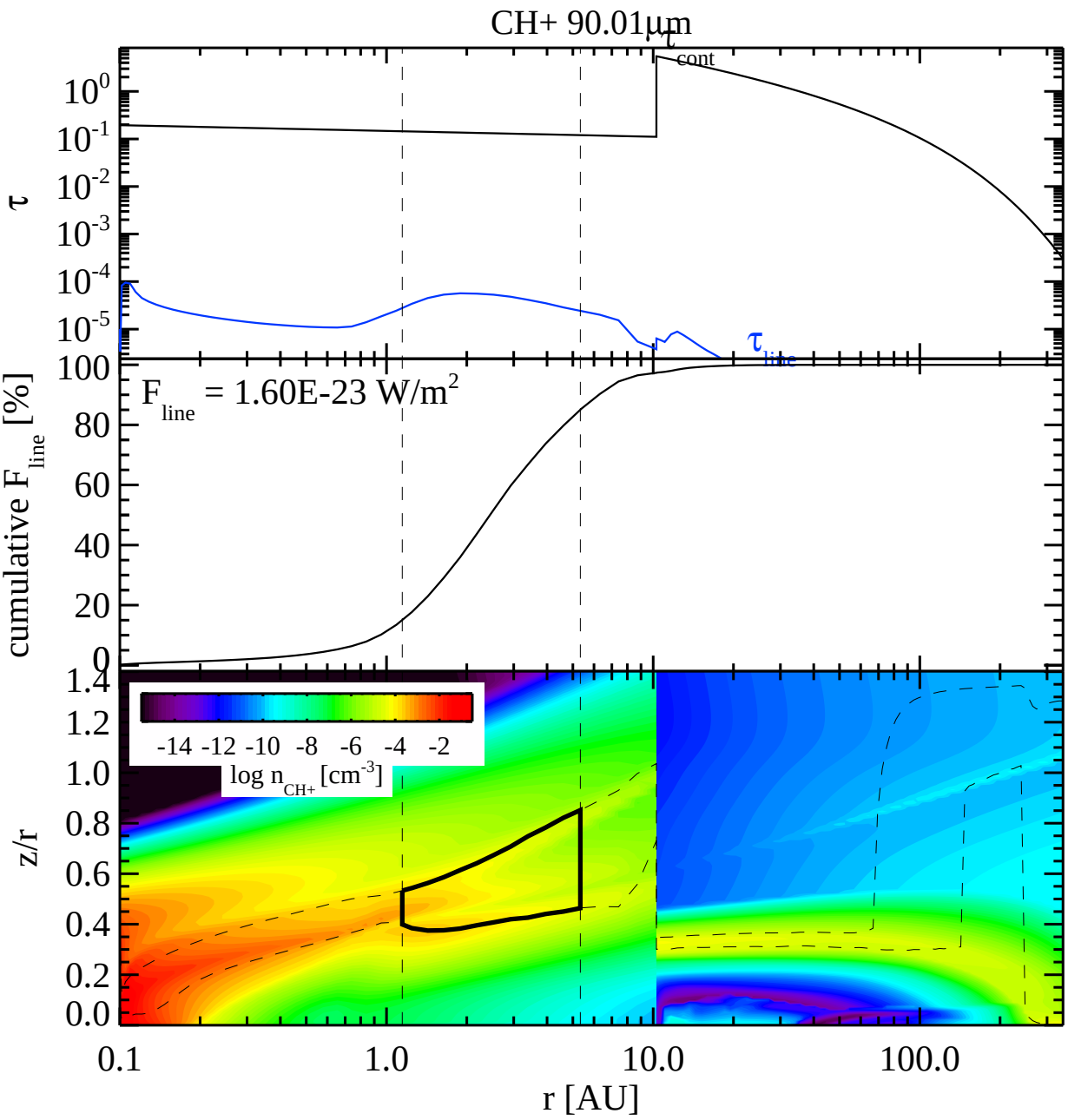


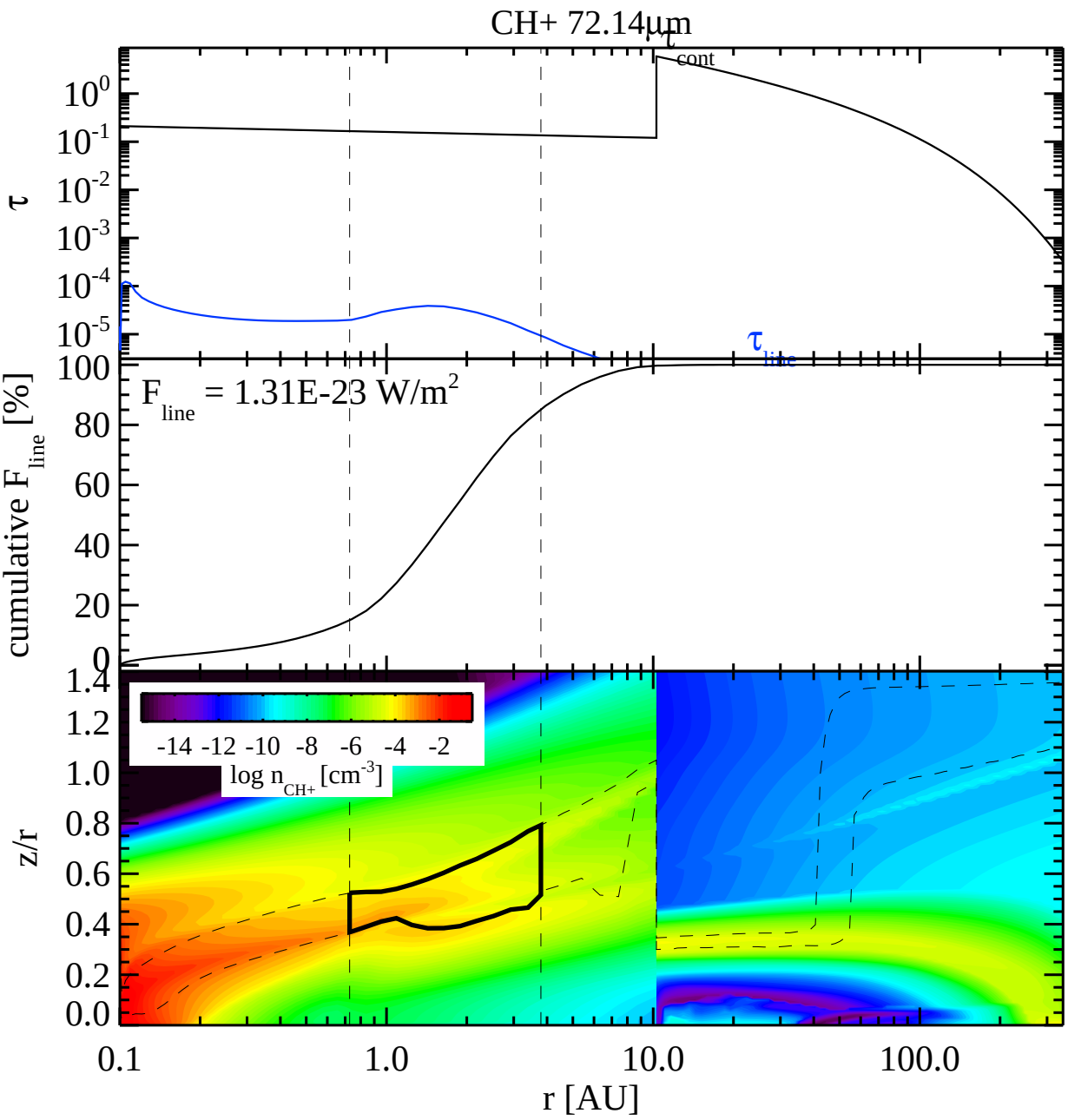
o-H2 2.248μm
τ
$\tau_{cont}$
$\tau_{line}$
$10^0$
$10^{-2}$
$10^{-4}$
$10^{-6}$
cumulative $F_{line}$ [%]
$F_{line}$ = 2.99E-21 W/m$^2$
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-4 -2 0 2 4 6 8 10
log $n_{H2}$ [cm$^{-3}$]
0.1
1.0
10.0
100.0
r [AU]

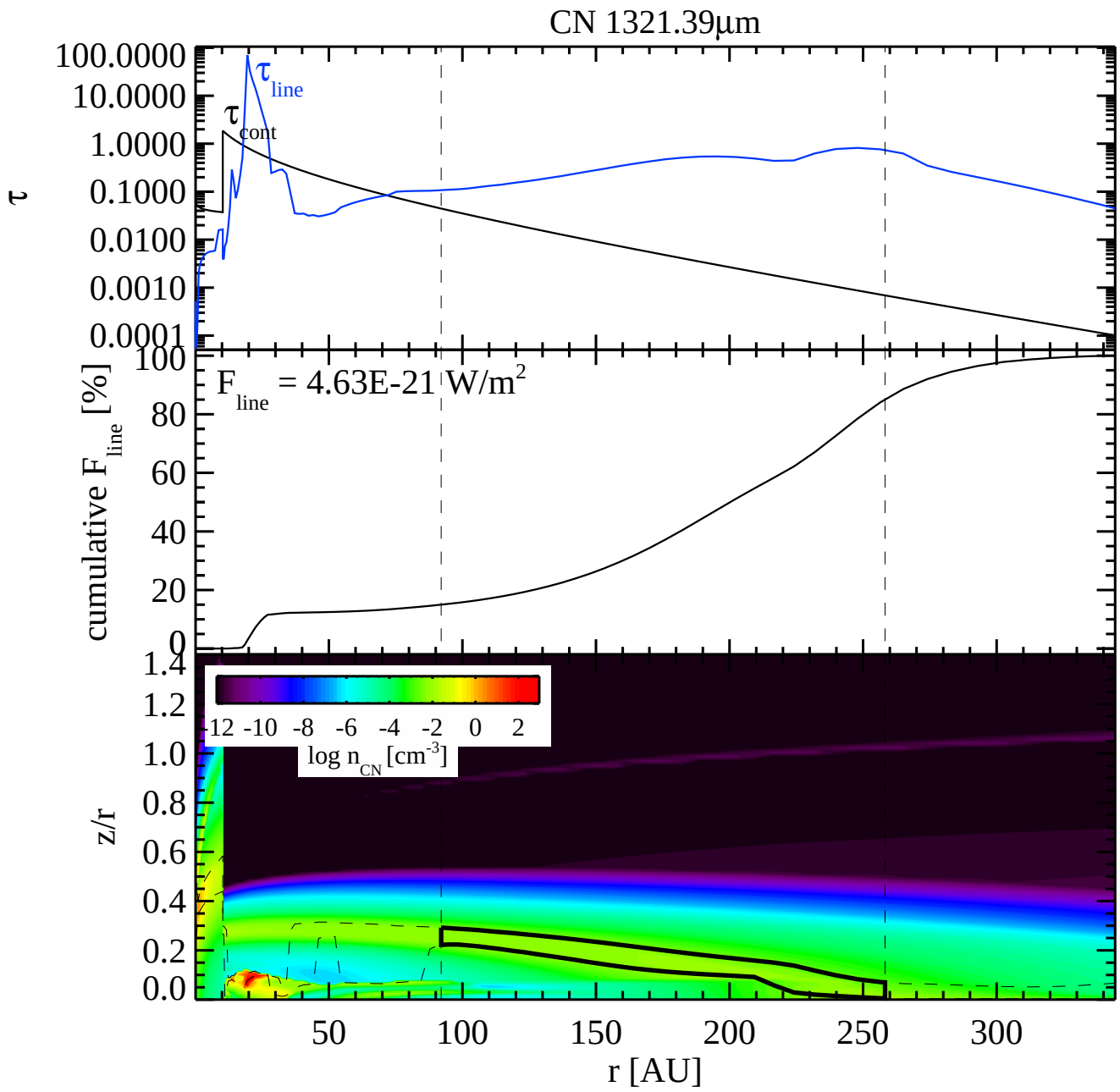

p-H2 2.223µm
τ cont
τ line
τ
10.000
1.000
0.100
0.010
0.001
F line = 6.51E-20 W/m2
cumulative F line [%]
100
80
60
40
20
0
log n H2 [cm-3]
-4 -2 0 2 4 6 8 10
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.1
1.0
10.0
100.0
r [AU]

