This HTML file was created by the program doc_tsuite.pl. doc_tsuite.txt contains a tab delimited list of the files.

`dynamics_HII_PDR.in` *fast H+He+metals (low ionization parameter) 009 km s*

```
title fast H+He+metals (low ionization parameter) 009 km s
failures 1
*
* ADVECTION PARAMETERS
*
wind -9 advection no continuum
set dynamics pressure mode subsonic
iterate 10 to convergence 0.001
* iterate 10 to convergence 0.001
set nend 2000
*
* INPUT SPECTRA
*
* hot wd star
blackbody 120,000
phi(h) 9.5
sphere
turbulence 8 km/sec
*
* OTHER PHYS PARAMS
normalize to "Q(H)" 4861
*
hden 3.5
*init "fast.ini"
init "ism.ini"
abundances hii region no grains
grains orion no qheat single
*
* STOPPING CRITERIA
*
stop thickness 18
stop efrac -3
stop temperature 100
no molecules
*
* SPEEDUP
*
atom h-like levels small
atom he-like levels small
* set drmin 12.5
*
* Output
punch dr "dynamics_HII_PDR.dr"
punch overview "dynamics_HII_PDR.ovr"
punch wind "dynamics_HII_PDR.wnd"
*
*
* asserts
c
c dynamics_HII_PDR.in
c
```

---

feii_blr_n09_p18.in *FeII model*

```
title FeII model
table agn
atom feii
print lines column
print lines sort intensity
hden 9
phi(h) 18
stop column density 23
iterate convergence
normalize to "totl" 1216 100
init "c84.ini"
punch feii lines "feii_blr_n09_p18.lin" last
punch feii column densities "feii_blr_n09_p18.fe2col" last
punch feii relative populations all "feii_blr_n09_p18.lev" last
punch feii relative populations range 0 200 "feii_blr_n09_p18.lv1" last
punch feii relative populations range 201 371 "feii_blr_n09_p18.lv2" last
punch overview "feii_blr_n09_p18.ovr" last
punch dr "feii_blr_n09_p18.dr" last
punch convergence reason "feii_blr_n09_p18.cvr"
```

This is one of the 5 models that sample the LOC plane.

---

feii_blr_n09_p18_Z20.in *FeII model*

```
title FeII model
table agn
print lines column
print lines sort intensity
atom feii
abundances starburst 20
hden 9
phi(h) 18
stop column density 23
iterate convergence
normalize to "totl" 1216 100
init "c84.ini"
punch feii lines "feii_blr_n09_p18_Z20.lin" last
punch feii colum density "feii_blr_n09_p18_Z20.fe2col" last
punch feii populations all "feii_blr_n09_p18_Z20.lev" last
punch overview "feii_blr_n09_p18_Z20.ovr" last
punch dr "feii_blr_n09_p18_Z20.dr" last
punch convergence reason "feii_blr_n09_p18_Z20.cvr"
```

This is one of the 5 models that sample the LOC plane.

---

feii_blr_n11_p20.in *FeII model*

```
title FeII model
table agn
print lines column
print lines sort intensity
atom feii
```

```
hden 11
phi(h) 20
stop column density 23
iterate convergence
normalize to "totl" 1216 100
init "c84.ini"
punch convergence reason "feii_blr_n11_p20.cvr"
punch feii lines "feii_blr_n11_p20.lin" last
punch feii column densities "feii_blr_n11_p20.fe2col" last
punch feii populations all "feii_blr_n11_p20.lev" last
punch overview "feii_blr_n11_p20.ovr" last
punch dr "feii_blr_n11_p20.dr" last
```

This is one of the 5 models that sample the LOC plane.

