The cooling function Λ

M.S. Longair "Galaxy Formation" p. 371

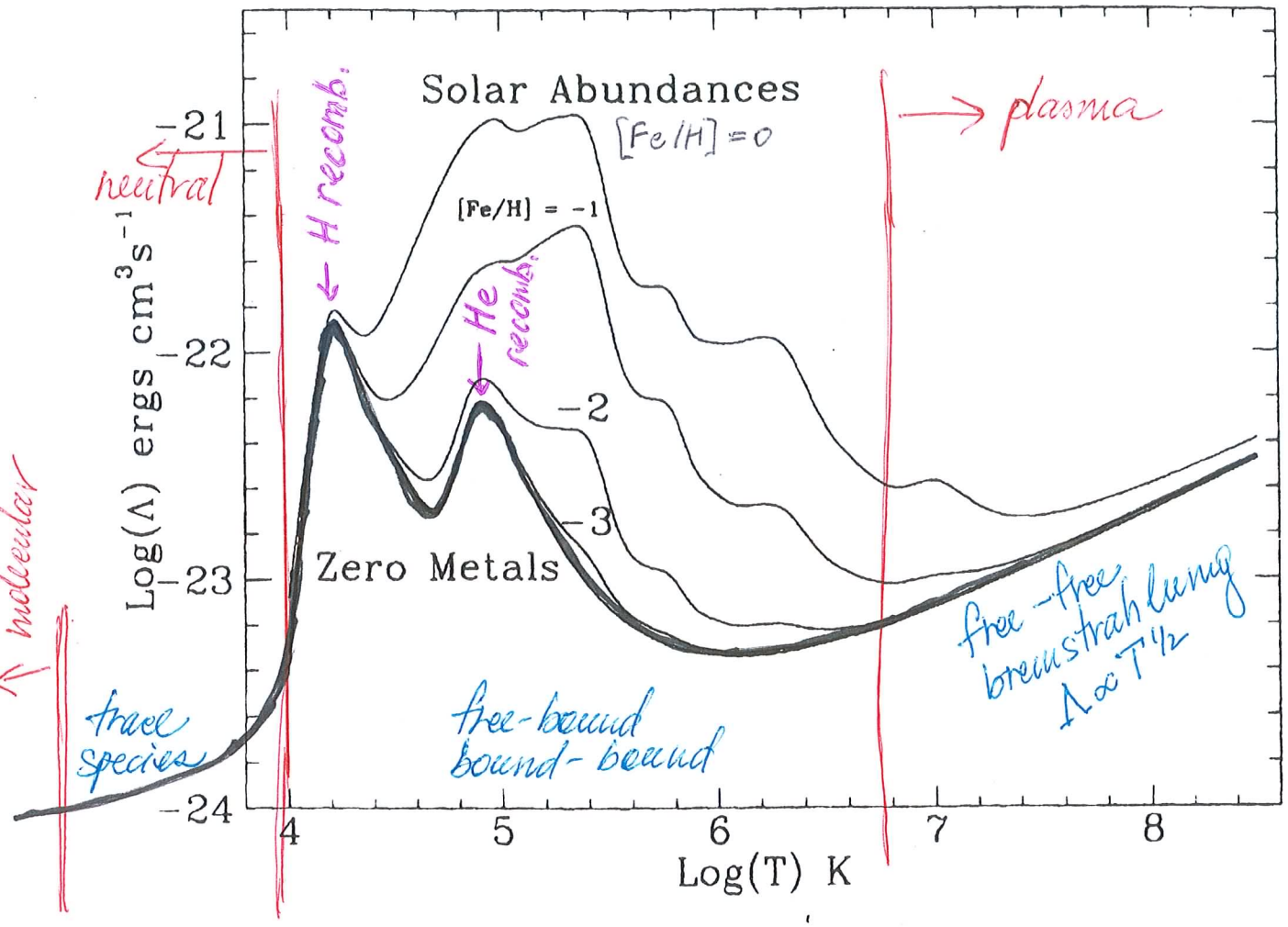

Fig. 16.2. The cooling rate per unit volume $\Lambda(T)$ of an astrophysical plasma of number density 1 nucleus cm^{-3} by radiation for different cosmic abundances of the heavy elements ranging from zero metals to the present abundance of the heavy elements as a function of temperature T (Silk and Wyse 1993, after Sutherland and Dopita 1993). In the zero metal case, the two maxima of the cooling curve are associated with the recombination of hydrogen ions and doubly ionised helium (see also Sect. 19.5 and Fig. 19.3).

Cooling function defined:

Energy loss rate per unit volume $= \frac{dE}{dt} = L = -n^2\Lambda$ (luminosity; n: particle density)

Cooling time $= \tau_{cool} = \frac{E_{total\ kinetic}}{|dE/dt|}$