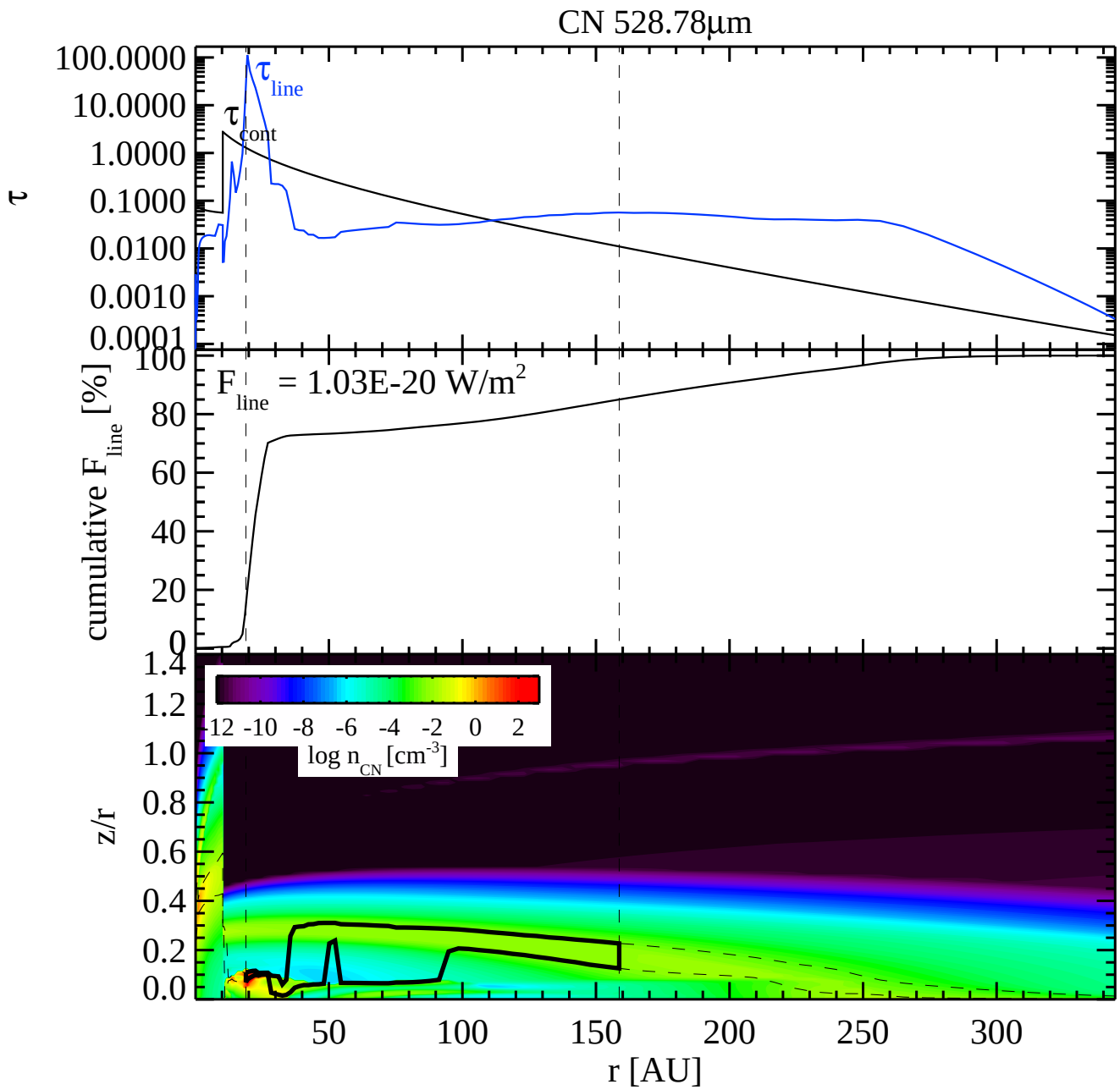

o-H2 2.122μm
τ cont
τ line
τ
10.000
1.000
0.100
0.010
0.001
F line = 1.48E-20 W/m2
cumulative F line [%]
100
80
60
40
20
0
-4 -2 0 2 4 6 8 10
log n H2 [cm-3]
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.1
1.0
10.0
100.0
r [AU]

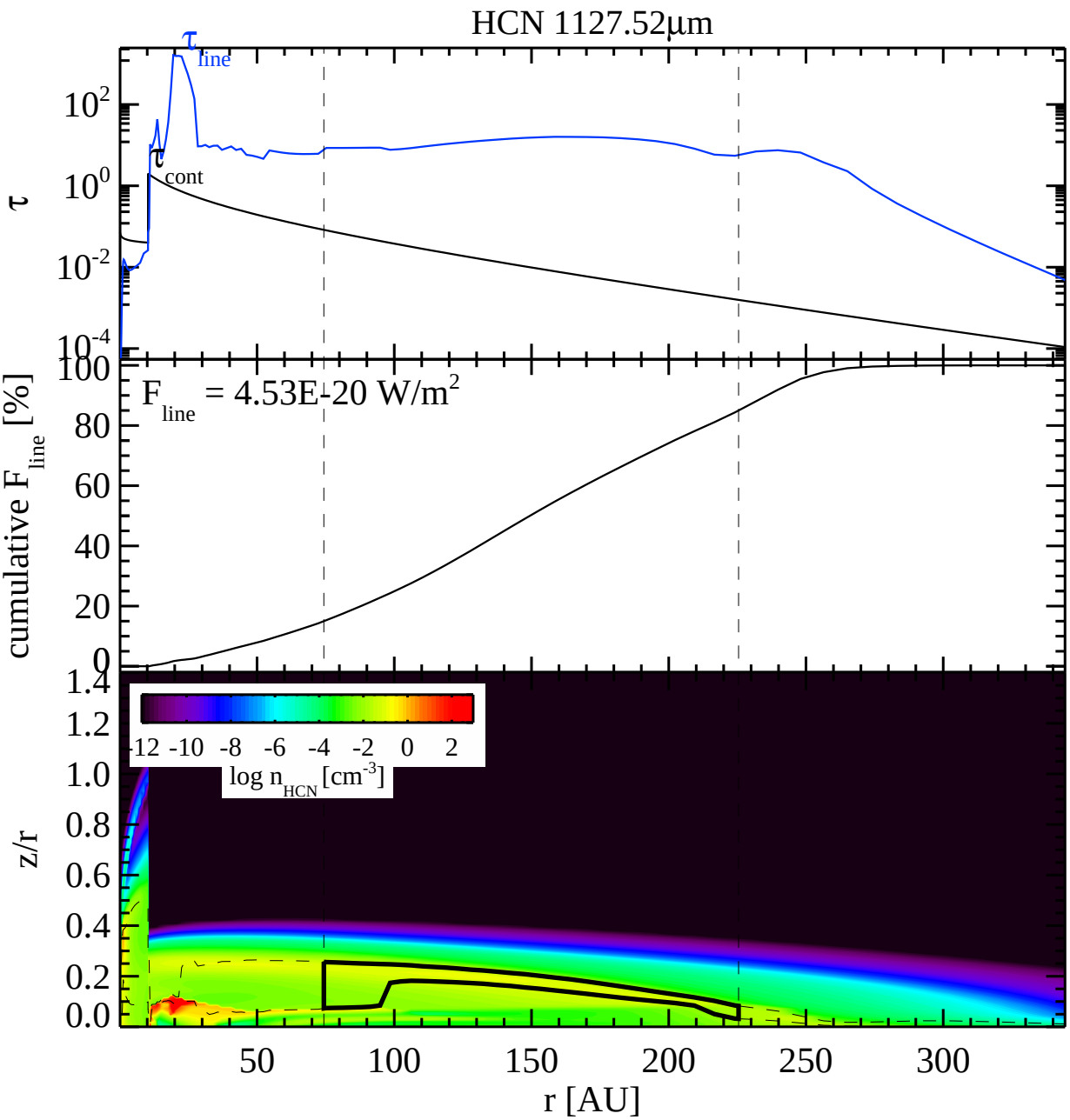

CH+ 179.59µm
τ
cont
τ
line
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
cumulative F_line [%]
F_line = 5.09E-23 W/m^2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-14 -12 -10 -8 -6 -4 -2
log n_CH+ [cm^-3]
0.1
1.0
10.0
100.0
r [AU]

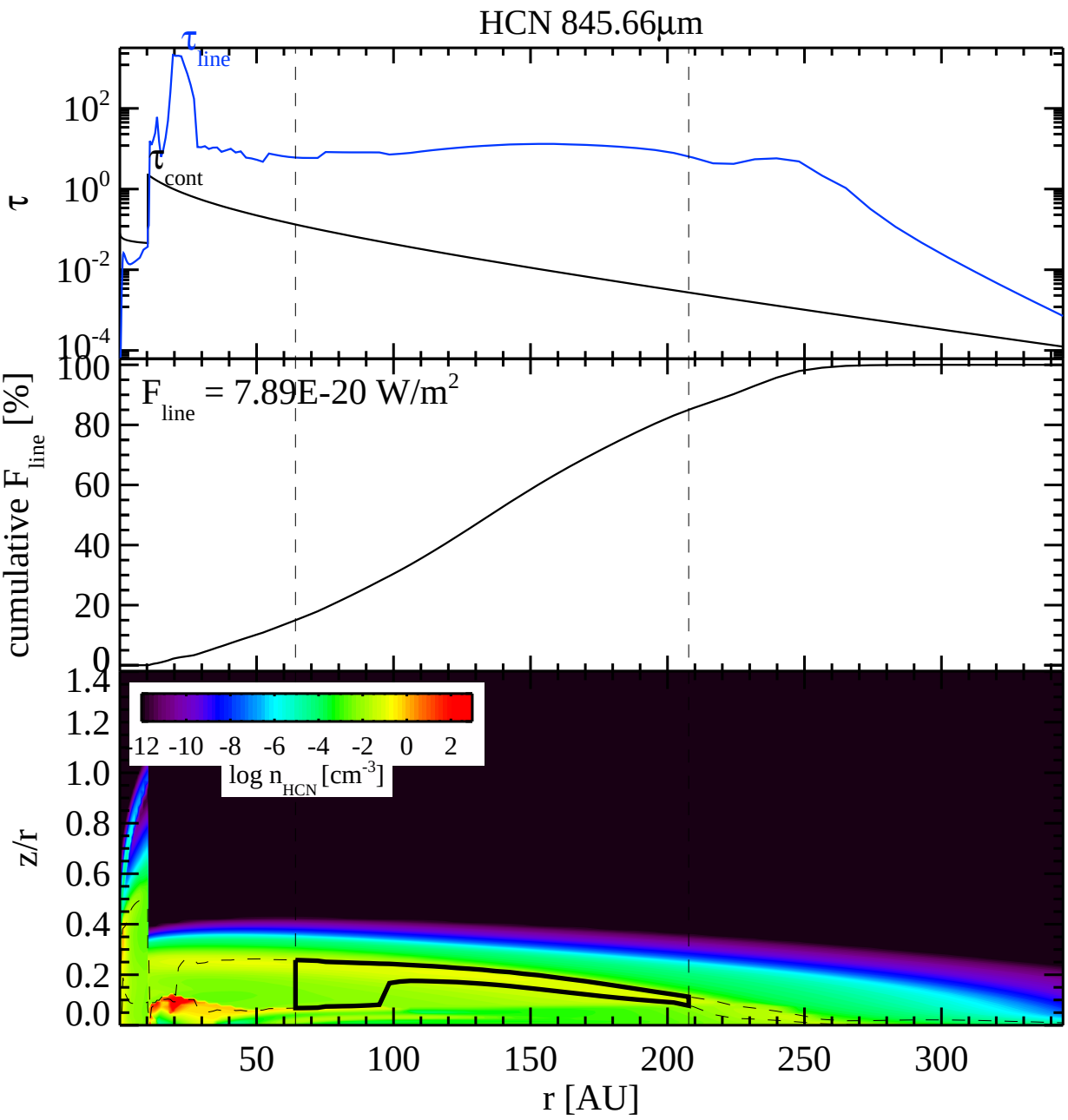

CH+ 90.01μm
τ
τ cont
τ line
cumulative F line [%]
F line = 1.60E-23 W/m2
-14 -12 -10 -8 -6 -4 -2
log n CH+ [cm-3]
z/r
r [AU]

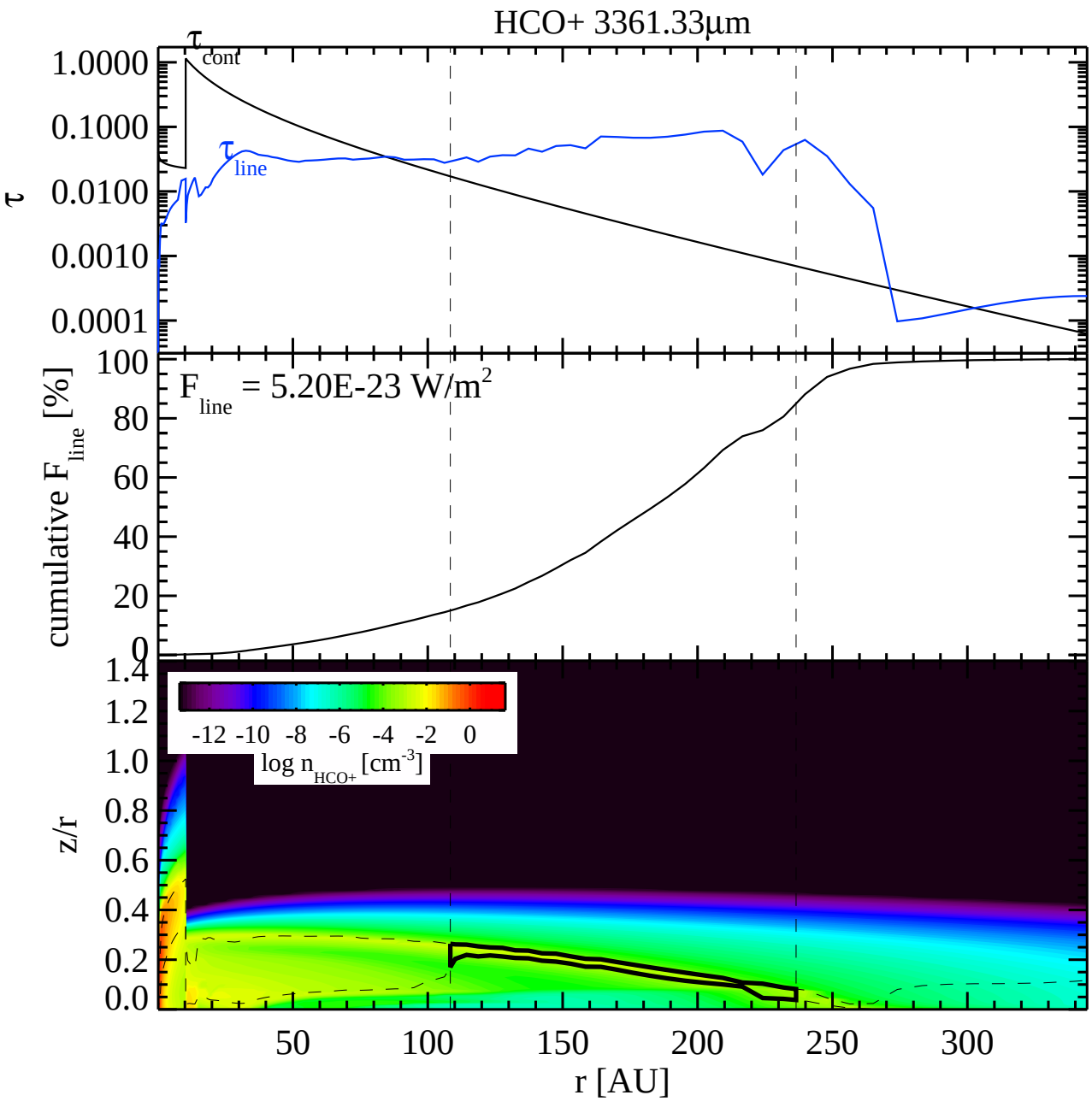

CH+ 72.14μm
τ_cont
τ_line
τ
cumulative F_line [%]
F_line = 1.31E-23 W/m²
-14 -12 -10 -8 -6 -4 -2
log n_CH+ [cm⁻³]
z/r
r [AU]
0.1
1.0
10.0
100.0