`feii_blr_n11_p20_Z20.in` *FeII model*

```
title FeII model
table agn
print lines column
print lines sort intensity
atom feii
failures 2
abundances starburst 20
hden 11
phi(h) 20
stop column density 23
iterate convergence
normalize to "totl" 1216 100
init "c84.ini"
punch cooling "feii_blr_n11_p20_Z20.col"
punch convergence reason "feii_blr_n11_p20_Z20.cvr"
punch feii lines "feii_blr_n11_p20_Z20.lin" last
punch feii column densites "feii_blr_n11_p20_Z20.fe2col" last
punch feii populations all "feii_blr_n11_p20_Z20.lev"
punch heating "feii_blr_n11_p20_Z20.het"
punch element calcium "feii_blr_n11_p20_Z20.ca"
punch overview "feii_blr_n11_p20_Z20.ovr" last
punch dr "feii_blr_n11_p20_Z20.dr"
```

This is one of the 5 models that sample the LOC plane.

`feii_blr_n12_p19.in` *FeII model*

```
title FeII model
table agn
print lines column
print lines sort intensity
atom feii
hden 12
phi(h) 19
stop column density 23
iterate convergence
normalize to "totl" 1216 100
init "c84.ini"
punch convergence reason "feii_blr_n12_p19.cvr"
```

```
punch feii lines "feii_blr_n12_p19.lin" last
punch feii populations all "feii_blr_n12_p19.lev" last
punch feii column densities "feii_blr_n12_p19.fe2col" last
punch overview "feii_blr_n12_p19.ovr" last
punch dr "feii_blr_n12_p19.dr" last
```

This is one of the 5 models that sample the LOC plane.

`feii_blr_n12_p19_Z20.in` *FeII model*

```
title FeII model
table agn
print lines column
print lines sort intensity
atom feii
abundances starburst 20
hden 12
phi(h) 19
stop column density 23
iterate convergence
normalize to "totl" 1216 100
init "c84.ini"
punch feii lines "feii_blr_n12_p19.lin" last
punch feii column densiteis "feii_blr_n12_p19.fe2col" last
punch feii populations all "feii_blr_n12_p19.lev" last
punch convergence reason "feii_blr_n12_p19.cvg"
punch overview "feii_blr_n12_p19.ovr" last
punch dr "feii_blr_n12_p19.dr" last
```

This is one of the 5 models that sample the LOC plane.

`feii_blr_n13_p18.in` *BLR model, density 1e13 cm-3, flux of H-ion phots 1e18 cm2 s-1*

```
title BLR model, density 1e13 cm-3, flux of H-ion phots 1e18 cm2 s-1
print lines column
print lines sort intensity
atom feii
c
c this is a very low ionization cloud
c the conditions, and some lines, are surprisingly sensitive
c to the treatment of hydrogen molecules
c
table agn
hden 13
phi(h) 18
stop column density 22
double
iterate convergence
normalize to "totl" 1216 100
init "c84.ini"
punch feii lines "feii_blr_n13_p18.lin" last
punch feii column densites "feii_blr_n13_p18.fe2col" last
punch feii populations all "feii_blr_n13_p18.lev" last
punch overview "feii_blr_n13_p18.ovr" last
```

```
punch dr "feii_blr_n13_p18.dr" last
punch convergence reason "feii_blr_n13_p18.cvr"
```

This is one of the 5 models that sample the LOC plane.

`feii_blr_n13_p18_Z20.in` *BLR model, density 1e13 cm-3, flux of H-ion phots 1e18 cm2 s-1*

```
title BLR model, density 1e13 cm-3, flux of H-ion phots 1e18 cm2 s-1
print lines column
print lines sort intensity
atom feii
abundances starburst 20
c
c this is a very low ionization cloud
c the conditions, and some lines, are surprisingly sensitive
c to the treatment of hydrogen molecules
c
table agn
hden 13
phi(h) 18
stop column density 19
double
iterate convergence limit 15
normalize to "totl" 1216 100
init "c84.ini"
punch feii lines "feii_blr_n13_p18_Z20.lin" last
punch feii column densities "feii_blr_n13_p18_Z20.fe2col" last
punch feii populations all "feii_blr_n13_p18_Z20.lev" last
punch overview "feii_blr_n13_p18_Z20.ovr" last
punch dr "feii_blr_n13_p18_Z20.dr" last
punch convergence reason "feii_blr_n13_p18_Z20.cvr"
```

This is one of the 5 models that sample the LOC plane.

