

### 1.12.5. *table crab*

If the keyword **crab** appears then the continuum summarized by Davidson and Fesen (1985) is generated. This is the net observed continuum, originating in both the pulsar and nebula, and not the pulsar continuum alone. The continuum is given in Table 3, which gives the observed flux at Earth ( $\text{erg cm}^{-2} \text{s}^{-1} \text{Hz}^{-1}$ ).

According to Davidson and Fesen, the total luminosity of the Crab is  $L_{\text{tot}} = 10^{38.14} \text{ erg s}^{-1}$ , so the Crab continuum could be generated by combining the commands

```
luminosity (total) 38.14
table Crab
```

### 1.12.6. *table Draine [factor=1.7]*

This enters the galactic background radiation field given by equation 23 of Draine & Bertoldi (1996). The continuum is only defined over a very narrow wavelength range so it is only appropriate for certain simple PDR calculations. It is shown in Figure 2 along with the continuum produced by the **table ism** command. This command specifies both the shape and intensity of the continuum. The optional scale factor changes the intensity of the continuum.

### 1.12.7. *table HM96 [factor=-1]*

This enters the Haardt & Madau (1996) background continuum for a redshift of  $z = 2$ . The cosmic microwave background is not included – use the **CMB** command described on page 5 above to add this component. Note that this table specifies both the shape and intensity of the continuum. There is an optional multiplicative scale factor to change the intensity. If the scale factor is less than or equal to zero then it is interpreted as the log of the scale factor.

The **background** command (see page 2 above) uses a simplistic form of the energetic continuum, but allows any redshift to be specified.

Table 3  
Crab Continuum

$\nu(\text{Ryd})$	$f_{\nu}$
1.0(-5)	3.77E-21
5.2(-4)	1.38E-21
1.5(-3)	2.10E-21
0.11	4.92E-23
0.73	1.90E-23
7.3	2.24E-24
73.	6.42E-26
7.3(+3)	4.02E-28
1.5(+6)	2.08E-31
7.4(+6)	1.66E-32

1.12.8. *table\_ism* [*factor* = 0.7]

The local interstellar radiation field is generated with the keyword `_ism`. This uses Figure 2 of Black (1987) to represent the *unextinguished* local interstellar radiation field (see Figure 2). This command specifies *both* the shape and luminosity of the radiation field. The continuum generated by Cloudy is exactly that given by Black, except that the radiation field between 1 and 4 Ryd is interpolated from the observed or inferred values. Actually, it is thought that this part of the radiation field is heavily absorbed by gas in the ISM, so that little 1 to 4 Ryd radiation exists, at least in the galactic plane. Such absorption can be introduced with the **extinguish** command, described on page 6 above.

The `table_ism` command also specifies the intensity of the incident radiation field, since this is directly observed. There is an optional parameter that specifies a scale factor for the intensity of the entire radiation field. It is the log of the scale factor if less than or equal to zero, and the scale factor itself if positive. The default is unity (i.e., Black's radiation field). The actual numbers used by Cloudy to interpolate on Black's table are given in Table 4. The frequencies are in Hz, and the product  $\nu f_\nu$  in  $\text{erg cm}^{-2} \text{s}^{-1}$ .

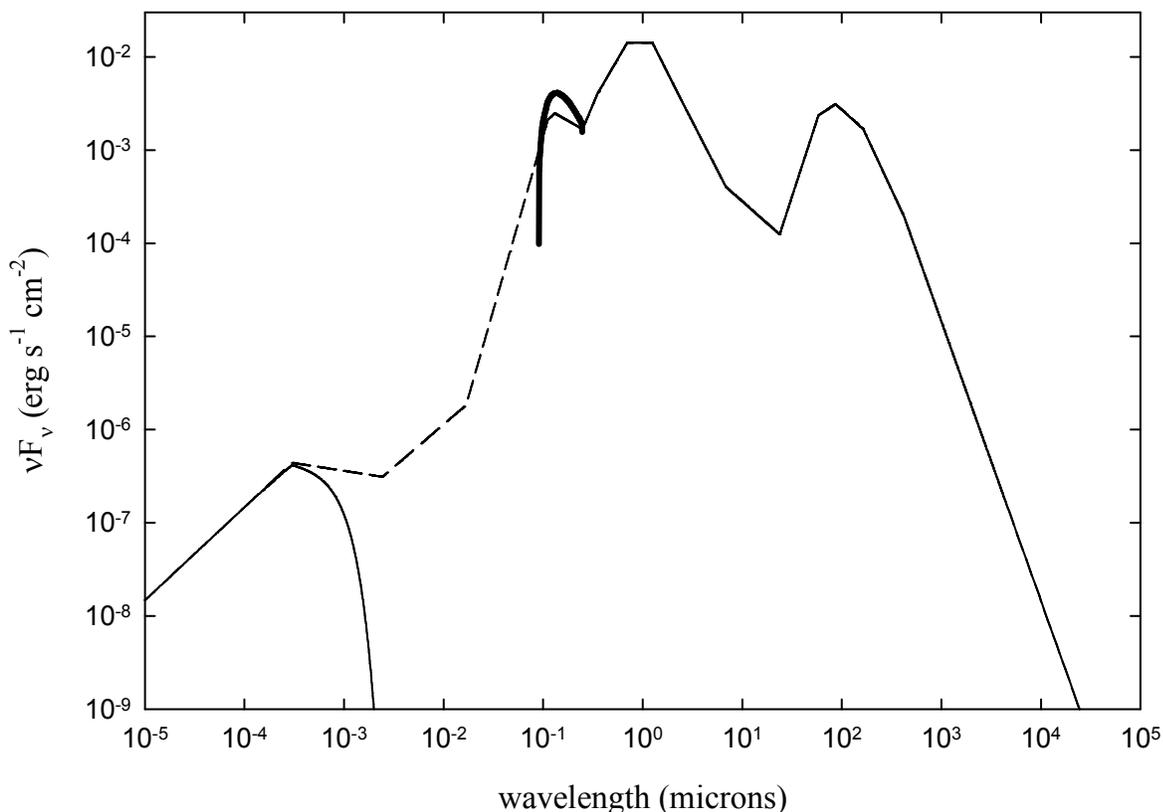


Figure 2 The continuum produced by the `table_ism` command. The infrared cirrus is the peak at  $\lambda \sim 100 \mu\text{m}$  and starlight dominates at shorter wavelengths. The points just shortward of the Lyman limit ( $0.0912 \mu\text{m}$ ) are interpolated - actually it is thought that interstellar extinction removes most of this continuum. The dashed line shows the interpolated continuum and the solid line shows the effects of absorption introduced by the **extinguish** command. The heavy line is the **table Draine** continuum. `ism_background`