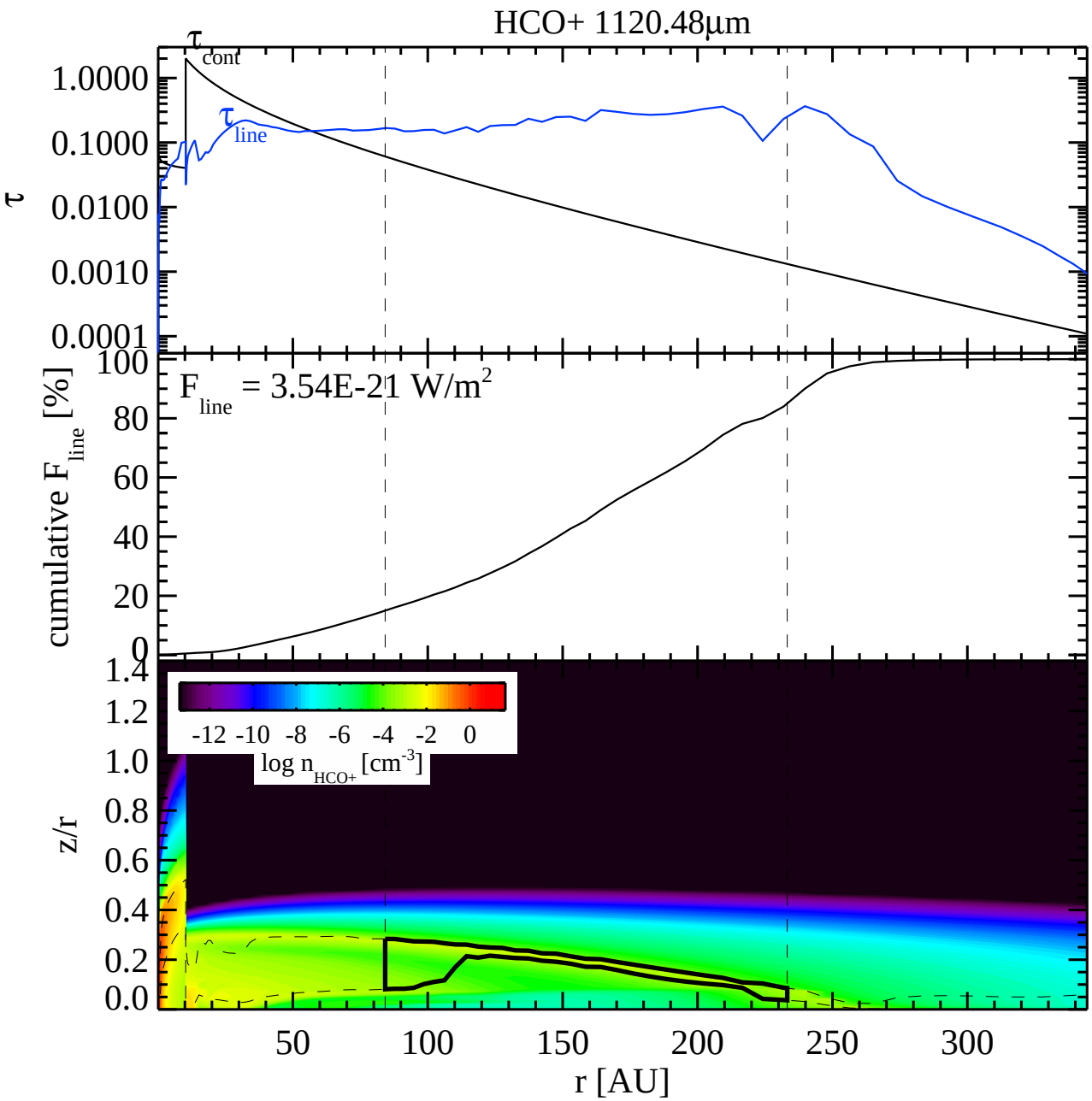

CN 1321.39µm
τ
100.0000
10.0000
1.0000
0.1000
0.0100
0.0010
0.0001
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 4.63E-21 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-12 -10 -8 -6 -4 -2 0 2
log n CN [cm-3]
50
100
150
200
250
300
r [AU]

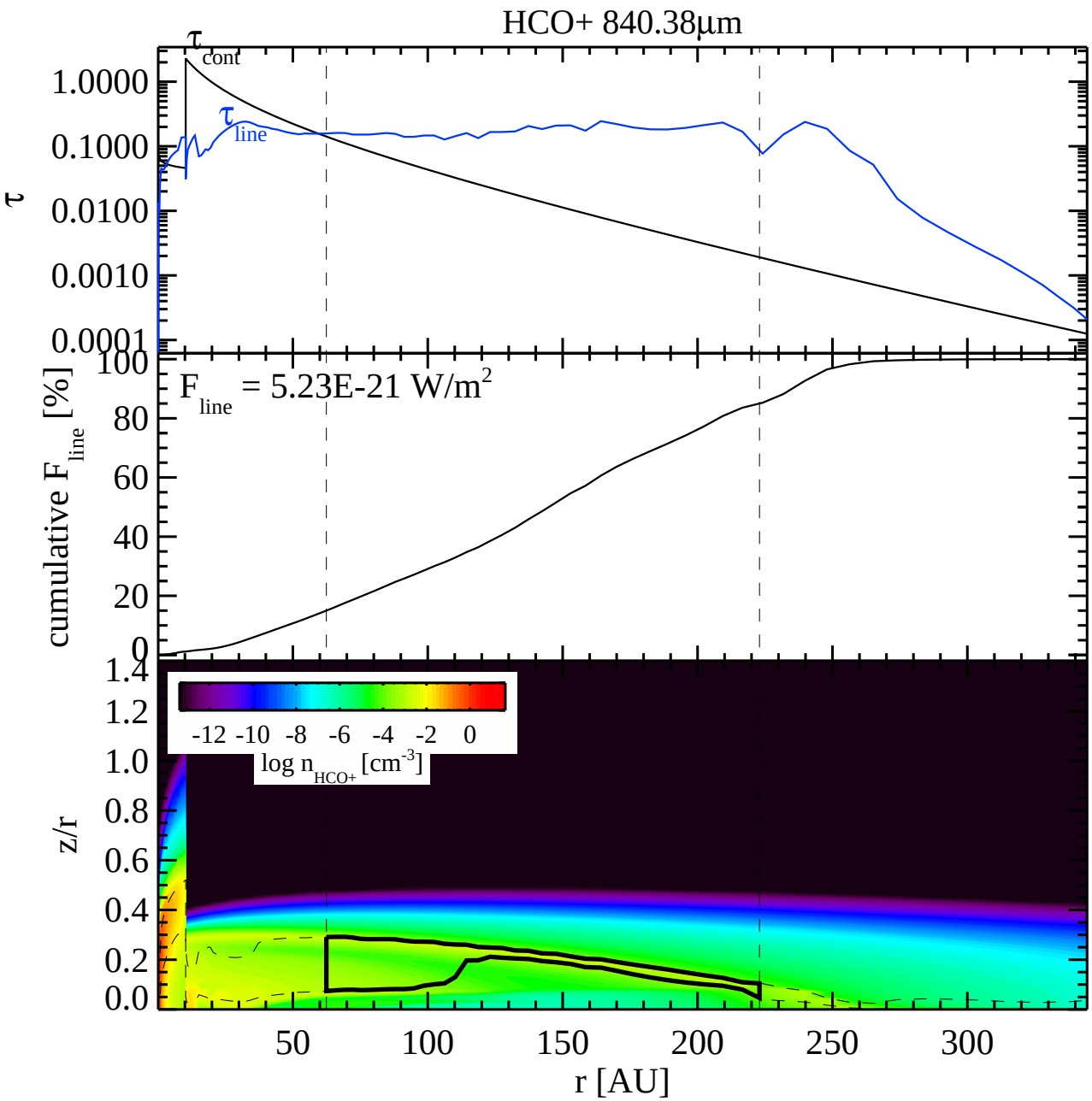

CN 528.78µm
τ
100.0000
10.0000
1.0000
0.1000
0.0100
0.0010
0.0001
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 1.03E-20 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-12 -10 -8 -6 -4 -2 0 2
log n CN [cm-3]
50
100
150
200
250
300
r [AU]

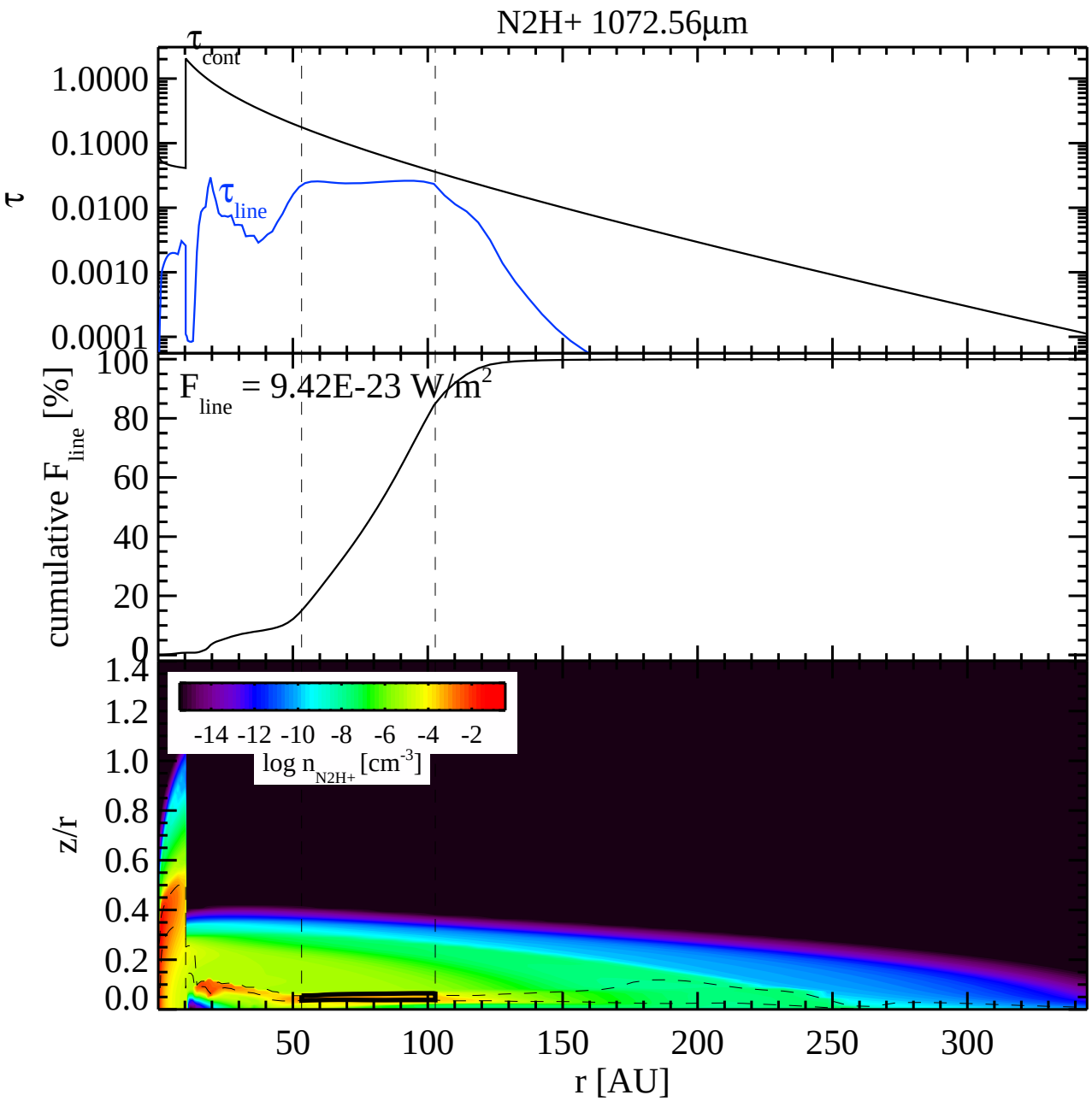

HCN 1127.52µm
τ line
τ cont
τ
10^2
10^0
10^-2
10^-4
F line = 4.53E-20 W/m^2
cumulative F line [%]
100
80
60
40
20
0
-12 -10 -8 -6 -4 -2 0 2
log n HCN [cm^-3]
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
50
100
150
200
250
300
r [AU]