`feii_blr_n13_p22.in` *FeII model*

```
title FeII model
table agn
print lines column
print lines sort intensity
atom feii
hden 13
phi(h) 22
stop column density 23
iterate convergence
normalize to "totl" 1216 100
init "c84.ini"
punch convergence reason "feii_blr_n13_p22.cvr"
punch feii lines "feii_blr_n13_p22.lin" last
punch feii populations all "feii_blr_n13_p22.lev" last
punch feii column density "feii_blr_n13_p22.col" last
punch overview "feii_blr_n13_p22.ovr" last
punch dr "feii_blr_n13_p22.dr" last
```

This is one of the 5 models that sample the LOC plane.

`feii_blr_n13_p22_Z20.in` *FeII model*

```
title FeII model
table agn
print lines column
print lines sort intensity
atom feii
abundances starburst 20
hden 13
phi(h) 22
stop column density 23
iterate convergence
normalize to "totl" 1216 100
init "c84.ini"
punch convergence reason "feii_blr_n13_p22_Z20.cvr"
punch feii lines "feii_blr_n13_p22_Z20.lin" last
punch feii column densities "feii_blr_n13_p22_Z20.fe2col" last
punch feii populations all "feii_blr_n13_p22_Z20.lev" last
punch overview "feii_blr_n13_p22_Z20.ovr" last
punch dr "feii_blr_n13_p22_Z20.dr"
punch heating "feii_blr_n13_p22_Z20.het"
punch cooling "feii_blr_n13_p22_Z20.col"
```

This is one of the 5 models that sample the LOC plane.

`h2_HTT91.in` *Hollenbach et al. 1991 low-density PDR*

```
title Hollenbach et al. 1991 low-density PDR
iterate
c
c
hden 3
c
c this is hot star continuum
black 30000
intensity 0.2 range 0.4412 to 1 Ryd
c this will remove all ionizing radiation
extinguish 24 0
c
turbulence 1.5 km/sec
c first continuum is FIR hot grain continuum produced in
c unmodeled HII Region
grains orion, abundance log 0.16
grains PAH
atom h2
init file="ism.ini"
abundances he -1.01 c -3.52 n-8 o-3.30 ne-8 mg-5.89
continue si -6.10 s -5.10 cl-7 ar-8 fe -6.60
normalize to 157.6m "C 2"
sphere
case b
cosmic rays, background
c stop when gas is fully neutral
stop efrac -10
c this is to stop at an intended place, since results would be
```

```
c very dependent on details if we stop on temperature
stop thickness 18.954
c stop when gas is cold
stop temperature 10 linear
c add this to mimic unmodelled neutral gas
double optical depths
c
c uv lines are strongly pumped by stellar continuum, break out contribution
print line pump
print line optical depths
print ages
c
punch overview last "h2_HTT91.ovr"
punch dr "h2_HTT91.dr "
punch molecules last "h2_HTT91.mol"
punch results last "h2_HTT91.rlt"
punch continuum units microns last "h2_HTT91.con"
punch heating last "h2_HTT91.het"
punch cooling last "h2_HTT91.col"
punch H2 destruction "h2_HTT91.H2d"
punch H2 creation "h2_HTT91.H2c"
c
c h2_HTT91.in
```

This is the Hollenbach et al 1991 Low-density PDR The case b command appears because the Lyman lines are vastly optically thick in this environment. If the command is removed the Lyman lines will be optically thin, which will result in fast fluorescent excitation of the (nearly totally neutral) hydrogen atom.

there is very little CO in this model since it is not thick enough for the UV pumping lines to become optically thick

---

`h2_orion_hii_pdr.in` *constant gas pressure orion into pdr*

```
title constant gas pressure orion into pdr
stop temperature 10 linear
c
c print lots of faint CO lines
print line faint -4
stop AV 1000 point
constant gas pressure
sphere
c
c the incident continuum is two parts
c star and flux of photons striking it
table read "star_kurucz_39600.dat"
c
Q(H) 49
radius 17.4507
c plus hot brems
brems 6
phi(h) 10
c
c add cosmic rays, which are important at depth
cosmic rays, background
c
c we have a spherical geometry but want to simulate observing
c through a spectrometer's slit. use the aperture
c command for this
aperture beam
c
```

```
c the observed microturbulence
turbulence 8 km/sec no pressure
c
c density and abundances
hden 4
init file="ism.ini"
abundances hii region no grains
grains orion
grains pah
atom h2
c
set nend 2000
c
punch overview last "h2_orion_hii_pdr.ovr"
punch hydrogen 21 cm last "h2_orion_hii_pdr.21cm"
punch heating "h2_orion_hii_pdr.het"
punch cooling "h2_orion_hii_pdr.col"
punch dr last "h2_orion_hii_pdr.dr"
punch results last "h2_orion_hii_pdr.rlt"
punch continuum last "h2_orion_hii_pdr.con" units microns
punch hydrogen lya last "h2_orion_hii_pdr.lya"
punch grain charge last "h2_orion_hii_pdr.grnchr"
punch grain potential last "h2_orion_hii_pdr.grnpot"
punch H2 lines last "h2_orion_hii_pdr.h2lin"
punch H2 column density last "h2_orion_hii_pdr.h2col"
punch H2 destruction "h2_orion_hii_pdr.H2d"
punch H2 creation "h2_orion_hii_pdr.H2c"
punch molecules "h2_orion_hii_pdr.mol"
c
c h2_orion_hii_pdr.in
```

05 dec 19, had stopped at 1 pc, gas/dust got very cold and H2 stopped forming, H2 went to H0 - this below the CO network out of the water. stop at AV of 1000 instead. Is this loss of H2 at low grain temperature physical? Is it ever seen?

`h2_pdr_leiden_f2.in` *low density high flux model 2 as defined in e-mail*

```
title low density high flux model 2 as defined in e-mail
c
c commands controlling continuum =========
c Use the Draine 1978 field, for a semi-infinite slab we have to use
c half the requested value, so the actual value
c they want for the model is actually twice the value below
table draine 50000
c insure that no H-ionizing radiation strikes cloud
extinguish 24
c
c commands for density & abundances =========
grains ism 1.16 no qheat
c hydrogen density
hden 3.
c
c commands controlling geometry =========
c
c other commands for details =========
atom h2
failures 3
c use leiden initialization file
```

```
init file="pdr_leiden.ini"
c This command defines the grain temperature to be a constant 20 Kelvin
constant grain temperature 20
c This sets the temperature to a constant 50 Kelvin
constant temperature 50 linear
c
c commands controlling output =========
punch overview "h2_pdr_leiden_f2.ovr"
punch leiden lines "h2_pdr_leiden_f2.lin"
punch leiden "h2_pdr_leiden_f2.lei"
punch dr "h2_pdr_leiden_f2.dr"
punch grain physical conditions "h2_pdr_leiden_f2.grn"
punch H2 lines "h2_pdr_leiden_f2.h2lin" all
punch H2 column density "h2_pdr_leiden_f2.h2col"
punch H2 populations matrix zone "h2_pdr_leiden_f2.pop"
punch H2 destruction "h2_pdr_leiden_f2.H2d"
punch H2 creation "h2_pdr_leiden_f2.H2c"
c
c
c h2_pdr_leiden_f2.in
c class pdr
c ======================================
c
```