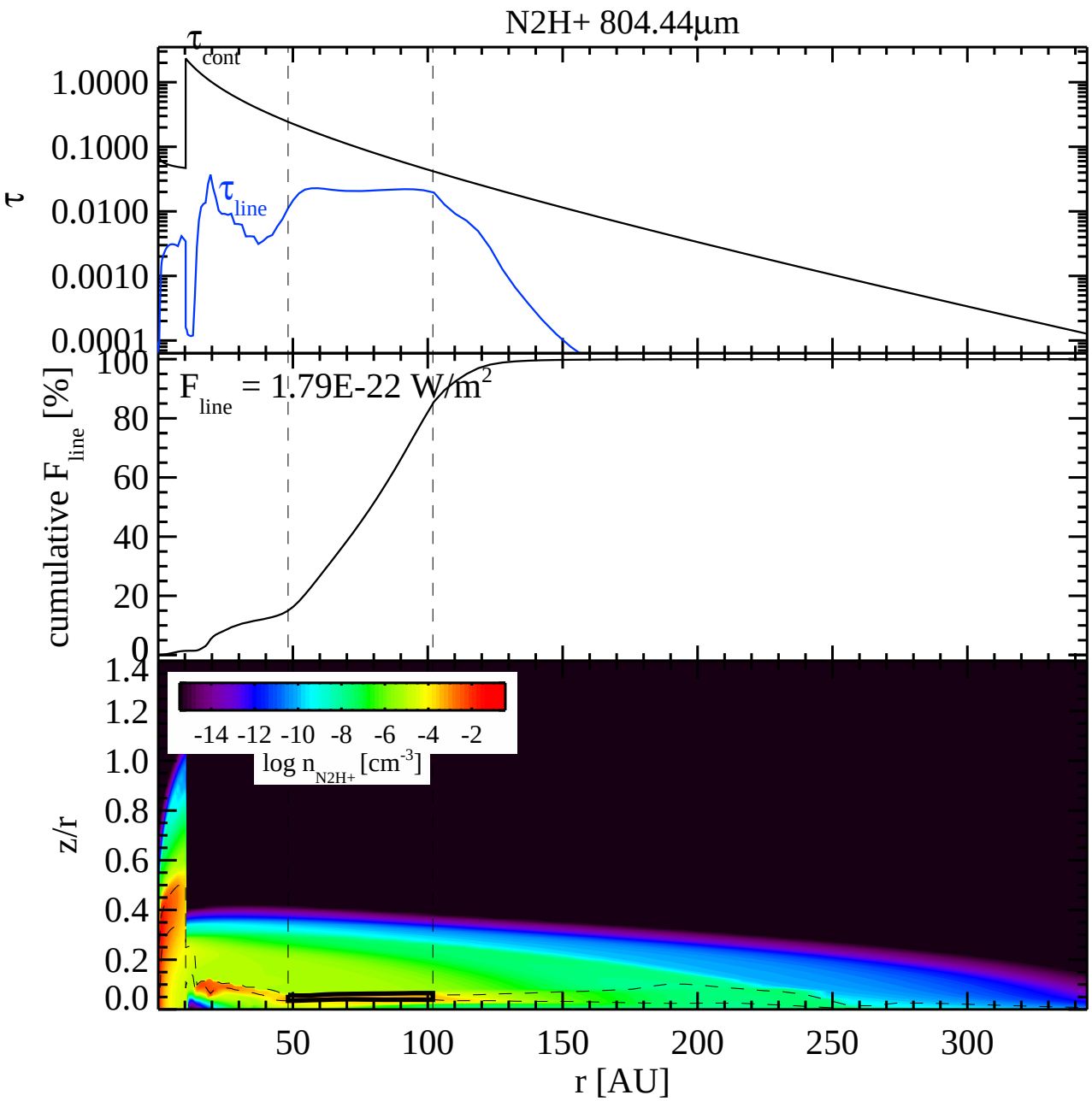

HCN 845.66µm
τ line
τ cont
τ
F line = 7.89E-20 W/m2
cumulative F line [%]
log n HCN [cm-3]
-12 -10 -8 -6 -4 -2 0 2
z/r
r [AU]
50 100 150 200 250 300

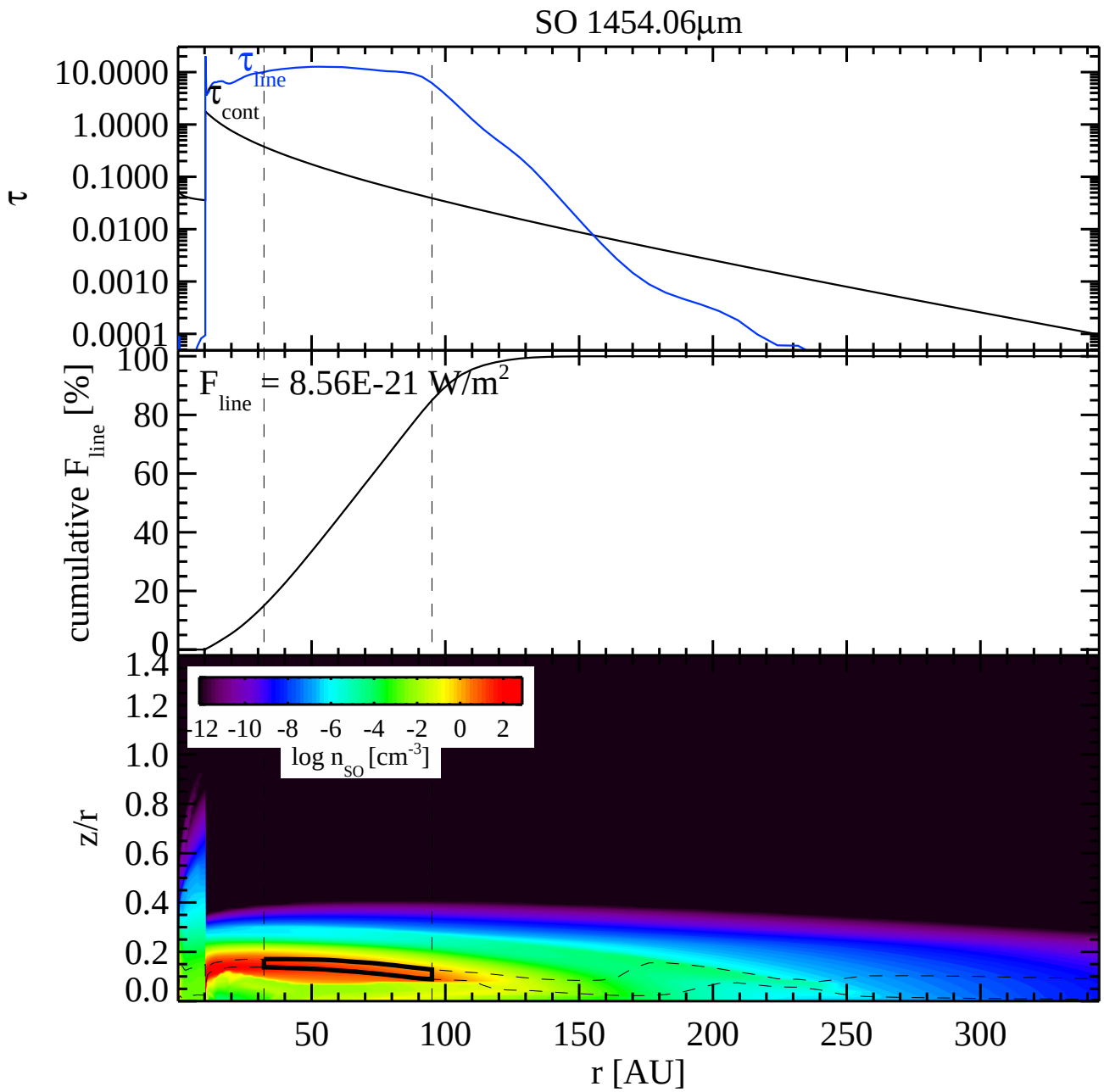

HCO+ 3361.33µm
τ
τ cont
τ line
1.0000
0.1000
0.0100
0.0010
0.0001
cumulative F line [%]
F line = 5.20E-23 W/m2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-12 -10 -8 -6 -4 -2 0
log n HCO+ [cm-3]
50
100
150
200
250
300
r [AU]

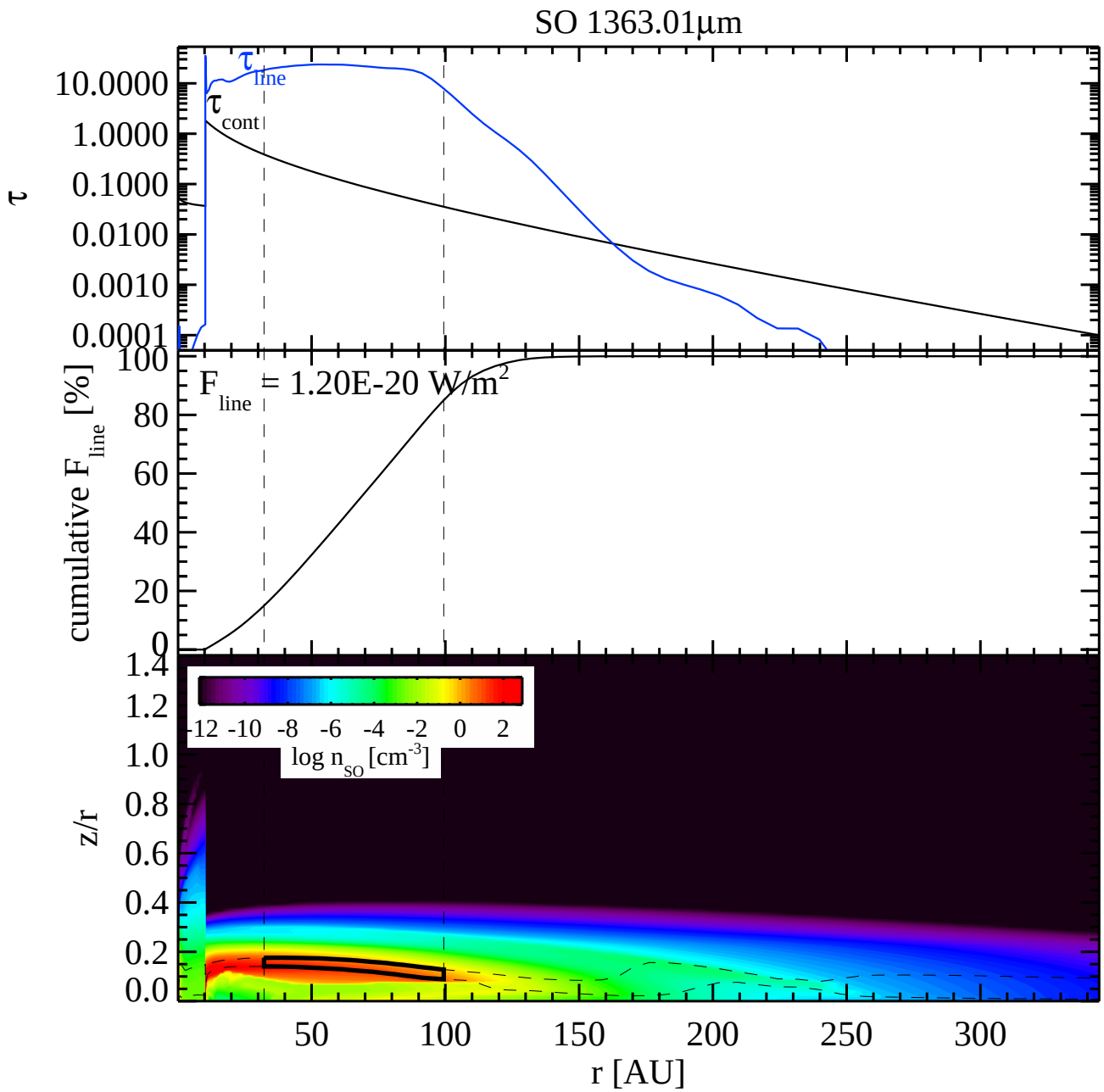

HCO+ 1120.48µm
τ cont
τ line
τ
1.0000
0.1000
0.0100
0.0010
0.0001
F line = 3.54E-21 W/m2
cumulative F line [%]
100
80
60
40
20
0
-12 -10 -8 -6 -4 -2 0
log n HCO+ [cm-3]
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
50
100
150
200
250
300
r [AU]

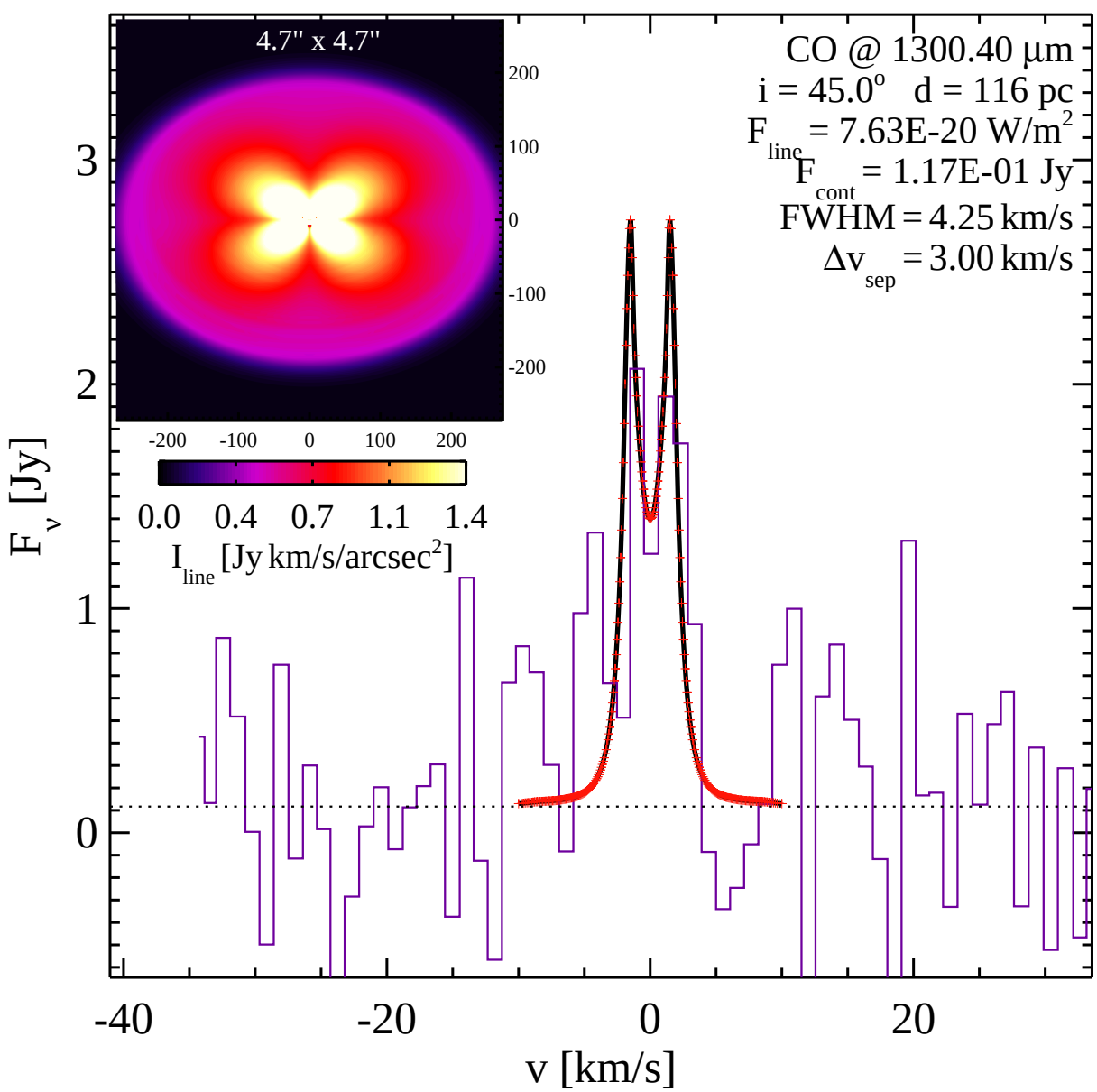

HCO+ 840.38µm
τ cont
τ line
τ
1.0000
0.1000
0.0100
0.0010
0.0001
F line = 5.23E-21 W/m2
cumulative F line [%]
100
80
60
40
20
0
-12 -10 -8 -6 -4 -2 0
log n HCO+ [cm-3]
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
50
100
150
200
250
300
r [AU]

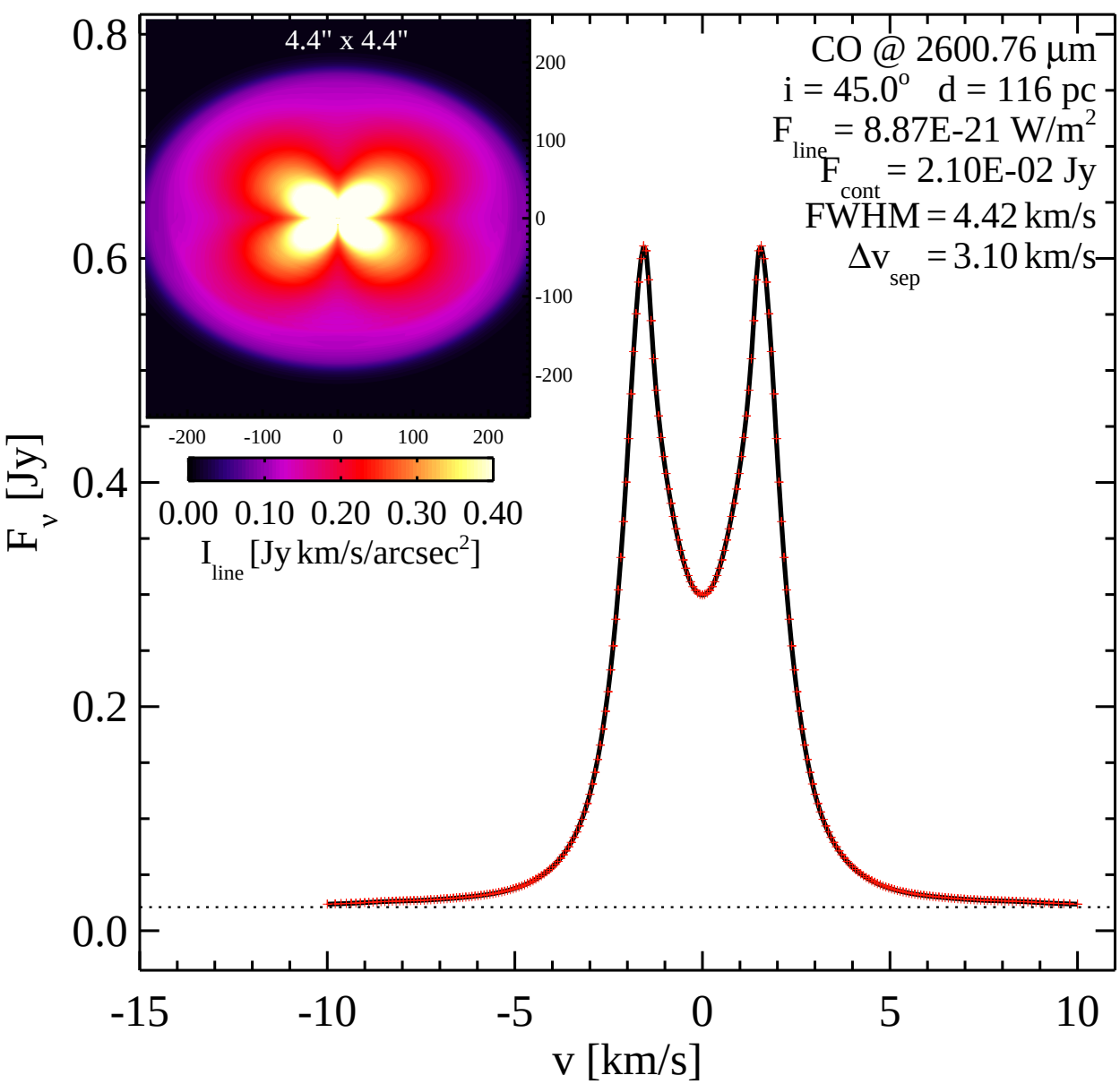

N2H+ 1072.56µm
τ cont
τ line
τ
1.0000
0.1000
0.0100
0.0010
0.0001
F line = 9.42E-23 W/m2
cumulative F line [%]
100
80
60
40
20
0
-14 -12 -10 -8 -6 -4 -2
log n N2H+ [cm-3]
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
50
100
150
200
250
300
r [AU]

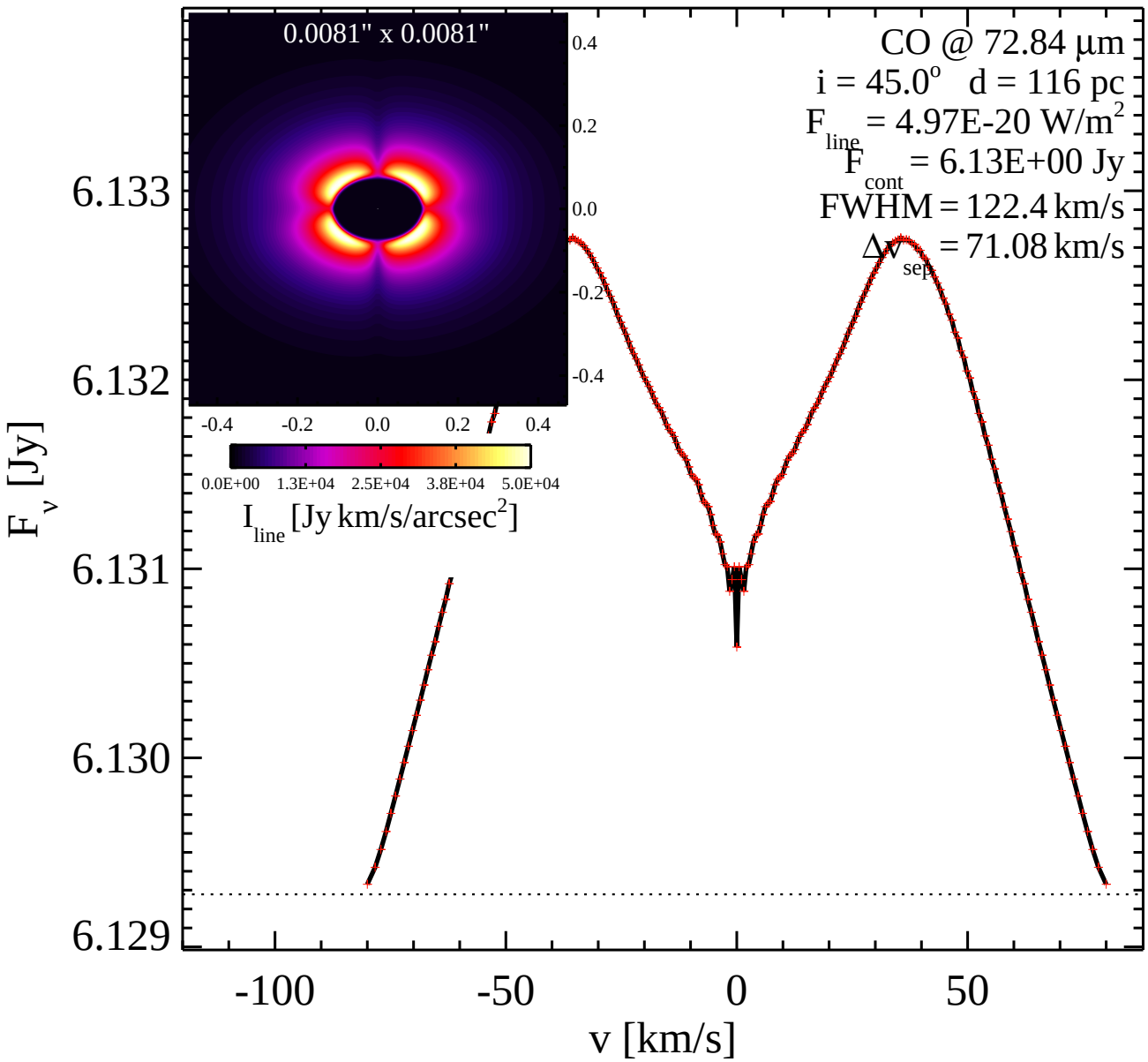

N2H+ 804.44µm
τ cont
τ line
τ
1.0000
0.1000
0.0100
0.0010
0.0001
F line = 1.79E-22 W/m2
cumulative F line [%]
100
80
60
40
20
0
-14 -12 -10 -8 -6 -4 -2
log n N2H+ [cm-3]
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
50
100
150
200
250
300
r [AU]

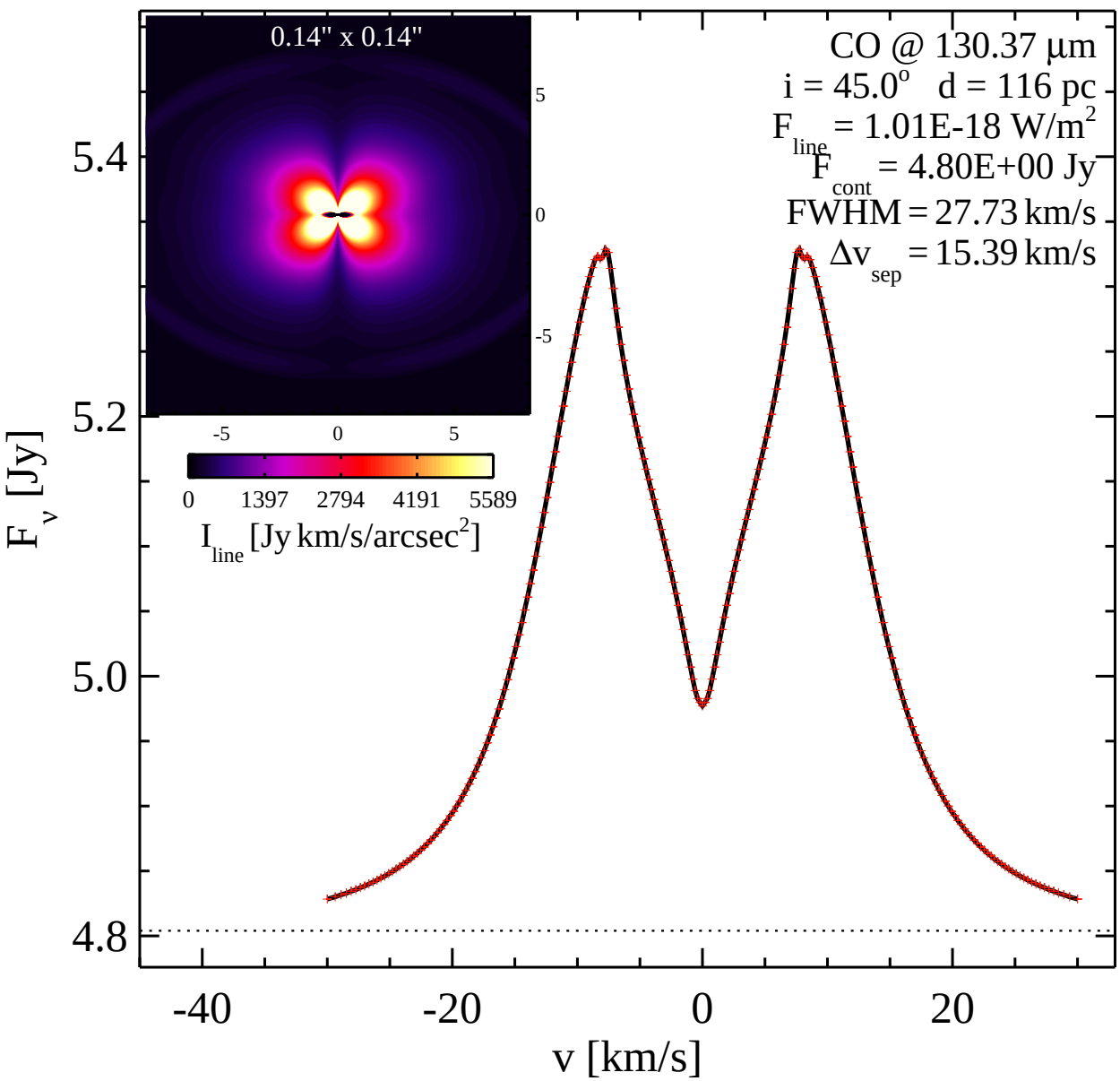

SO 1454.06µm
τ
10.0000
1.0000
0.1000
0.0100
0.0010
0.0001
τ line
τ cont
cumulative F line [%]
100
80
60
40
20
0
F line = 8.56E-21 W/m2
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-12 -10 -8 -6 -4 -2 0 2
log n SO [cm-3]
50
100
150
200
250
300
r [AU]