`h2_pdr_leiden_f3.in` *high density low flux model 3 as defined in e-mail*

```
title high density low flux model 3 as defined in e-mail
c
c commands controlling continuum =========
c Use the Draine 1978 field, for a semi-infinite slab we have to use half
c the requested value, so the actual value
c they want for the model is actually twice the value below
table draine 5
c insure that no H-ionizing radiation strikes cloud
extinguish 24
c
c commands for density & abundances =========
grains ism 1.16 no qheat
c hydrogen density
hden 5.5
c
c commands controlling geometry =========
c
c other commands for details =========
c ice formation is exteme and will establish the thickness, which would
c make this very sensitive to details - turn off ices
no grain molecules
atom h2
failures 3
c use leiden initialization file
init file="pdr_leiden.ini"
c This command defines the grain temperature to be a constant 20 Kelvin
constant grain temperature 20
c This sets the temperature to a constant 50 Kelvin
constant temperature 50 linear
c
c commands controlling output =========
punch overview "h2_pdr_leiden_f3.ovr"
punch leiden lines "h2_pdr_leiden_f3.lin"
```

```
punch leiden "h2_pdr_leiden_f3.lei"
punch dr "h2_pdr_leiden_f3.dr"
punch grain physical conditions "h2_pdr_leiden_f3.grn"
punch H2 lines "h2_pdr_leiden_f3.h2lin" all
punch H2 column density "h2_pdr_leiden_f3.h2col"
punch H2 populations matrix zone "h2_pdr_leiden_f3.pop"
punch H2 rates "h2_pdr_leiden_f3.rat"
punch H2 destruction "h2_pdr_leiden_f3.H2d"
punch H2 creation "h2_pdr_leiden_f3.H2c"
c
c
c h2_pdr_leiden_f3.in
c class pdr
c ======================================
c
```

`h2_pdr_leiden_f4.in` *high density high flux model 4 as defined in e-mail*

```
title high density high flux model 4 as defined in e-mail
c
c commands controlling continuum =========
c
c commands for density & abundances =========
grains ism 1.16 no qheat
c
c commands controlling geometry =========
c Use the Draine 1978 field, for a semi-infinite slab we have to use half
c the requested value, so the actual value
c they want for the model is actually twice the value below
table draine 50000
c insure that no H-ionizing radiation strikes cloud
extinguish 24
c
c hydrogen density
hden 5.5
c
c other commands for details =========
atom h2
failures 3
c use leiden initialization file
init file="pdr_leiden.ini"
c This command defines the grain temperature to be a constant 20 Kelvin
constant grain temperature 20
c This sets the temperature to a constant 50 Kelvin
constant temperature 50 linear
c
c commands controlling output =========
punch overview "h2_pdr_leiden_f4.ovr"
punch leiden lines "h2_pdr_leiden_f4.lin"
punch leiden "h2_pdr_leiden_f4.lei"
punch dr "h2_pdr_leiden_f4.dr"
punch grain physical conditions "h2_pdr_leiden_f4.grn"
punch H2 lines "h2_pdr_leiden_f4.h2lin" all
punch H2 column density "h2_pdr_leiden_f4.h2col"
punch H2 populations matrix zone "h2_pdr_leiden_f4.pop"
punch H2 solomon "h2_pdr_leiden_f4.sol"
punch H2 destruction "h2_pdr_leiden_f4.H2d"
punch H2 creation "h2_pdr_leiden_f4.H2c"
c
```

```
c
c h2_pdr_leiden_f4.in
c class pdr
c ======================================
c
```