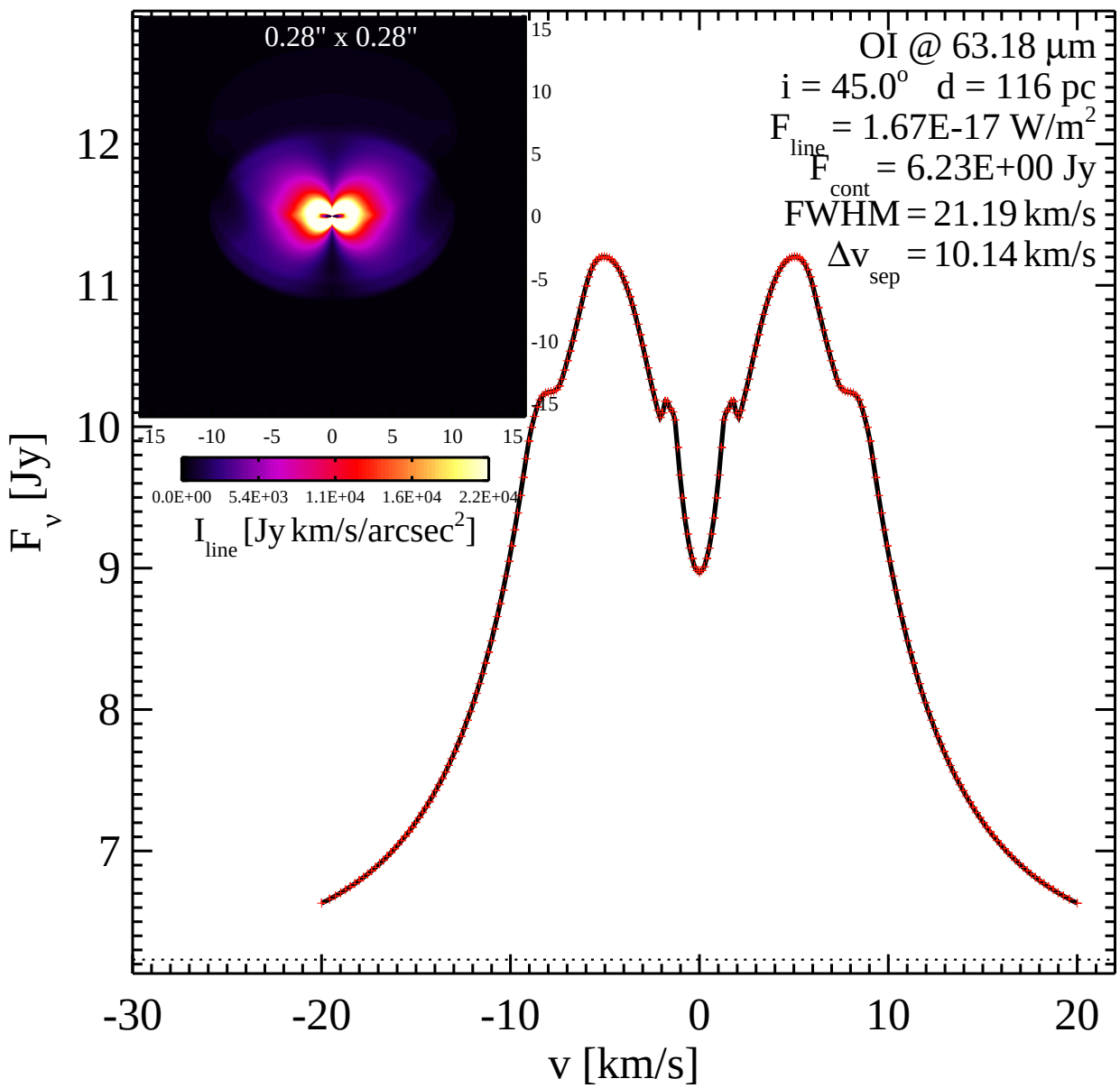

SO 1363.01µm
τ
τ line
τ cont
10.0000
1.0000
0.1000
0.0100
0.0010
0.0001
cumulative F line [%]
F line = 1.20E-20 W/m2
100
80
60
40
20
0
z/r
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-12 -10 -8 -6 -4 -2 0 2
log n SO [cm-3]
50
100
150
200
250
300
r [AU]

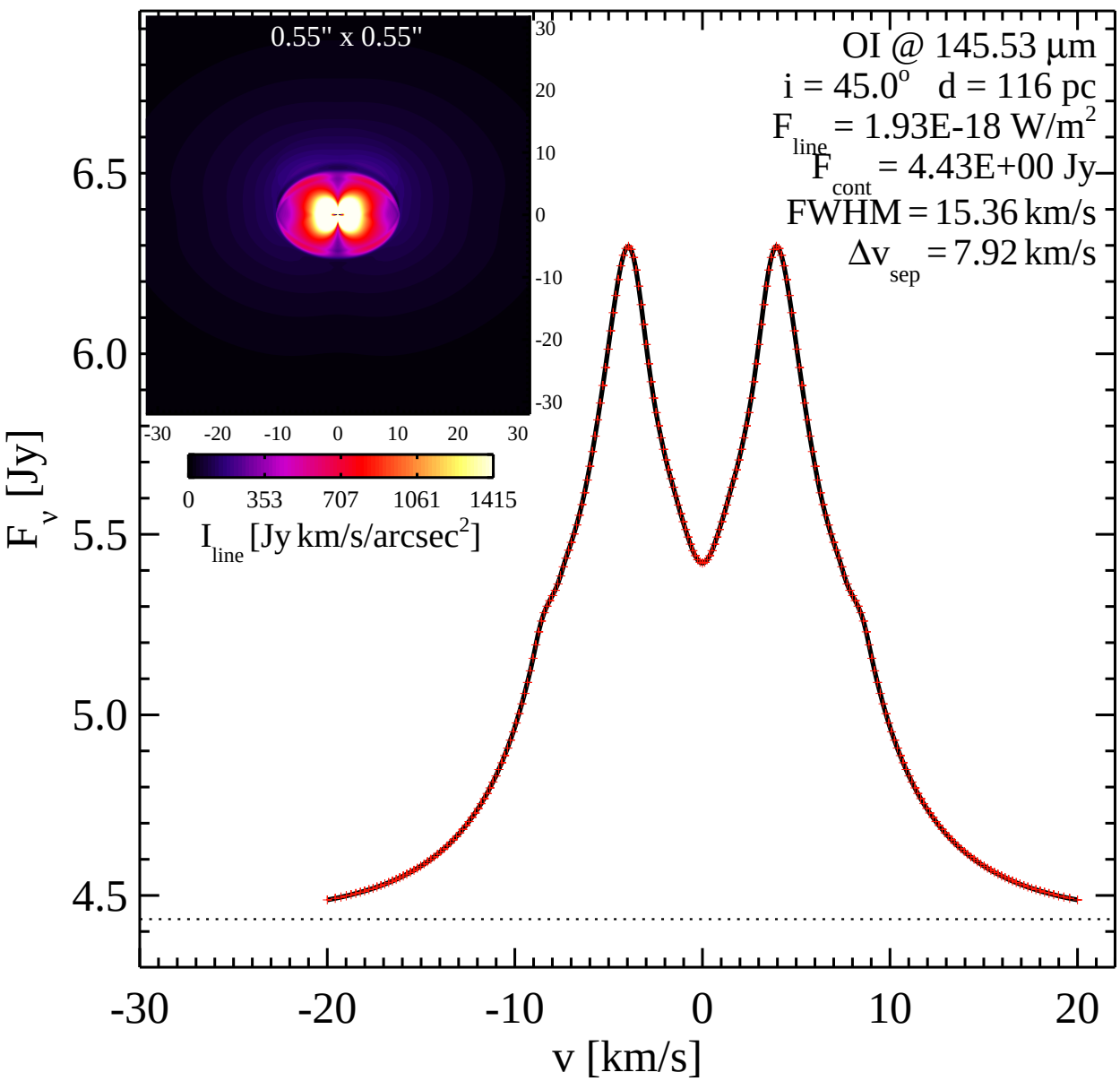

4.7" x 4.7"
200
100
0
-100
-200
-200 -100 0 100 200
0.0 0.4 0.7 1.1 1.4
I line [Jy km/s/arcsec2]
CO @ 1300.40 µm
i = 45.0o d = 116 pc
F line = 7.63E-20 W/m2
F cont = 1.17E-01 Jy
FWHM = 4.25 km/s
Δv sep = 3.00 km/s
F v [Jy]
3
2
1
0
-40
-20
0
20
v [km/s]

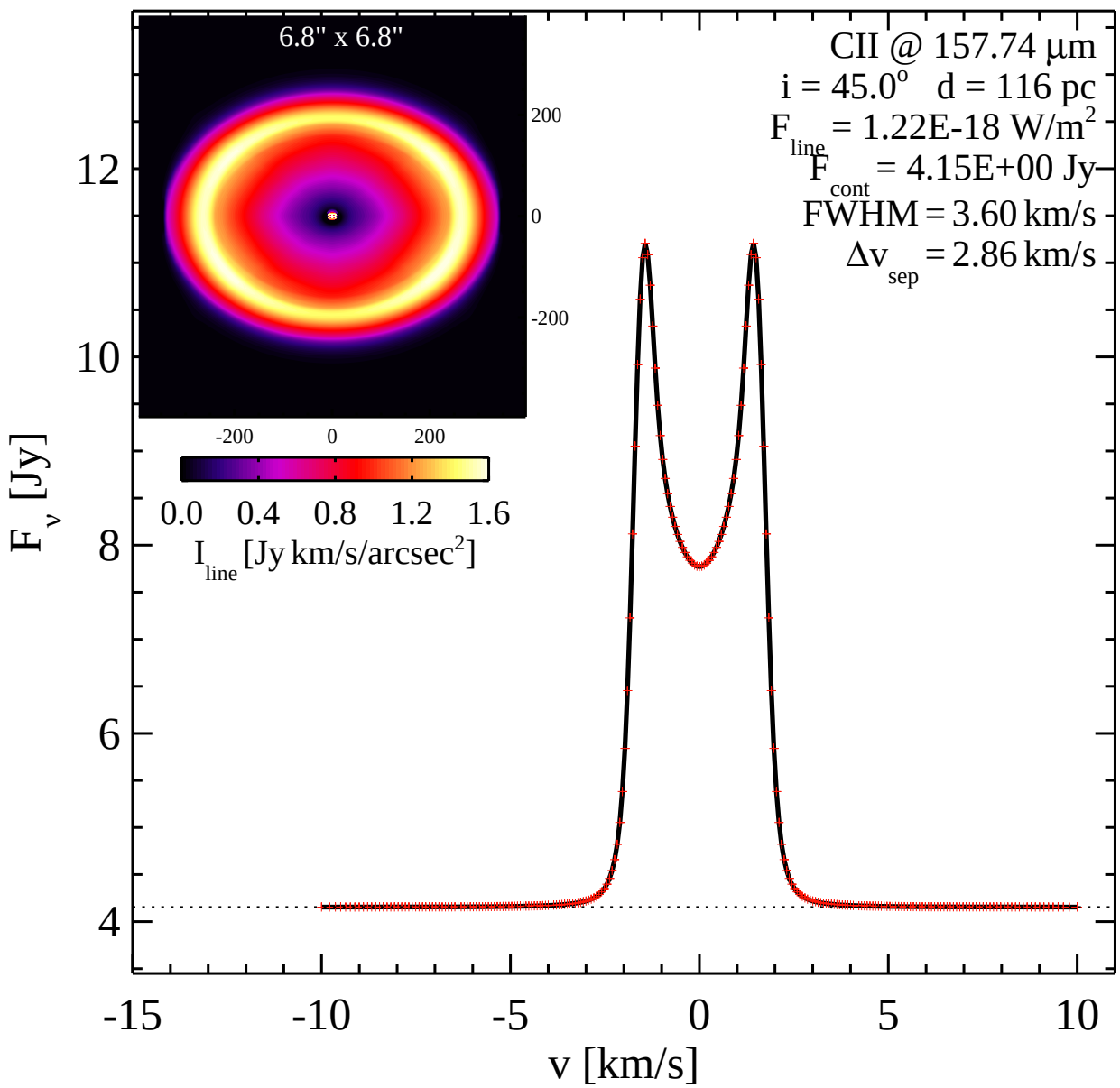

4.4" x 4.4"
200
100
0
-100
-200
-200 -100 0 100 200
0.00 0.10 0.20 0.30 0.40
I line [Jy km/s/arcsec2]
CO @ 2600.76 µm
i = 45.0o d = 116 pc
F line = 8.87E-21 W/m2
F cont = 2.10E-02 Jy
FWHM = 4.42 km/s
Δv sep = 3.10 km/s
F v [Jy]
0.0
0.2
0.4
0.6
0.8
-15 -10 -5 0 5 10
v [km/s]