---

h2_pdr_leiden_hack_f1.in *low density low flux model 1 as defined in e-mail*

```
title low density low flux model 1 as defined in e-mail
atom h2
c
c commands controlling continuum =========
c Use the Draine 1978 field, for a semi-infinite slab we have to use half
c the requested value, so the actual value
c they want for the model is actually twice the value below
table draine 5
c insure that no H-ionizing radiation strikes cloud
extinguish 24
c
c commands for density & abundances =========
c hydrogen density
hden 3.
grains ism 1.16
c
c commands controlling geometry =========
c
c other commands for details =========
failures 3
c use leiden initialization file
init file="pdr_leiden_hack.ini"
c This command defines the grain temperature to be a constant 20 Kelvin
constant grain temperature 20
c This sets the temperature to a constant 50 Kelvin
constant temperature 50 linear
c
c commands controlling output =========
punch leiden lines "h2_pdr_leiden_hack_f1.lin"
punch leiden "h2_pdr_leiden_hack_f1.lei"
punch dr "h2_pdr_leiden_hack_f1.dr"
punch grain physical conditions "h2_pdr_leiden_hack_f1.grn"
punch overview "h2_pdr_leiden_hack_f1.ovr"
c
punch H2 lines "h2_pdr_leiden_hack_f1.h2lin"
punch H2 column density "h2_pdr_leiden_hack_f1.h2col"
punch H2 populations matrix zone "h2_pdr_leiden_hack_f1.pop"
c
c h2_pdr_leiden_hack_f1.in
c class pdr
c ======================================
c
```

---

h2_pdr_leiden_v1.in *model 5 as defined in e-mail*

```
title model 5 as defined in e-mail
c
```

```
c commands controlling continuum =========
c Use the Draine 1978 field, for a semi-infinite slab we have to use half
c the requested value, so the actual value
c is half the requested value
c they want for the model is actually twice the value below
table draine 5
c insure that no H-ionizing radiation strikes cloud
extinguish 24
c
c commands for density & abundances =========
c hydrogen density
hden 3.
grains ism 1.16 no qheat
c add PAHs
grains PAH no qheat 3 function
atom h2
c
c commands controlling geometry =========
c
c other commands for details =========
failures 3
c use leiden initialization file
init file="pdr_leiden.ini"
c
c commands controlling output =========
punch overview "h2_pdr_leiden_v1.ovr"
punch leiden lines "h2_pdr_leiden_v1.lin"
punch leiden "h2_pdr_leiden_v1.lei"
punch dr "h2_pdr_leiden_v1.dr"
punch grain dust temperature "h2_pdr_leiden_v1.grn"
punch H2 destruction "h2_pdr_leiden_v1.H2d"
punch H2 creation "h2_pdr_leiden_v1.H2c"
c
c
c
c
c h2_pdr_leiden_v1.in
c class pdr
c ========================================
c
```

---

h2_pdr_leiden_v2.in *model 6 as defined in e-mail*

```
title model 6 as defined in e-mail
c
c commands controlling continuum =========
c Use the Draine 1978 field, for a semi-infinite slab we have to use half
c the requested value, so the actual value
c they want for the model is actually twice the value below
table draine 50000
c insure that no H-ionizing radiation strikes cloud
extinguish 24
c
c commands for density & abundances =========
c add PAHs and grains
grains PAH no qheat 3 function
grains ism 1.16 no qheat
c hydrogen density
hden 3.
c
c commands controlling geometry =========
```

```
c
c other commands for details =========
atom h2
failures 3
c use leiden initialization file
init file="pdr_leiden.ini"
c
c commands controlling output =========
punch overview "h2_pdr_leiden_v2.ovr"
punch leiden lines "h2_pdr_leiden_v2.lin"
punch leiden "h2_pdr_leiden_v2.lei"
punch dr "h2_pdr_leiden_v2.dr"
punch grain dust temperature "h2_pdr_leiden_v2.grn"
punch H2 destruction "h2_pdr_leiden_v2.H2d"
punch H2 creation "h2_pdr_leiden_v2.H2c"
c
c
c h2_pdr_leiden_v2.in
c class pdr
c ======================================
c
```

---

h2_pdr_leiden_v3.in *model 7 as defined in e-mail*

```
title model 7 as defined in e-mail
c
c commands controlling continuum =========
c Use the Draine 1978 field, for a semi-infinite slab we have to use half
c the requested value, so the actual value
c they want for the model is actually twice the value below
table draine 5
c insure that no H-ionizing radiation strikes cloud
extinguish 24
c
c commands for density & abundances =========
c add PAHs and grains
grains PAH no qheat 3 function
grains ism 1.16 no qheat
c hydrogen density
hden 5.5
c
c commands controlling geometry =========
c
c other commands for details =========
atom h2
failures 3
c use leiden initialization file
init file="pdr_leiden.ini"
c
c commands controlling output =========
punch overview "h2_pdr_leiden_v3.ovr"
punch leiden lines "h2_pdr_leiden_v3.lin"
punch leiden "h2_pdr_leiden_v3.lei"
punch dr "h2_pdr_leiden_v3.dr"
punch grain dust temperature "h2_pdr_leiden_v3.grn"
punch heating "h2_pdr_leiden_v3.het"
punch cooling "h2_pdr_leiden_v3.col"
punch molecules "h2_pdr_leiden_v3.mol"
punch H2 destruction "h2_pdr_leiden_v3.H2d"
punch H2 creation "h2_pdr_leiden_v3.H2c"
c
```

```
c
c h2_pdr_leiden_v3.in
c class pdr
c ======================================
c
```

`h2_pdr_leiden_v4.in` *model 8 as defined in e-mail*

```
title model 8 as defined in e-mail
c
c commands controlling continuum =========
c Use the Draine 1978 field, for a semi-infinite slab we have to use half
c the requested value, so the actual value
c they want for the model is actually twice the value below
table draine 50000
c insure that no H-ionizing radiation strikes cloud
extinguish 24
c
c commands for density & abundances =========
grains PAH no qheat 3 function
grains ism 1.16 no qheat
c hydrogen density
hden 5.5
c
c commands controlling geometry =========
c
c other commands for details =========
failures 3
c use leiden initialization file
init file="pdr_leiden.ini"
atom h2
c
c commands controlling output =========
punch overview "h2_pdr_leiden_v4.ovr"
punch leiden lines "h2_pdr_leiden_v4.lin"
punch leiden "h2_pdr_leiden_v4.lei"
punch dr "h2_pdr_leiden_v4.dr"
punch grain dust temperature "h2_pdr_leiden_v4.grn"
punch H2 destruction "h2_pdr_leiden_v4.H2d"
punch H2 creation "h2_pdr_leiden_v4.H2c"
c
c
c h2_pdr_leiden_v4.in
c class pdr
c ======================================
c
```

`h2_th85orion.in` *Tielens and Hollenbach pdr model with orion grains, Table 2, paper b*

```
title Tielens and Hollenbach pdr model with orion grains, Table 2, paper b
failures 3
c
print line sort intensity
print line column
iterate
```

```
c
c cosmic background
background
cosmic rays, background
c
set nend 2000
c simulate effects of gas we do not model
double
c
c first continuum is FIR hot grain continuum produced in
c unmodeled HII Region
blackbody, t=75K
intensity 2.7 (total)
c
c this is the attenuated hot stellar continuum
black 30000
intensity 2.204 range 0.4412 to 1 Ryd
c
c this will remove all ionizing radiation
extinguish 24 0
c
hden 5.362
grains orion
grains PAH
atom h2
init file="ism.ini"
abundances he -1.01 c -3.52 n-8 o-3.30 ne-8 mg-5.89
continue si -6.10 s -5.10 cl-7 ar-8 fe -6.60
turbulence 2.7 km/sec
normalize to "C 2" 157.6m
sphere
case b
cosmic rays, background
c this should be the one actually used
stop AV 33.2
c stop when gas is fully neutral
stop efrac -10
c stop when gas is cold
stop temperature 10 linear
c stop at thickness so that would make results very
c detail dependent
stop thickness 19
c uv lines are strongly pumped by stellar continuum, break out contribution
print line pump
print line optical depths
print ages
punch overview last "h2_th85orion.ovr" no hash
punch pdr last "h2_th85orion.pdr"
punch molecules last "h2_th85orion.mol"
punch dr "h2_th85orion.dr"
punch hydrogen physical conditions last "h2_th85orion.hyd"
punch results last "h2_th85orion.rlt"
punch continuum units microns last "h2_th85orion.con"
punch fine conti unit last micron "h2_th85orion_con.fin" range 0.7 1. skip 2
* punch fine opaci unit micron "h2_th85orion_opc.fin" range 0.7 1. skip 2
punch heating last "h2_th85orion.het"
punch cooling last "h2_th85orion.col"
punch hydrogen 21 cm last "h2_th85orion.21cm"
punch H2 destruction "h2_th85orion.H2d"
punch H2 creation "h2_th85orion.H2c"
c
c
c h2_th85orion.in
```