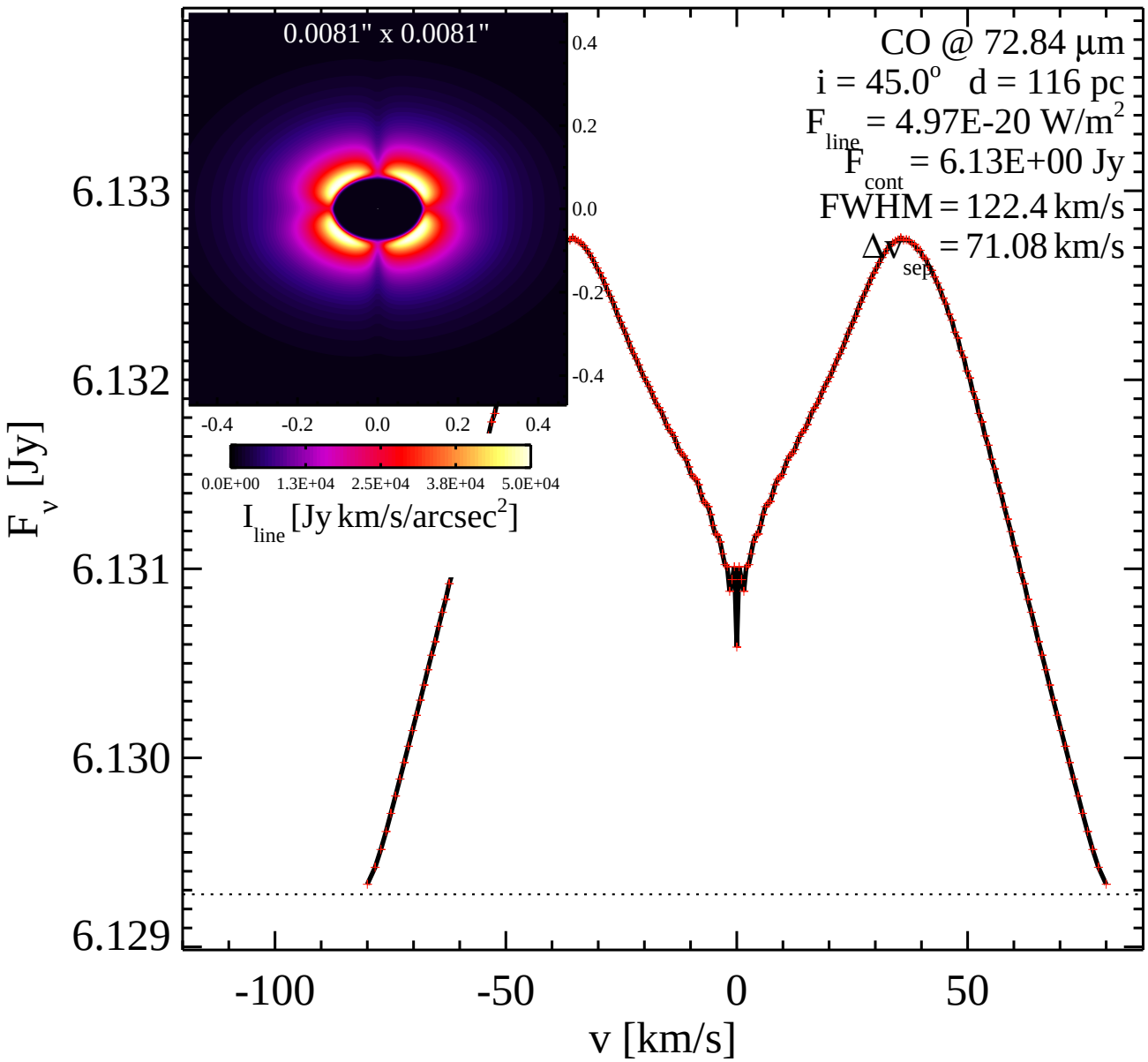

0.0081" x 0.0081"
CO @ 72.84 µm
i = 45.0° d = 116 pc
F line = 4.97E-20 W/m2
F cont = 6.13E+00 Jy
FWHM = 122.4 km/s
Δv sep = 71.08 km/s
6.133
6.132
6.131
6.130
6.129
F v [Jy]
-100
-50
0
50
v [km/s]
0.4
0.2
0.0
-0.2
-0.4
-0.4
-0.2
0.0
0.2
0.4
0.0E+00
1.3E+04
2.5E+04
3.8E+04
5.0E+04
I line [Jy km/s/arcsec2]

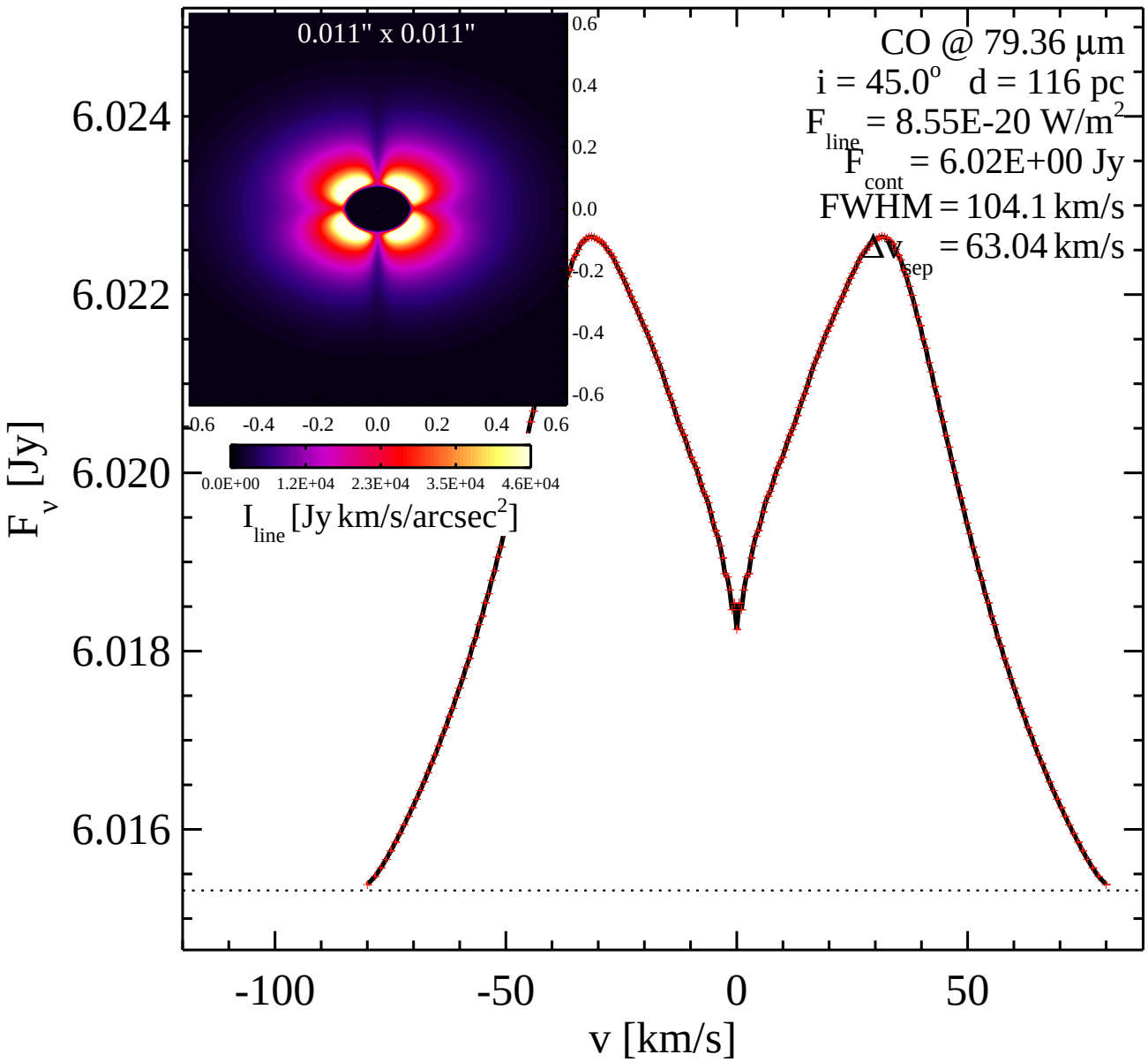

0.14" x 0.14"
5
0
-5
-5
0
5
0
1397
2794
4191
5589
I line [Jy km/s/arcsec2]
CO @ 130.37 µm
i = 45.0o d = 116 pc
F line = 1.01E-18 W/m2
F cont = 4.80E+00 Jy
FWHM = 27.73 km/s
Δv sep = 15.39 km/s
5.4
5.2
5.0
4.8
F v [Jy]
-40
-20
0
20
v [km/s]

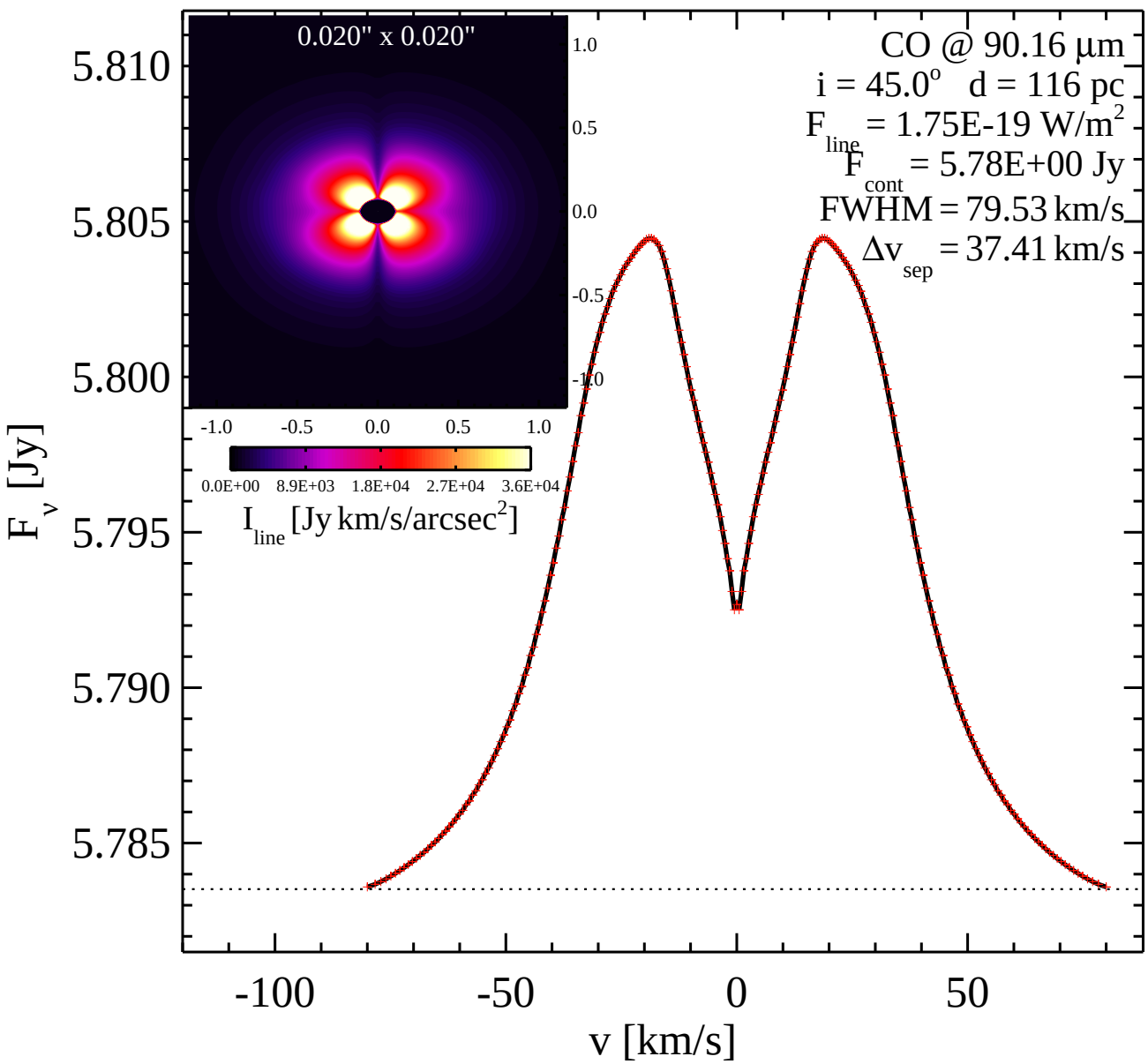

0.28" x 0.28"
OI @ 63.18 µm
i = 45.0° d = 116 pc
F line = 1.67E-17 W/m2
F cont = 6.23E+00 Jy
FWHM = 21.19 km/s
Δv sep = 10.14 km/s
F v [Jy]
v [km/s]
I line [Jy km/s/arcsec2]
0.0E+00 5.4E+03 1.1E+04 1.6E+04 2.2E+04