This is the Tielens and Hollenbach (1985a, b) standard model of the Orion photodissociation region (PDR).

Specifically, this is my attempt at their Table 2 of paper 2, ApJ 291, p749. The case b command appears because the Lyman lines are vastly optically thick in this environment. If the command is removed the Lyman lines will be optically thin, which will result in fast fluorescent excitation of the (nearly totally neutral) hydrogen atom.

// >>refer model pdr Tielens, A. G. G. M., & Hollenbach, D. 1985a, ApJ, 291, 722 // >>refer model pdr Tielens, A. G. G. M., & Hollenbach, D. 1985b, ApJ, 291, 746

`m17_P07.in` *Pellegrini et al 2008 model for M17*

```
title Pellegrini et al 2008 model for M17
c a brief description of its purpose
c
c commands controlling incident radiation field =========
c these give the shape and intensity
brems 8,500,000K
luminosity 33.5 range 7.35 to 176 Ryd
table star CoStar, 47,490K
Q(h) 49.63
table star CoStar, 45,335K
Q(h) 49.47
table star CoStar, 43,151K
Q(h) 49.30
table star CoStar, 41,209K
Q(h) 49.18
table star CoStar, 39,084K
Q(h) 49.08
table star CoStar, 36,982K
Q(h) 48.81
table star atlas, 34,914K
Q(h) 48.97
table star atlas,27,700K
absolute bolometric magnitude -8.5
table star atlas, 23,700K
absolute bolometric magnitude -7.5
table star atlas, 20,350K
absolute bolometric magnitude -6.6
table star atlas, 17,050
absolute bolometric magnitude -6.3
c
c commands for density & abundances =========
hden 2.065
abundances H II region no qheat no grains
grains PAH 10
grains orion 1
element Helium abundance -0.98
element Carbon abundance -4.14
element Nitrogen abundance -4.2
element Oxygen abundance -3.47
element Neon abundance -4.4
element Sulphur abundance -5.06
element Chlorine abundance -6.88
element Argon abundance -5.64
element Iron abundance -5.5
c these are to speed things up a bit
element limit off -6.9
c
c commands controlling geometry =========
radius 0.35355 linear parsecs
```

```
c the observed extinction along this sight line
stop Av extended 6.36
c do not want to stop at too small a depth due to low temperature
stop temperature off
c magnetostatic equilibrium
constant pressure
sphere
c
c other commands for details =========
magnetic field tangled -4.3125 2
turbulence 3km/s
iterate
cosmic rays background 2.5
c
c commands controlling output =========
punch lines emissivity last "m17_P07.ems"
H 1 6563
S 2 6720
12CO 1294m
12CO 2589m
12CO 863.0m
12CO 369.8m
C 2 157.6m
C 1 369.7m
C 1 609.2m
O 1 63.17m
O 1 145.5m
Si 2 34.81m
end of line
print line sort wavelength
punch overview last "m17_p07.ovr"
punch hydrogen 21 CM last "m17_p07.h21"
punch pressure last "m17_p07.pre"
punch molecules last "m17_p07.mol"
punch heating last "m17_p07.het"
punch cooling last "m17_p07.col"
punch continuum last "m17_p07.con" units microns
c
c
c m17_P07.in
c class hii pdr
c ======================================
c
```

This is the magnetostatic model of the M17 H+ / H0 / H2 region presented in Pellegrini et al. 2007, ApJ, 658, 1119