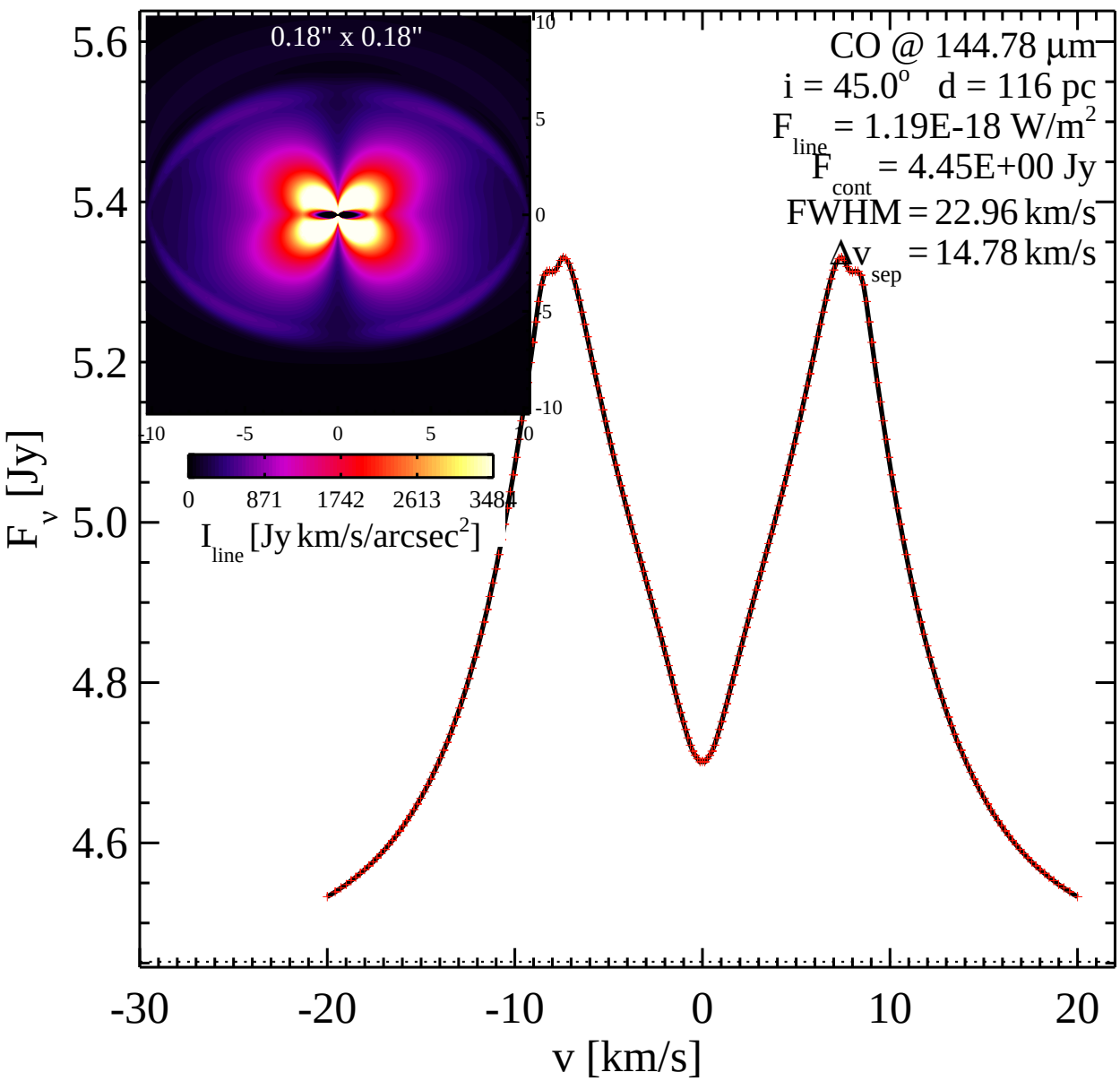

0.55" x 0.55"
OI @ 145.53 µm
i = 45.0° d = 116 pc
F_line = 1.93E-18 W/m²
F_cont = 4.43E+00 Jy
FWHM = 15.36 km/s
Δv_sep = 7.92 km/s
F_v [Jy]
v [km/s]
I_line [Jy km/s/arcsec²]
0 353 707 1061 1415
-30 -20 -10 0 10 20 30
4.5 5.0 5.5 6.0 6.5

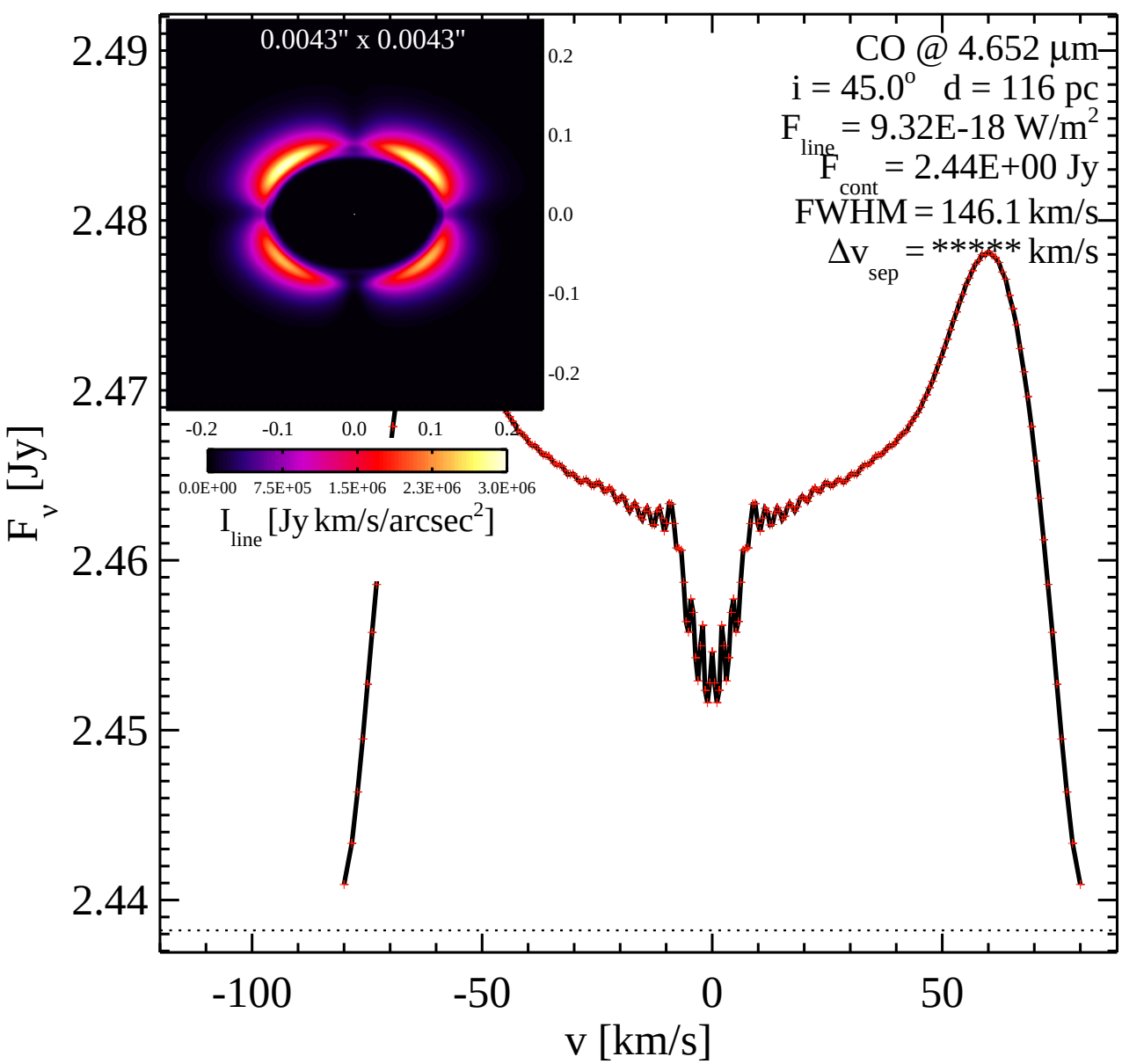

6.8" x 6.8"
200
0
-200
-200
0
200
0.0
0.4
0.8
1.2
1.6
I line [Jy km/s/arcsec2]
CII @ 157.74 µm
i = 45.0o d = 116 pc
F line = 1.22E-18 W/m2
F cont = 4.15E+00 Jy
FWHM = 3.60 km/s
Δv sep = 2.86 km/s
F v [Jy]
12
10
8
6
4
-15
-10
-5
0
5
10
v [km/s]

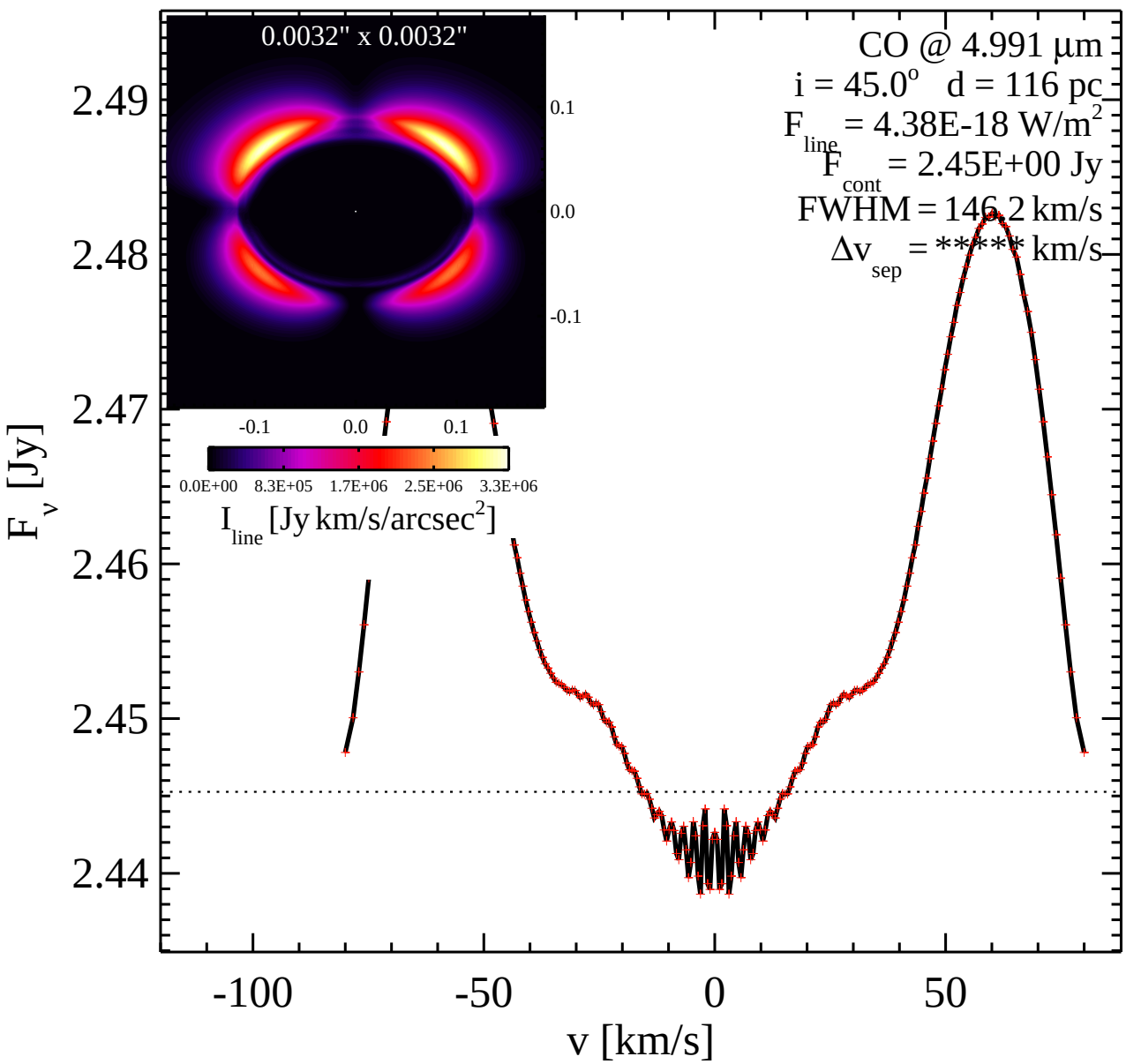

0.0081" x 0.0081"
CO @ 72.84 µm
i = 45.0° d = 116 pc
F line = 4.97E-20 W/m2
F cont = 6.13E+00 Jy
FWHM = 122.4 km/s
Δv sep = 71.08 km/s
6.133
6.132
6.131
6.130
6.129
F v [Jy]
-100
-50
0
50
v [km/s]
0.4
0.2
0.0
-0.2
-0.4
-0.4
-0.2
0.0
0.2
0.4
0.0E+00
1.3E+04
2.5E+04
3.8E+04
5.0E+04
I line [Jy km/s/arcsec2]


0.011" x 0.011"
CO @ 79.36 µm
i = 45.0° d = 116 pc
F line = 8.55E-20 W/m2
F cont = 6.02E+00 Jy
FWHM = 104.1 km/s
Δv sep = 63.04 km/s
F v [Jy]
v [km/s]
I line [Jy km/s/arcsec2]
6.024
6.022
6.020
6.018
6.016
-100
-50
0
50
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
0.0E+00
1.2E+04
2.3E+04
3.5E+04
4.6E+04


0.020" x 0.020"
CO @ 90.16 µm
i = 45.0° d = 116 pc
F line = 1.75E-19 W/m2
F cont = 5.78E+00 Jy
FWHM = 79.53 km/s
Δv sep = 37.41 km/s
I line [Jy km/s/arcsec2]
0.0E+00 8.9E+03 1.8E+04 2.7E+04 3.6E+04
F v [Jy]
v [km/s]


0.18" x 0.18"
CO @ 144.78 µm
i = 45.0° d = 116 pc
F line = 1.19E-18 W/m2
F cont = 4.45E+00 Jy
FWHM = 22.96 km/s
Δv sep = 14.78 km/s
F v [Jy]
v [km/s]
I line [Jy km/s/arcsec2]
0 871 1742 2613 3484


0.0043" x 0.0043"
CO @ 4.652 µm
i = 45.0° d = 116 pc
F line = 9.32E-18 W/m2
F cont = 2.44E+00 Jy
FWHM = 146.1 km/s
Δv sep = ***** km/s
2.49
2.48
2.47
2.46
2.45
2.44
F v [Jy]
-100
-50
0
50
v [km/s]
-0.2
-0.1
0.0
0.1
0.2
0.0E+00
7.5E+05
1.5E+06
2.3E+06
3.0E+06
I line [Jy km/s/arcsec2]


0.0032" x 0.0032"
0.1
0.0
-0.1
-0.1
0.0
0.1
0.0E+00
8.3E+05
1.7E+06
2.5E+06
3.3E+06
I line [Jy km/s/arcsec2]
CO @ 4.991 µm
i = 45.0o d = 116 pc
F line = 4.38E-18 W/m2
F cont = 2.45E+00 Jy
FWHM = 146.2 km/s
Δv sep = ***** km/s
F v [Jy]
2.49
2.48
2.47
2.46
2.45
2.44
-100
-50
0
50
v [km/s]